



Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379-2000

February 14, 1997

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

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

SEQUOYAH NUCLEAR PLANT (SQN) - REQUEST FOR DISCRETIONARY
ENFORCEMENT FOR FOR UNITS 1 AND 2 TECHNICAL SPECIFICATION (TS)
3.8.1.1, ACTION B FOR DIESEL GENERATOR (D/G) 2A-A

This letter serves to document TVA's request for discretionary enforcement for
Units 1 and 2 TS 3.8.1.1 for D/G 2A-A.

During planned testing on the 2A-A D/G, the D/G 'C' phase winding was
determined to have an inadequate polarization index level. During subsequent
troubleshooting, the generator pigtail insulation was identified as the source of the
dielectric breakdown. Replacement and testing of the generator pigtails has been
completed. At the end of the post maintenance testing for the generator pigtail
repairs, a degraded performance of the 2A2 engine governor was noted.

The remaining time required to replace the governor actuator and perform the
subsequent testing to ensure D/G operability is expected to exceed the allowed
outage time governed by TS Action 3.8.1.1.b by approximately 12 hours.

In order to allow adequate time to complete the testing of the 2A-A D/G,
discretionary enforcement is being requested for 48 hours (~ 36 hour margin),
which is in addition to the 72-hours allowed outage time provided by TS Action
3.8.1.1.b. Without this additional time, both units will be shut down as required
by TSs at approximately 1725 hours Eastern Standard Time on February 14,
1997. Note that an allowed outage time of 7 days has been justified for a planned
D/G maintenance outage once per 18-months per D/G in TS Change Request 96-
08 (submitted to NRC August 22, 1996).

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Please direct questions concerning this issue to me at (423) 843-7170.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. H. Shell".

R. H. Shell
Site Licensing and Industry Affairs Manager

Enclosure
cc: See page 3

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cc (Enclosure):

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ENCLOSURE

Request for Discretionary Enforcement for D/G 2A-A

Background

In February of 1996, during planned surveillance testing, the polarization index and megger readings were found to be low on the "C" phase of the 2A-A D/G and cleaning of the cables was required to achieve an acceptable reading. Corrective actions were established to perform additional megger checks and polarization index measurements. The results of previous readings were evaluated to determine adverse trends associated with the D/G 2A-A stator and further corrective actions.

On February 11 and 12, 1997, while performing the additional tests, low megger readings and unacceptable polarization index readings were identified on the "C" Phase D/G stator winding. Cleaning of cables and connections could not return the readings to an acceptable value. The generator pigtail insulation was identified as the source of the dielectric breakdown. Replacement and testing of the generator pigtails was completed with ~24 hours left in the allowed outage time. At the end of the post maintenance testing for the generator pigtail repairs, a degraded performance of the 2A2 engine governor actuator was noted. As a conservative measure, TVA is replacing the degraded actuator and the actuator on the other tandem engine.

The root cause of the 2A2 actuator degradation is being investigated. A preliminary investigation has not identified additional failures of this actuator at Sequoyah. A failure analysis of this actuator will be conducted as a part of our investigation.

The remaining time required to replace the engine actuators and complete required testing is expected to exceed the allowed outage time (AOT) governed by Technical Specification (TS) 3.8.1.1, Action "b" by approximately 12 hours. This will require a total D/G allowed outage time of 84 hours.

TS Compliance

TS 3.8.1.1, Action "b", allows a D/G to be inoperable for up to 72 hours before proceeding to a shutdown condition. The 72-hour period will expire at 1725 hours Eastern Standard Time on February 14, 1997. Installation, testing and return to operation activities for the 2A-A D/G are estimated to be completed by 0500 hours on February 15, 1997.

Safety Consequences

The electrical system design is described in Section 8.0, "Electrical Power," in the SQN Final Safety Analysis Report (FSAR). SQN is connected to a strong offsite transmission network. In the vicinity of SQN, the lines are on right of ways which are sufficiently wide enough to preclude the likelihood of a failure of one line causing failure of the other line. Electric power to SQN is supplied by two physically and electrically independent circuits from the SQN 161-kV switchyard through three

separate transformers to the onsite electrical distribution system. The 161-kV switchyard is designed with two main bus sections and is arranged so that the supply to the onsite power system, as well as the connections to the generator and the 500-161-kV transformer bank, is maintained to one bus section for a failure of the other section. Four 161-kV lines terminate on one bus, and four other 161-kV lines terminate on the other bus. Two fuseless 84 MVAR 161-kV capacitor banks are tied to the 161-kV switchyard through double bus-tie breakers. Each bank is independently switched. These capacitors provide reactive voltage support for the 161-kV offsite system.

Several improvements to the plant/grid interfaces at SQN have been made since the 72-hour AOT was established. They include:

1. Replacing the common station service transformers (CSSTs) with ones having automatic high-speed onload voltage tap changers in order to maintain optimal voltages to the safety-related system while connected to the preferred power supply (PPS) and during all modes of plant startup, shutdown, and operation. With the installation of these new transformers, the in-plant auxiliary power system can accommodate a transmission system bandwidth of ± 5 percent of nominal versus a 1-2 percent bandwidth before.
2. SQN has implemented a design change which provides for the in-plant alternating current auxiliary power system to be normally fed from the PPS during all modes of plant operation, startup, and shutdown. This increases reliability by reducing plant transfers during a plant shutdown and provides better voltage regulation to the safety-related boards during all modes of plant operation.
3. SQN installed two 84 MVAR capacitor banks outside the 161-kV switchyard to provide reactive power support to the plant during a Unit 2 trip and shutdown.
4. Transmission Power Systems performs comprehensive Transmission system Studies for all TVA nuclear plants on a three-year cycle. These studies include load flow analyses and transient stability studies and are performed in accordance with the guidelines in IEEE 765-1995 for transmission system studies. This verification ensures that SQN can withstand a design-basis accident with a preexisting problem in one of the two qualified offsite power lines.

Preferred power to SQN is supplied by either of the 161-kV buses to three CSSTs. The CSSTs supply power to the four start buses (SBs), and the four SBs supply power to the eight unit boards. There are four unit boards per unit and the unit boards supply power to the four shutdown boards, there are two shutdown boards per unit. Each of the shutdown boards supply a single train of safe shutdown equipment along with some common equipment. The shutdown boards can also be supplied emergency power by seismic, environmentally qualified D/Gs that supply backup power to the vital 6.9-kV, and 480-kV busses in the event of a loss of normal and alternate offsite power.

During power operation, the D/Gs help to ensure that sufficient power will be available to the safety-related equipment, which is needed for the safe shutdown of the plant and for mitigation and control during accident conditions. During shutdown and refueling condition, the D/Gs help to ensure that the facility is able to maintain shutdown or refueling conditions for extended periods of time.

SN D/Gs have high availability and reliability ratings. For implementation of 10 CFR 50.63, SN established an D/G target reliability of 0.975. SN D/G unavailability for 1996 was 0.008; for 1995, 0.015; and for 1994, 0.017 which clearly indicates an improving trend. These values are well below the year 2000 industry goal of 0.025.

The increase in risk for having the 2A-A D/G out of service two additional days may be determined by computing the change in mean core damage probability as discussed in EPRI Report EPRI TR-105396, PSA Applications Guide (see example in Section 4.2.3). The change in mean core damage probability (ΔCDP) can be determined by multiplying the change in mean core damage frequency for the given condition by the length of time in the configuration. For the case considering one D/G out of service due to maintenance, the calculated mean core damage frequency is $4.81E-5$ events per year. This results in a risk achievement worth of 1.5 (i.e., $4.81E-5 / 3.2E-5$). The core damage probability for two additional days of maintenance is calculated as follows:

$$\Delta CDP = [(1.5 * 3.2 \times 10^{-5}) - 3.2 \times 10^{-5}] * (2/365) = 0.875 \times 10^{-7}$$

The analysis was performed using the SN PSA zero maintenance model (ZMM). This model computes the mean core damage frequency assuming all equipment is in service. The model is used to provide insights relative to specific pieces of equipment or configurations. Removal of equipment from service is evaluated for its risk impact in accordance with plant maintenance procedures.

Based on Figure 4.3 of the PSA Applications Guide, this change in mean core damage probability is well below the threshold for potentially risk significant changes ($1.0E-5$). In fact, the determined ΔCDP is at the lower range of non-risk significant category ($1.0E-7$).

Compensatory Measures

The proposed compensatory measure is to perform Surveillance Requirement 4.8.1.1.a every four hours (eight hour frequency is required by TSs). In addition, in accordance with TS Action 3.8.1.1.b, the remaining DGs will be tested per SR 4.8.1.1.2.a.4. SN is protecting B-train components while the 2A train D/G is out of service. Further, the switchyard will be protected to ensure offsite power supply reliability. The remaining emergency D/Gs (1A, 1B and 2B) are operable.

The duration of the requested enforcement discretion (i.e., 48 hours) is based upon the anticipated additional time, plus margin, needed to replace the D/Gs governor actuator and perform the required functional testing.

The basis for the conclusion that a USQ does not exist is as follows:

1. The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report may be increased; or

The probability of occurrence of an accident or malfunction of equipment important to safety is not increased as the D/G performs a function of accident mitigation only and cannot cause an accident. Similarly, the D/G itself is out of service and cannot cause other equipment to malfunction. The consequences of an accident are not increased as the increase in core damage frequency as a result of the additional AOT is judged to be insignificant and the offsite dose would not increase.

2. A possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may be created; or

The possibility for an accident or malfunction to be created does not exist as a result of the increase in AOT for the D/G, as the D/G performs a function of accident mitigation only and cannot result in the malfunction of other equipment.

3. The margin of safety as defined in the basis for any TS is reduced.

The calculated increase in the AOT for one D/G out of service shows a non-risk significant increase in the predicted core damage frequency (CDF). That calculation did not provide credit for the additional compensatory measures imposed by TVA. When considered together, TVA concludes that the margin of safety has not been reduced. In addition, the configuration that the plant will be in for this additional period of time (one D/G inoperable) has previously been evaluated.

TVA has evaluated the enforcement discretion request and has determined that it does not represent a significant hazards consideration based on criteria established in 10 CFR 50.92. Operation of SQN in accordance with the proposed amendment will not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

The D/Gs supply backup power to the essential safety systems in the event of a loss-of-offsite (normal) power. The D/Gs cannot initiate an accident. The requested relief will not impact the plant design or operation. The increased out of service time does not invalidate assumptions used in evaluating the radiological consequences of an accident and does not provide a new or altered release path. Therefore, this relief does not involve an increase in the probability of any accident previously evaluated.

An increase in the AOT would not change the conditions, operating configuration, or minimum amount of operable equipment assumed in the plant FSAR for accident mitigation. The longer AOT would provide a longer time window for maintenance. Based on the small increase in plant risk during maintenance, this change will not result in a significant

increase in the consequences of an accident.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

The proposed relief to extend the AOT for the D/Gs does not alter the physical design, or configuration of the plant. The D/G operation remains unchanged, therefore, this change does not create the possibility of a new or different kind of accident from any previously analyzed.

3. Involve a significant reduction in a margin of safety.

The calculated increase in the AOT for one D/G out of service shows a non-risk significant increase in the predicted core damage frequency (CDF). That calculation did not provide credit for the additional compensatory measures imposed by TVA. When considered together, TVA concludes that the margin of safety has not been reduced. In addition, the configuration that the plant will be in for this additional period of time (one D/G inoperable) has previously been evaluated.

Also, the action does not involve an unreviewed environmental question because it does not increase any adverse environmental impacts, change effluents or power levels, or result in unreviewed environmental matters. In addition, the proposed request has been approved by the Plant Operations Review Committee.

This enforcement discretion meets criterion 1(a) of Section B of Inspection Manual, Part 9900. This criteria is satisfied in that a dual unit shutdown and associated undesirable transients would be avoided.

Prior adoption of an approved line item improvement to the TSs or the improved TSs (ITS) would not have obviated the need for this notice of enforcement discretion (NOED) request.