Docket Nos.: 50-390
and 50-391

28 JUL 1986

Mr. Steven A. White
Manager of Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. White:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING THE ADDITIONAL DIESEL GENERATOR AT THE WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

During its review of Amendment 57 to the Watts Bar FSAR, the staff has determined the need for additional information with regard to the Emergency Diesel Generator Systems, the Additional Diesel Generator System and their associated buildings. Attached are the staff's questions regarding these systems.

Please respond to these questions in a time frame consistent with your fuel load date. If you have any questions concerning this matter, please contact the project manager, T.J. Kenyon, at FTS 492-7377.

Sincerely,

/S/

B.J. Youngblood, Director
PWR Project Directorate #4
Division of PWR Licensing-A

Enclosure: As stated

cc: See next page

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Docket File	GZech	KHooks
NRC PDR	NGrace	ACRS(10)
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MDuncan	JHolonich	TVAOG (3) S. Richardson AR 5029
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TKenyon	BHayes	BKSingh
SWeise, RII	WLong	TAlexion
OELD	LSpessard	

PWR#4/DPWR-A	PWR#4/DPWR-A	PWR#4/DPWR-A
TKenyon/rad	MDuncan	BJYoungblood
07/24/86	07/28/86	07/28/86

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PDR ADOCK 05000390
A PDR

Mr. S. A. White
Tennessee Valley Authority

Watts Bar Nuclear Plant

cc:

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010.41 (3.4.1.4) SRP 3.5.1.4 (NUREG-0800) Item III.4 states the following: "Applicants . . . shall have the option at the OL stage of showing conformance with either their original commitment [for the Tornado Missile Spectrum] or Rev. 2 (same as Rev. 1) to this SRP Section. Partial compliance with each is not acceptable." Amendment 57 to the FSAR added Table 3.5-17 "Tornado Missile Spectrum D for Additional Diesel Generator Building and Additional Category I Structures after July 1979." Even though the Tornado Missile Spectrum in Table 3.5-17 is in compliance with Tornado Missile Spectrum II of the SRP, it is not in compliance with the Tornado Missile Spectrums submitted with the original FSAR and evaluated and accepted by the staff in the Watts Bar SER (NUREG-0847 dated June 1982). Thus it is not in conformance with SRP criteria stated above. Justify your deviation from your original Tornado Missile Spectrum Criteria.

010.42 (9.2.1) Figures 9.2-6 and 9.2-11 of the FSAR show the Essential Raw Cooling Water (ERCW) arrangement to the Diesel Generator (D/G) Heat Exchangers. The arrangements shown in the two figures are not identical to each other, and the arrangements shown in Figure 9.2-6 are not identical between the diesel generators. The typical ERCW arrangement to the D/G heat exchangers seems to be that the cooling water is taken from the ERCW main header (A or B); flows through a manually operated heat exchanger inlet

valve, a motor operated control valve, a check valve and then a common header serving both D/G heat exchangers; furthermore, this heat exchanger header is connected to the other ERCW main header by the same valve arrangement. The discrepancies between the figures and within Figure 9.2-6 are as follows:

1. Figure 9.2-6 shows the cooling water take-off from the main header for D/G OC-S located upstream of the manually operated heat exchanger inlet valves, whereas Figure 9.2-11 does not show the heat exchanger inlet valves.

2. Figure 9.2-6 shows the cooling water take-offs for D/G 2A and 2B from the main header. In one case the take-off is directly from the main header like D/G 1A,1B and OC-S. In the other case the take-off is between the manually operated heat exchanger inlet valve and its associated motor-operated control valve (FCV 67-68 and FCV 67-65). This take-off arrangement is not the same as that for D/G OC-S.

3. No check valves are shown after the motor-operated control valves (FCV 67-72 and FCV 67-73) for D/G OC-S.

Explain these discrepancies in the figures. (SRP 9.2.1 Items II.4,III.2.a. and III.4).

010.43 (9.4.5) In Section 9.4.5.2.2.4 of the FSAR it is stated that the additional diesel generator building ventilation and heating systems are tested "initially and periodically thereafter." Define "periodically." (SRP 9.4.5 Item III.1)

010.44 (9.4.5) Figure 9.4-22 of FSAR Amendment 52 and Figure 9.4-22 of Amendment 57 show the muffler room exhaust fans on the roof of the Diesel Generator Building and the Additional Diesel Generator Building (ADGB), respectively. Sections 9.4.5.2.1.1 and 9.4.5.2.2.1 of the FSAR state that "the muffler room is ventilated as required to remove heat during warm weather." Tables 9.4-4 and 9.4-4A do not describe the effects of the muffler room exhaust fan failure or exhaust blockage on D/G operation. Provide this information as well as describe the tornado missile protection provided for the muffler fan exhaust structure (SRP 9.4.5, Item III.3).

010.45 (9.4.5) Table 9.4-4A of the FSAR states that a blocked fresh air intake to the 480V auxiliary board room will result in failure of the Additional Diesel Generator. Table 9.4.4 has a similar statement for the electrical board rooms in the Diesel Generator Building. Blockage of the air intakes by snow, ice, or debris from tornados and heavy winds, could result in the loss of all D/G's at Watts Bar. Discuss and justify the provisions made to prevent blockage of the air intakes, and the tornado missile protection provided for the air intake structure (SRP 9.4.5 Item II.1 and II.2).

010.46 (9.5.1) Section C.1.b(1) of Branch Technical Position (BTP) APCSB 9.5-1 states that a detailed fire hazard analysis should be done during initial plant design and that this analysis should be

revised before and during major plant modifications. Therefore, provide the fire hazard analysis for the Additional Diesel Generator Building.

010.47 (9.5.1) BTP APCSB 9.5-1, Appendix A to BTP APCSB 9.5-1, and Appendix R to 10 CFR 50 present staff guidelines for the development of a fire protection program. Accordingly, provide a comparison of the fire protection features of the Additional Diesel Generator Building with the applicable guidelines of each of these documents. Also, identify and justify any deviations from the guidelines presented in these documents.

010.48 (9.5.1) General Design Criteria (GDC) 3 of Appendix A to 10 CFR Part 50 states that fire fighting systems shall be designed to assure that their rupture or inadvertant operations do not significantly impair the safety capability of structures, systems, and components important to safety. Verify that the fire fighting systems installed in the Additional Diesel Generator Building meet this GDC.

040.129 (8.3) (9.5.2) (9.5.3) (9.5.4) (9.5.5) Except as noted in the above requests for additional information, (RAI), verify that the responses to RAI 040.34 thru 040.47, 040.74 thru 040.111, 040.125, 040.127 and 040.128 are applicable to the Additional Diesel Generator and ADGB. Identify where the RAIS are not applicable, and provide an explanation for this non applicability. (SRPs 8.3, 9.5.2, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, and 9.5.8).

(9.5.6)

(9.5.7)

(9.5.8)

040.130 (8.3) Operating experience at two nuclear power plants has shown that during periodic surveillance testing of a standby diesel generator, initiation of an emergency start signal (LOCA or LOOP) resulted in the diesel failing to start and perform its function due to depletion of the starting air supply from repeated activation of the starting relay (See IE Notice 83-17). This event occurred as the result of inadequate procedures and from failure to provide a built-in time delay relay in the engine starting and control circuit logic to assure the engine comes to a complete stop before attempting a restart (i.e., during the period that the relay was open, fuel injection to the engine was blocked while the starting air was uninhibited). This condition, with repeated start attempts, depleted starting air and rendered the diesel generator unavailable until the air system could be repressurized.

Review procedures and control system logic to assure this event will not occur at your plant. Provide a detail discussion of

how your system design, supplemented by procedures, precludes the occurrence of this event. Should the diesel generator starting and control circuit logic and procedures require changes, provide a description of the proposed modifications. (Refer to Request 040.135 for control air requirements) (SRP 8.3.1 Part II & III).

040.131 (9.5.4) The response to RAI 040.81 and 040.87 with regards to tornado missile protection of the fuel oil storage tank fill lines and the procedures used to refill the tanks following damage of these fill lines from tornado missiles and seismic events is unacceptable for the Additional Diesel Generator. The design layout of the ADGB is not the same as the Diesel Generator Building, thus the procedures found acceptable for refilling the D/G fuel oil storage tanks in the D/G building are not applicable to the ADGB. It is also the staff's position that the fuel oil fill line for additional D/G fuel oil storage tanks should be designed to seismic Category I and be tornado missile protected or justification should be provided for not doing so. Discuss your plans for complying with this position.

040.132 (9.5.4) Section 9.5.4.2 of the FSAR states in part:

"Level switches are provided on the storage tank assemblies to provide the following functions: . . .

4. Provide an interlock with the 200 gpm transfer pumps at the yard storage tanks and in the diesel building fuel oil transfer room, to shut off the pumps automatically on high level. This interlock feature is not employed when using

the additional diesel generator building (ADBG) fuel oil transfer pump or in transferring fuel oil to the ADGB fuel oil tanks."

Describe why the pump interlock feature is not employed when using the ADGB fuel oil transfer pump or in transferring fuel to the ADGB fuel oil tanks. (SRP 9.5.4 Item II.4.c)

040.133 (9.5.5) Operating experience indicates that diesel engines have failed to start on demand due to water spraying on locally mounted electronic/electrical components in the diesel engine starting system. Describe the measures that have been incorporated in the diesel engine electrical starting system to protect such electronic/electrical components from such potential environment. (SRP 9.5.5, Parts II and III)

040.134 (9.5.6) The diesel generator in many cases utilize air pressure or air flow devices to control diesel generator operation and/or emergency trip functions such as air operated overspeed trips. The air for these controls is normally supplied from the emergency diesel generator air starting system. Provide the following:

a) Expand your FSAR to discuss any diesel engine control functions supplied by the air starting system or any air system. The discussion should include the mode of operation for the control function (air pressure and/or flow), a failure modes and effects analysis, and the necessary P&IDs to evaluate the system.

b) Since air systems are not completely air tight, there is a potential for slight leakage from the system. The air

starting system uses a non-seismic air compressor to maintain air pressure in the seismic Category I air receivers during the standby condition. In case of an accident, a seismic event, and/or loop, the air in the air receivers is used to start the diesel engine. After the engine is started, the air starting system becomes non-essential to diesel generator operation unless the air system supplies air to the engine controls. In this case the controls must rely on the air stored in the air receiver since the air compressor may not be available to maintain system pressure and/or flow. If the air starting system is used to control engine operation, when the compressor is unavailable, show that a sufficient quantity of air will remain in the air receivers, following a diesel engine start, to control engine operations for a minimum of seven days assuming a reasonable leakage rate. If the air starting system is not used for engine control describe the air control system provided and provide assurance that it can perform for a period of seven days or longer. (SRP 9.5.6, Part III)

040.135 (9.5.7) Provide the information requested below related to replenishment of lube oil without interrupting operation of the diesel generator.

a) What are the provisions made in the design of the lube oil system to add lube oil to the sump? Your response should include procedures or instructions available to the operator on the proper addition of lube oil to the diesel generator.

b) Are operating procedures or instructions posted or locally available in the diesel generator rooms?

c) Verify that personnel responsible for the operation and maintenance of the diesel are trained in the use of these procedures.

d) Verify that the color coded, or otherwise marked, lines associated with the diesel-generator are correctly identified and that the line or point for adding lube oil (when the engine is on standby or in operation) has been clearly identified.

(SRP 9.5.7. Parts II & III)

040.136 The responses to RAI 040.108 and 040.111 need to be revised.

a) A review of Figures 3.8.4-79, 8.3-1, 8.3-1A and 9.4-22 of Amendments 52 and 57 indicates that the D/G exhaust stacks and the muffler room exhaust fan discharge vents are in close proximity to the 480V Auxiliary Board Room fresh air intake for the Additional Diesel Generator and the Electrical Board Room air intake vents for the emergency diesel generators. Under the right meteorological conditions, the products of combustion from a fire in the Air Intake/Muffler Room or the D/G exhaust gases could be introduced into the

480V Auxiliary Board Room and/or the Electrical Board Rooms. This could result in the failure of more than one diesel generator, due to the particles of combustion and combustion gases affecting the electrical components in these rooms. Revise your responses to RAI 040.108 and 040.111 to address this concern. (SR 9.5.8, Items II and III.3)

b) Section 8.3.1.1 of the FSAR describes the connectors used to connect the additional diesel generator to the disabled D/G unit train control and annunciation cables. Revise RAI 040. 111 to describe the dust and dirt protection provided for these connectors and their receptacles.

040.137 Figures 8.3.-1 and 8.3-1A of the FSAR show that the diesel generator exhaust muffler and associated piping are in the same room as the D/G combustion air intake. By temperature alone the D/G exhaust system can be considered a high energy system. The failure of this system by any means i.e. corrosion, degradation of gasket material, vibration induced looseness of flange fastners, etc. could result in the failure of one or more D/G at Watts Bar. Describe inspections, surveillance requirements, and testing that will be performed on the D/G exhaust system to preclude this event.

(SRP 9.5.8 Items II.2, II.4 and III.8)

040.138 (9.5.8) The D/G combustion air intake and exhaust system is designed such that the total air intake and exhaust system pressure

losses shall not exceed the maximum pressure losses specified by the diesel generator manufacturer. Recent events have shown that not all aspects in the design of the D/G combustion air intake and exhaust system have been taken into account resulting in the pressure losses through the system exceeding manufacturer's limitations. Verify that the pressure losses through your systems do not exceed manufacturer's recommendations taking into consideration pipe losses, and pressure drops associated with the filters, silencers, and intake and exhaust structure openings (SRP 9.5.8, Part III)