

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

September 11, 1979

Director of Nuclear Reactor Regulation  
Attention: Mr. L. S. Rubenstein, Acting Chief  
Light Water Reactors Branch No. 4  
Division of Project Management  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

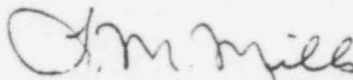
Dear Mr. Rubenstein:

In the Matter of the Application of ) Docket Nos. 50-327  
Tennessee Valley Authority ) 50-328

In accordance with our commitment to Regulatory Guide 1.68.2 and Regulatory Positions C.2.a and C.2.b of Regulatory Guide 1.108, as documented in response to question 17.78 in the Sequoyah Nuclear Plant (SNP) Final Safety Analysis Report (FSAR), enclosed are revisions to FSAR Tables 14.1-1 and 14.1-2. These revisions to the diesel generator preoperational and startup tests will be incorporated into the SNP FSAR by Amendment 62. The requirements of Regulatory Guide 1.108 not covered in the preoperational and startup test programs are met by the surveillance requirements of technical specification 4.8.1.1.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



L. M. Mills, Manager  
Nuclear Regulation and Safety

Enclosure

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## REVISION 40 PREOPERATIONAL AND STARTUP TEST LISTS

TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-13A	Onsite AC Distribution System	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation of all components and equipment associated with this system and required installation inspections have been completed. All construction checks and functional tests of circuit breakers, relays, and control circuits have been completed. All systems required to support operation and testing of this system have either been preoperationally tested or cleared under an IOR. Electrical power supplies have been energized and the necessary associated equipment is available for service. The diesel generator sets and supporting auxiliaries are operational.	<p>This test verifies that the interlocks and mode selector switch allow or prevent, as required, the operation of the normal feeder, alternate feeder, and diesel generator breakers on the 6.9-kV shut-down board under manual or automatic conditions. It also demonstrates that the separation of control features between the normal and auxiliary controls will function in accordance with design criteria, and that the board protective devices operate properly.</p> <p>Acceptance criteria will be that the breakers perform under manual and automatic conditions as described in FSAR Subsection 8.3.1.1.</p>

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives</u> <u>Summary of Test</u> and <u>Acceptance Criteria</u>
TVA-13B1	TVA Onsite AC Distribution System	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation and required installation inspection activities of all equipment associated with this system have been completed in accordance with test and design specifications. All components and equipment required for system operation and/or testing have been preoperationally tested or cleared under an IOR.	<p>This test shall verify that the diesel generator loading logic relays will start the diesel generator, connect the diesel generator to the shutdown board bus, and disconnect and connect the required loads in sequence for the condition of loss of preferred power. This test shall also verify, by the absence of voltage to the power trains not under test, that each power train is independent of the other.</p> <p>Acceptance criteria shall be met if the required loads are tripped and are sequentially applied to the board in the correctly timed sequence per FSAR section 8.3.1.1.</p> <p>Power train independence will be deemed acceptable if voltage on power trains not under test remain de-energized throughout testing of the train under test.</p>

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-13B2	Onsite AC Distribution System	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation and required installation inspection activities have been completed in accordance with design and test specifications. All components and equipment required to support operation and/or testing have been preoperationally tested or cleared under an IOR. Control power from the Vital Battery System must be available for the operation of control, protective, and instrumentation circuits. The diesel generator sets and supporting auxiliaries shall be operational.	<p>This test shall confirm that the diesel loading logic relays will start the diesel generator, connect the diesel generator to the shutdown board bus, and disconnect and connect the required loads for the condition of loss of preferred power followed by or concurrent with an accident. Also, system response time to a safety injection, and a safety injection concurrent with a blackout condition, will be verified.</p> <p>Acceptable system performance will be demonstrated when the requirements given in FSAR section 8.3.1.1 have been satisfied.</p>

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-13C	Onsite AC Distribution System (Diesel Generator Qualification Test)	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation and required inspection activities have been completed in accordance with design and testing specifications. The Diesel Generator Fuel Oil, Starting Air, Heating and Ventilating, and 125V Battery Systems have been preoperationally tested. The diesel generator sets and supporting auxiliaries shall be operational.	Qualification testing of the diesel generators will be conducted in three major parts. These tests shall demonstrate: <ol style="list-style-type: none"> <li>1) The diesel generators' capability to start, accelerate to rated speed and voltage, automatically tie to the shutdown board, and be loaded to at least 50 percent of nameplate rating 23 consecutive times without a failure,</li> <li>2) The diesel generators' capability of carrying the continuous rating of 5,500 kVA for a time required to reach a equilibrium temperature plus 1 hour,</li> <li>3) The diesel generators' capability of carrying the short time rating of 5,000 kVA for a period of 2 hours without exceeding manufacturer's design limits,</li> <li>4) The diesel generators' capability to start and carry loads that are greater than the most severe load step change within the plant design loading sequence without experiencing instability resulting in generator voltage collapse or instability of the engine speed to recover. A load of at least 1,000 horsepower shall be used.</li> </ol>

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5. The diesel generator will not trip by overspeed following load rejection of a load equal to the continuous rating (5000 kw) also that the diesel generator voltage and frequency will recover following load rejection.

Acceptance criteria will be met upon demonstration that the diesel generator set can start and accept 50 percent load, carry the continuous load of 5500 kVA, and the 2 hour load of 5000 kVA for the designated period of time without exceeding the manufacturer's design limits as specified in FSAR section 8.3.1.1.

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-13D	Onsite AC Distribution System (Blackout with Diesel Generator In Test Mode)	The tentative transfer of all affected equipment from CONST to P PROD has been completed. Installation and required installation inspection activities have been completed in accordance with design and testing specifications. The Diesel Generator Fuel Oil, Starting Air, Heating and Ventilation, and 125V Battery Systems have been preoperationally tested. The diesel generator sets and supporting auxiliaries shall be operational.	<p>This test will verify the capability of the diesel generator to supply emergency power within the required time while operating in the test mode. The test will demonstrate:</p> <ol style="list-style-type: none"> <li>1) That the diesel generator overcurrent relays will trip the diesel generator 6.9 kV ACB only when the diesel generator is in the test mode (i.e., parallel with offsite power);</li> <li>2) That if the diesel generator receives an emergency start signal while in the test mode, the manual control lockout will not trip until the diesel generator is isolated from offsite power;</li> <li>3) That when the diesel generator is in the test mode and a blackout occurs, the blackout signal will automatically override the diesel generator manual controls and establish the appropriate electrical alignment.</li> </ol> <p>Acceptance criteria will be met if the above objectives are satisfactorily completed.</p>

TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-14A	Diesel Generators and Supporting Auxiliaries (Diesel Generator Fuel Oil System)	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation of all equipment associated with this system has been completed in accordance with design specifications. Required installation inspections, integrity testing activities, and cleaning and flushing activities have been completed on fuel storage tanks, and fuel oil piping. All pumps, valves, and electrical supplies have been functionally tested. Instrumentation and alarms have been checked, tested, and calibrated. The diesel generator building CO <sub>2</sub> Fire Protection System must be operable before performing tests on the Fuel Oil System. Electrical power supplies have been energized and the associated equipment is available for service. The required amount of No. 2 diesel fuel has been installed in the proper tanks.	This test will verify the system's ability to transfer fuel oil from the railcar unloading station to fill the yard storage tanks and transfer fuel oil in all the different operational modes. This test will also verify the systems associated interlocks, controls, and annunciators.  Acceptance criteria for the Diesel Generator Fuel Oil System shall be met upon demonstration that the requirements given in FSAR section 9.5.4.2 have been satisfied.

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-14B	Diesel Generators and Supporting Auxiliaries (Diesel Generator Starting Air System)	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installa- tion of all equipment associated with this system has been completed. Required installation inspections, integrity testing activities, and cleaning and flushing activities have been completed. Electrical power supplies have been energized and associated equipment is available for service.	<p>This test will demonstrate the ability of the air start system controls to maintain the air pressure in the air receiver tanks between 250 psig to 300 psig and provide 200 psig air to the air start motors through pressure reducing valves. This test will also demonstrate the proper operation of the air start system interlocks and alarms. The ability of the air receivers to provide a sufficient quality of air to allow five diesel starts will be verified as well as the ability to recharge the receivers to 300 psig within 30 minutes.</p> <p>Acceptance criteria will be met upon demonstration that the air start system performs in accordance with the requirements of section 9.5.6 of the FSAR.</p>

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-14C	Diesel Generators and Supporting Auxiliaries (Diesel Generator Building Heating and Ventilation System)	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation of all equipment associated with this system has been completed in accordance with design specifications. Required installation inspections, integrity testing activities, and cleaning and flushing activities have been completed. Instrumentation and alarms have been checked, tested, and calibrated. Electrical power supplies have been energized and the associated equipment is available for service.	<p>This test will verify that the Diesel Generator Building Heating and Ventilation System maintains an acceptable environment for the protection of the diesel generator equipment. Verification of the proper operation of the control circuits for the air intake dampers and various exhaust fans shall be demonstrated.</p> <p>Acceptance criteria for the DGH&amp;V system will be demonstrated when the design requirements given in FSAR section 9.4.5 have been satisfied</p>

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-14D	Diesel Generators and Supporting Auxiliaries (125-V Control and Field Flashing Batteries)	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installa- tion and required installa- tion inspections of all equipment associated with this system have been completed in accordance with design and testing specifications. All instrumentation and annunciators have been installed, tested, and calibrated.	<p>This test is divided into three sections or phases which are performed on each diesel generator set. Phase 1 will be an acceptance test to determine that the battery meets manufacturer's guaranteed rating. Phase 2 will be a service test to determine if the battery is sized properly to supply the actual system loads. Phase 3 will demonstrat that the charger will recharge the battery to its nominally full charged state from the 30-minute minimum design discharge while supplying normal loads, within a 12-hour period.</p> <p>Acceptance criteria will be satisfied if the batteries meet the above objectives.</p>

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TABLE 14.1-1 (Continued)

LIST OF PREOPERATIONAL TESTS

<u>Test No.</u>	<u>Title of Test</u>	<u>Test Prerequisites</u>	<u>Test Objectives Summary of Testing and Acceptance Criteria</u>
TVA-14E	Diesel Generators and Supporting Auxiliaries (Diesel Generator Functional Tests)	The tentative transfer of all the affected equipment from CONST to P PROD has been completed. Installation of all equipment associated with this system has been completed in accordance with design specifications. Required installation inspections, integrity testing activities, and cleaning and flushing activities have been completed. Instrumentation and alarms have been checked, tested, and calibrated. The diesel generator building CO <sub>2</sub> Fire Protection System, Essential Raw Cooling Water System, and AC Distribution System have been preoperationally tested and are available. Preoperational tests 14A-D have been performed.	This test will demonstrate the proper operation of the controls, interlocks, and alarms associated with the diesel generators and the supporting auxiliaries. Also the capability of the diesels to start and run for 24 hours, while loaded to 4,000-kW, without exceeding design specifications will be demonstrated. This test will be deemed acceptable if the diesel performance is in accordance with the manufacturer's testing that was performed on the diesels prior to shipment to TVA.

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TABLE 14.1-2 (continued)

LIST OF STARTUP TESTS

Title of Test	Test Prerequisites	Test Objectives Summary of Testing and Acceptance Criteria
SU-10.1 NSSS Acceptance Test	The plant is at 100-percent power. All preoperational tests have been completed. All startup physics testing is complete.	The NSSS is operated for 300 continuous hours at rated thermal output to verify that the plant is acceptable. Operation of plant systems and components are verified and monitored during this time period.
SU-10.2 Steam Generator Moisture Carryover Measurement	The Power level is at 100% of full power.	The test objective is to determine the moisture carryover performance of the steam generators. This measurement is obtained by using a radioactive tracer method using Sodium-24 as the source. The acceptance criteria is that the moisture carryover measured be less than or equal to the warranted value of 0.25% by weight.

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