

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401  
400 Chestnut Street Tower II

April 16, 1985

Director of Nuclear Reactor Regulation  
Attention: Ms. E. Adensam, Chief  
Licensing Branch No. 4  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of ) Docket Nos. 50-390  
Tennessee Valley Authority ) 50-391

Enclosure 1 contains relevant Watts Bar Nuclear Plant unit 1 technical specification changes concerning the diesel generator (DG) fuel oil sampling system. These changes reflect the decisions made in a TVA/NRC meeting held on April 10, 1985. Enclosure 2 contains proposed final safety analysis report (FSAR) revisions. These revisions will be incorporated into a future FSAR amendment.

If you have any questions concerning this matter, please get in touch with K. Mali at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

*R. H. Shell*

R. H. Shell  
Nuclear Engineer

Sworn to and subscribed before me  
this 16<sup>th</sup> day of Apr. 1985.

*Bryant M. Lowery*  
Notary Public

My Commission Expires 4/8/86

Enclosures (2)

cc: U.S. Nuclear Regulatory Commission (Enclosures)  
Region II  
Attn: Dr. J. Nelson Grace, Regional Administrator  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

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*Boo!*

ENCLOSURE 1  
TECHNICAL SPECIFICATION CHANGES

D. G. Fuel Oil Sampling - Technical Specification 4.8.1.1.2

As discussed with NRC staff in the 4/10/85 meeting in Bethesda, TVA will modify the manway covers to the 4 interconnected tanks which constitute each 7 day fuel oil storage tank. This will allow for water checking and obtaining samples from each interconnected tank for particulate analysis. Although TVA still believes a 6 month interval for checking each individual tank is adequate to address the NRC staff concerns, in order to resolve this issue we have agreed to sample each tank on a 31 day basis. As discussed in the meeting, the NRC staff has agreed to a 6 month waver on sampling each of the interconnected tanks to allow us adequate time to modify the manway covers and procure portable sampling pumps. Attached are marked up copies of the technical specifications which reflect the agreed upon resolution of this item.

# FINAL DRAFT

## SURVEILLANCE REQUIREMENTS (Continued)

- 2) Verifying the fuel level in the 7-day fuel storage tank,
- 3) Verifying the fuel transfer pump starts and transfers fuel from the 7-day fuel storage tank to the engine-mounted tank,
- 4) Verifying the diesel starts from ambient condition and accelerates to  $900 \pm 18$  rpm in less than or equal to 10 seconds.\* The generator voltage and frequency shall be  $6900 \pm 690$  volts and  $60 \pm 1.2$  Hz within 10 seconds\* after the start signal. The diesel generator shall be started for this test by using one of the following signals:
  - a) Manual, or
  - b) Simulated loss-of-offsite power by itself, or
  - c) Simulated loss-of-offsite power in conjunction with an ESF actuation test signal, or
  - d) An ESF actuation test signal by itself.
- 5) Verifying the generator is synchronized, loaded to greater than or equal to 4400 kW in less than or equal to 60 seconds,\* and operates with a load greater than or equal to 4400 kW for at least 60 minutes, and
- 6) Verifying the diesel generator is aligned to provide standby power to the associated shutdown boards.
  - b. At least once per 31 days and after each operation of the diesel generator set where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the engine-mounted fuel tanks;
  - c. At least once per 31 days by checking for and removing accumulated water from the 7-day fuel oil storage tanks;\*\*  
*each of the 4 interconnected tanks which constitute*
  - d. By sampling new fuel oil in accordance with ASTM-D4057 prior to addition to storage tanks and:
    - 1) By verifying in accordance with the tests specified in ASTM-D975-81 prior to addition to the storage tanks that the sample has:
      - a) An API Gravity of within 0.3 degrees at 60°F, or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;

\*These diesel generator set starts from ambient conditions shall be performed only once per 184 days in these surveillance tests and all other engine starts for the purpose of this surveillance testing shall be preceded by an engine prelube period and/or other warmup procedures recommended by the manufacturer so that the mechanical stress and wear on the diesel engine is minimized.

WATTS BAR - UNIT 1

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\*\*During the first 6 month interval only one of the four interconnected tanks is required to be sampled every 31 days for each 7 day fuel oil storage tank.

ENCLOSURE 2  
FSAR REVISIONS

The Diesel Generator Fuel Oil System consists of four embedded storage tank assemblies, one for each diesel generator unit, with their associated day tanks, pumps, valves, and piping. The tanks themselves are embedded in the Diesel Generator Building substructure and have a capacity of 68,000 gallons of fuel for each diesel generator unit.

*each assembly consists of four interconnected tanks*

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Level switches are provided on the diesel generator building storage tank assemblies to provide the following functions:

1. Provide local fuel level indication.
2. Annunciate an alarm in the Main Control Room when the fuel level drops below a seven-day supply.
3. Annunciate an alarm in the Main Control Room on high level above the pump shut-off setting.
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.

A truck fill connection, condensate sump suction connection, and inspection-dipstick gauge manholes are provided for each embedded storage tank assembly. The vents to the atmosphere on all tank assemblies are provided with double fire screens to prevent an outside spark from entering the assemblies and igniting the gases within. All tank connections and vents are above maximum flood elevation. That portion of the seven-day fuel oil tank vent above the roof level is encased in reinforced concrete for missile protection.

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Two skid-mounted, electric motor driven, 15 gpm fuel oil transfer pumps are provided for each generating unit to transfer fuel from the embedded storage tank assemblies to the two skid-mounted day tanks per generating unit. Each of these pumps is capable of supplying fuel to both day tanks.

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Two sets of level switches are provided for each day tank and associated transfer pumps. The level switches are arranged so that one pump will be the primary pump and the other a supplementary pump. The supplementary pump is provided so that in the event of a failure of the primary pump, the supplementary pump will start. In addition, these level switches provide both local and backup remote alarms to indicate high and low fuel oil level in the day tanks.

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From each day tank, fuel is supplied to the diesel injectors by a diesel engine driven pump. An electric motor-driven fuel pump is provided as a backup for the engine driven fuel pump. Separate suction and discharge lines serve each pump. Each line has a

suction strainer and dual element fuel filters are provided at each pump discharge. Additional filters at the inlet and outlet of each fuel injector protect the working parts of the injector. Pressure gages are provided on both sides of the dual element filters to provide a means of determining the pressure drop across the filters. Pressure switches are also provided between the pumps and the dual element filters, and between the final filters and the fuel injectors which give local and main control room alarms upon abnormally high pressure at the former location and abnormally low pressure at the latter location. Maintenance procedures call for periodic changing of filters and surveillance test runs to verify the cleanliness of these filters.

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Screens are provided in the suction lines of the transfer pumps which move the fuel to the storage tanks. The seven-day supply tanks are sloped to collect water and sediment at the low end and can be 'dip leg' pumped as necessary. The fuel storage and transfer system is protected against the entry of rain water, and the day tanks and seven-day supply tanks will not be harmed by flood waters; the fuel therein contained will remain dry, and will keep the diesels running until the flood subsides enough to permit shipment of fuel to the site.

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Each shipment of No. 2 diesel fuel is sampled prior to pumping to the 71,000-gallon yard tanks *in accordance with the technical specifications.* ~~for sediment, water content, and flash point (125 degrees Fahrenheit or above in accordance with ASTM D 93-62 using an apparatus similar to that described in ASTM E 124-64).~~ Additional samples are taken to ensure that the fuel oil meets contractual requirements set forth in Federal Specification VV-F-800B. A shipment of fuel can be held in the year storage tanks until its compliance is verified, and it can be discarded if necessary.

Tanks are inspected and sampled ~~as follows:~~ *in accordance with the technical specifications.*

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- ~~1. Sample the main 71,000-gallon storage tanks and the 7-day embedded supply tanks at least quarterly and analyze for water and sediment, viscosity, and microbiological contamination.~~
- ~~2. Sample the 7-day embedded supply tanks one day after the addition of new fuel and inspect for condensate accumulation.~~
- ~~3. Sample and inspect all diesel engine integral day tanks at least quarterly for microbiological contamination and monthly for condensate accumulation.~~
- ~~4. Following operation for more than one hour of a diesel generator or whenever fuel is transferred to an integral day tank, inspect its two integral day tanks for condensate accumulation.~~

The methods for maintaining acceptable levels of fuel quantity for the standby diesel generators at Watts Bar Nuclear Plant meet the intent of guidelines set forth by NRC Regulatory Guide 1.137 and ANSI N195-1976 while utilizing Federal Specification VV-F-800B as the standard for fuel procurement.

A 200 gpm transfer pump located in the fuel oil transfer pump room of the Diesel Generator Building provides the following functions:

1. Transfer fuel oil from any embedded diesel fuel oil storage tank assembly to any other.
2. Transfer fuel oil from any embedded diesel fuel oil storage tank assembly to either of two 71,000 gallon yard fuel oil storage tanks.
3. Reject fuel oil from the embedded diesel oil storage tank assemblies through a reject connection in the yard.

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A 200 gpm transfer pump located adjacent to the yard fuel oil storage tanks provides the following functions:

1. Transfer fuel oil from a tank truck to either of two yard fuel oil storage tanks.
2. Transfer fuel oil from either yard fuel oil storage tank to the other.
3. Transfer fuel oil from either yard fuel oil tank to any one of the four diesel generator building embedded fuel oil storage tank assemblies.
4. Reject fuel oil from either yard fuel oil tank through a reject connection in the yard.

#### 9.5.4.3 Safety Evaluation

With 60,000 gallons of diesel fuel in each fuel tank assembly, and each assembly embedded in the concrete substructure of a Seismic Category I building and separated by 18 inches of concrete, the diesel generator units will be assured of having at least 7 days fuel supply for any of the conditions discussed in Section 9.5.4.1. The diesel generator fuel oil tank assemblies, piping, and pumps are so arranged that malfunction or failure of either an active or passive component associated with the source of supply for any one diesel generator unit will not impair the ability of the other sources to supply fuel oil to the other units.

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Each diesel generator is aligned so as to be able to supply power to its own auxiliaries so that a single failure will not result

4. Recirculation of the fuel oil between the two interior tanks of the four tank assembly that serves as the 7-day tank for the diesel generator.

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The engine-mounted, motor and engine-driven fuel oil transfer pumps and day tanks were functionally tested in the vendor's shop in accordance with the manufacturer's standards to verify the performance of the diesel generator units and accessories. The fuel oil transfer pumps in the yard and Diesel Generator Building were tested in the manufacturer's factory to verify their performance. The embedded fuel oil storage tanks were tested with compressed air to 20 psig prior to shipment to the plant site.

The entire Diesel Fuel Oil System was flushed with oil and then functionally tested at the plant site in accordance with TVA Preoperational Test TVA-14A. The Diesel Fuel Oil System will be periodically tested to satisfy the Technical Specification 3/4.8, surveillance requirement 4.8.1.1.2. ~~This requires that at least once per 31 days on a staggered test basis, the diesel generators shall be demonstrated to be operable.~~ Portions of these surveillance requirements include the following:

1. Verify the proper fuel oil levels in the engine-mounted day tanks.
2. Verify the proper fuel oil level in the diesel generator fuel oil storage tank assemblies.
3. Verify ~~that a sample of diesel fuel from~~ <sup>the</sup> ~~the fuel oil storage tank assembly is within the acceptable limits specified in Table 1 of ASTM D975-68 when checked for viscosity, water, and sediment,~~ <sup>in</sup> ~~sampled~~ *in accordance with the technical specifications.*
4. Verify that the fuel oil transfer pump can be started and that it can transfer fuel from the storage system to the engine-mounted day tanks.

In addition, all engine-mounted fuel oil system components are inspected at periodic intervals as specified in the scheduled maintenance program for the Watts Bar diesel generator units.

#### 9.5.5 Diesel Generator Cooling Water System

A closed-loop circulating water cooling system is furnished for each engine of the four tandem diesel generator units housed within the Diesel Generator Building. The Building is designed to Seismic Category I requirements, and is designed to withstand the effects of tornadoes, credible missiles, hurricanes, floods, rain, snow, or ice as defined in Chapter 3 (Sections 3.3, 3.4, and 3.5). Each cooling system includes a pump, heat exchanger expansion tank, and all accessories required for a cooling loop. (See Figure 9.5-23). To preclude long term corrosion or organic fouling the engine cooling water system requires de-ionized water with a corrosion inhibitor. The water