



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 80 TO FACILITY OPERATING LICENSE NO. DPR-32  
AND AMENDMENT NO. 81 TO FACILITY OPERATING LICENSE NO. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY  
SURRY POWER STATION, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-280 AND 50-281

INTRODUCTION

By letter dated August 17, 1982, the Virginia Electric and Power Company (the licensee) proposed changes to the Technical Specifications appended to Facility Operating License Nos. DPR-32 and DPR-37 for the Surry Power Station, Unit Nos. 1 and 2. The requested change would revise the Technical Specifications related to the degraded voltage protection system.

DISCUSSION

The criteria and staff positions pertaining to degraded grid voltage protection were transmitted to Virginia Electric and Power Company (VEPCO) by NRC Generic Letter dated June 3, 1977. In response to this, by letters dated September 26, 1977, October 15, 1979, May 26, 1981, March 31, 1982, June 11, 1982, June 30, 1982 and August 17, 1982, the licensee proposed certain design modifications and changes to the Technical Specifications. A detailed review and technical evaluation of these proposed modifications and changes to the Technical Specifications was performed by LLL, under contract to the NRC, and with

general supervision by NRC staff. This work is reported by LLL in "Degraded Grid Protection for Class 1E Power Systems Surry Power Station, Units 1 and 2" (attached). We have reviewed this Technical Evaluation Report and concur in conclusion that the proposed electrical design modifications and Technical Specification changes are acceptable.

#### EVALUATION

The criteria used by LLL in its technical evaluation of the proposed changes include GDC-17 ("Electric Power Systems") of Appendix A to 10 CFR 50; IEEE Standard 279-1971 ("Criteria for Protection Systems for Nuclear Power Generating Stations"); IEEE Standard 308-1977 ("Voltage Ratings for Electrical Power Systems and Equipment - 60 Hz"); and staff positions defined in NRC Generic Letter to VEPCO dated June 3, 1977.

The existing loss of voltage protection at Surry consist of two undervoltage relays on each 4160 volt Class 1E bus arranged in a two-out-of-two coincident logic. If the bus voltage should degrade to 84% of nominal for 12 seconds, the relays will start the diesel generators. Continued voltage degradation to 79.5% of nominal for an additional 12 seconds will result in disconnection of the offsite power, load shedding of selected Class 1E loads, and transfer of the Class 1E buses to the onsite emergency diesel generator.

The existing design will not automatically shed all normal Class 1E running loads when transferring from offsite power to the onsite emergency diesel generators. The only Class 1E loads automatically shed for this transfer are the residual heat removal (RHR) and component cooling water (CCW) pumps. These loads are connected to 4160 volt stub buses which are fed from the

4160 volt Class 1E buses. After the diesel generator breaker closes and the bus voltage is restored above 79.5% voltage setpoint, the above load shed feature is reinstated and safety load sequencing will occur.

The following electrical system design modifications were proposed by VEPCO:

1. Modify the existing loss of voltage relaying on each 4160 volt Class 1E bus to provide a two-out-of-three logic per bus. The relays have a setpoint of  $75\% \pm 1\%$  of nominal and a time delay of 2 seconds + 5 seconds - 0.1 seconds.
2. Install three undervoltage (degraded grid protection) relays on each 4160 volt Class 1E bus with a two-out-of-three logic per bus. These relays will have a setpoint of  $90 \pm 1\%$  of nominal with a time delay of  $7 \pm 0.35$  seconds for a safety injection (SI) on consequence limiting sequence (CLS), and  $60 \pm 3$  seconds for non-accident conditions. System operation is as follows:

If the Class 1E bus voltage should degrade to less than 90% of nominal, under non-accident conditions, the undervoltage relays will, after 10 seconds, actuate an alarm in the control room. If the undervoltage persists; at 50 seconds, the diesel generators are automatically started, after 60 seconds the offsite source is disconnected and the Class 1E buses are transferred to the onsite emergency diesel generators. If an SI or CLS signal exists concurrent with the degraded voltage, the 10, 50 and 60 second time delays are bypassed and a 7 second time delay is used. At 7 seconds

the diesel generators receive a start signal and the transfer from offsite to onsite power is initiated. Upon transfer initiation for an SI or CLS condition, the offsite source breaker, the stub bus tie breaker, the RHR, CCW and bus 1H charging pump breaker are automatically tripped. Once the diesel generator achieves acceptable frequency and voltage, the output breaker will close and safety loads sequencing will occur. Closing the diesel generator breaker will automatically bypass the loss of voltage and degraded grid voltage relays on the 4160 volt Class 1E buses. If the diesel generator breaker should trip, the undervoltage protection relays will be automatically reinstated.

The licensee's analysis shows that the undervoltage (degraded grid protection) relay setpoint of 90% of nominal with a time delay of 7 seconds for accident conditions and 60 seconds for non-accident conditions will provide protection to all Class 1E equipment. The licensee has provided Technical Specifications for the proposed design modifications which include relay setpoints with tolerances, surveillance requirements and limiting conditions for operation. An analysis to substantiate the limiting conditions for operation and minimum and maximum setpoint limits were included as part of the modification proposal.

We have reviewed the LLL Technical Evaluation Report and concur in its findings that:

1. The proposed degraded grid modifications will protect the Class 1E equipment and systems from sustained degraded voltage of the offsite power system.
2. The load shedding feature is automatically bypassed when the onsite emergency diesel generators are supplying the Class 1E buses. This feature will be automatically reinstated if the diesel generator breaker should trip.
3. The proposed Technical Specification changes and additions are acceptable.

We therefore find the Surry Power Station, Units 1 and 2 degraded grid voltage protection design acceptable subject to completion of all proposed modifications.

#### EVALUATION

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of an accident previously evaluated, do not create the possibility of an accident of a type different from any evaluated previously, and do not involve a significant reduction in a margin of safety, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will not be conducted in compliance with the Commission's regulations and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: October 5, 1982

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