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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 52 TO LICENSE NO. DPR-13

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE UNIT NO. 1

DOCKET NO. 50-206

1.0 INTRODUCTION AND DISCUSSION

By application dated April 4, 1980 (Proposed Change No. 91) the licensee proposed a change to the Unit 1 Technical Specifications to reflect a new switchyard configuration. The licensee proposes to use the newly constructed switchyard as a common switchyard for Units 1, 2 and 3 when Units 2 and 3 are approved for operation. This proposed modification would tie Unit 1 into the new switchyard. In so doing, the number of available offsite power circuits for Unit 1 increases from six (at 220 kv and at 138 kv) to seven circuits (all at 230 kv) which come into the switchyard from two separate transmission corridors [4 from Southern California Edison Company (SCE) (the licensee) 3 from San Diego Gas & Electric Company (SDG&E)]. The four SCE circuits are supported by two double circuit sets of transmission towers. The three circuits form SDG&E are supported by a single set of transmission towers.

The following evaluation documents our review and approval of the proposed new switchyard design configuration as well as our modification of the associated proposed change No. 91 to the Technical Specifications. We have discussed these modifications to the proposed Technical Specifications with the licensee and he has accepted them.

2.0 EVALUATION

The proposed Technical Specifications would specify any two out of the seven circuits as sufficient to meet the requirements of GDC 17 for a minimum of two offsite power circuits. We have modified the proposed Technical Specifications to assure that multiple circuits on a single set of transmission towers are afforded sufficient independence between them to satisfy the physical independence requirements of General Design Criterion (GDC 17). In addition, the Technical Specifications as modified appropriately take into account that the separation between the two sets of transmission towers along the SCE transmission corridor is insufficient to prevent a tower from one set falling on the second set.

The Technical Specification Section 3.7 have been changed to read:

"Specification: The reactor shall not be made critical or maintained critical unless the following conditions are met:

1. As a minimum the following shall be operable:

A. One Southern California Edison Company and one San Diego Gas & Electric Company high voltage transmission line."

And, the bases for the Technical Specification 3.7 have been revised to read:

> "The station is connected electrically to the Southern California Edison Company and San Diego Gas & Electric Company systems via either of two physically independent high voltage transmission routes composed of four Southern California Edison Company high voltage lines and of a minimum of three San Diego Gas & Electric Company high voltage lines.
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> Of the four Southern California Edison Company lines, any one can serve as a source of power to the station auxiliaries at any time. Similarly, any of the three San Diego Gas & Electric Company lines can serve as a source of power to the station auxiliaries at any time. By specifying one transmission line from each of the two physically independent high voltage transmission routes, redundancy of sources of auxiliary power for an orderly shutdown is provided."

In summary, the seven 230 kv transmission lines coming into the SONGS site via two physically independent rights-of-way exceed the requirements of GDC 17 for that portion of the system. In addition, the transient capability of the offsite power system has been reviewed and this modification does not degrade that capability. Therefore, we conclude that this portion of the offsite power system is in full compliance with GDC-17 and is acceptable.

The remaining portion of the offsite power system, i.e. the switchyard itself and the lines into Unit 1 from the switchyard, must also meet the requirements of GDC 17. The design has the required minimum of two lines from the switchyard to Unit 1 both with the capability for safe shutdown of the reactor. One line is connected to the main transformer and the second to the start-up transformer. The only requirement placed upon this portion of the offsite power system by GDC 17 is that physical independence be maintained to the extent practical between the lines. Each line has one support tower intervening between the switchyard and its respective transformer. These towers are spaced such that a tower failure will not jeopardize both lines. Based upon this physical independence, we find this portion of the offsite power system to be in conformance with GDC 17 and acceptable.

The remaining portion of the offsite power system is the switchyard itself. GDC 17 specifically allows a common switchyard, however, there are two items of our review in this area we wish to highlight. These items are the use of a single battery for switchyard breaker control/protection and the use of a common structure within the switchyard supporting both lines into Unit 1.

Use of a single power supply for breaker control and protective switching means that a single failure in the power supply will negate the automatic and remote manual capabilities of these devices. Power supply failure leaves all breakers in an as-is position. Therefore, the failure itself does not present a threat to the nuclear unit, is detectable, and can be compensated for by dispatching personnel to the switchyard for manual action. When the breaker control power

supply failure is counted as a single failure in conjunction with an initiating event such as a transmission line fault, the following will occur. First, the other end of the faulted line will open to clear the fault from that portion of the power system. Then, upon the failure of the SONGS Unit 1 switchyard end of the line to clear the fault, Unit 1 will trip on a loss of load transient (caused by loss of offsite power) and the shutdown loads will be energized by the onsite emergency power system.

The simultaneous failure of the switchyard control power source coincident with a transmission line fault results in a loss of offsite power for SONGS 1. The probability of occurrence of this specific scenario and the contribution of this scenario to the overall loss of offsite power probability is very low; the event results in an anlyzed transient; the prevention of this specific scenario as well as the entire class of such events (i.e. losses of offsite power) would require a single-failure-proof offsite power system; and GDC 17 explicitly does not require a single-failure-proof offsite power system. We therefore conclude that this portion of the offsite power system design is in conformance with GDC 17, results in no measurable increase in challenges to the onsite power system and is acceptable.

The new offsite power system configuration places the two lines from the switchyard to Unit 1 on opposite ends of a common three bay dead end structure within the switchyard. This type of configuration reflects common industry practice and has been used in many of the nuclear power plant switchyards. The bases for acceptability for this aspect of the offsite power system design are as follows. GDC 17 requires "two physically independent circuits designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure." Whereas, a common switchyard and common right-of-way are acceptable, the relative vulnerabilities of the two offsite power lines within and without the switchyard must be examined. Circuits that run along transmission corridors present a much larger physical target for physical phenomena than does a switchyard. Typical examples of physical phenomena of concern are hurricanes, tornadoes, earthquakes, and airplane crashes. However, none of these examples are required design bases for the offsite power system. This is because it is not practical to design a power system in a manner that guarantees invulnerability to such events. The staff does require (as noted above) sufficient physical independence between the two required offsite power circuits to withstand the loss of structural integrity of a transmission line tower and still maintain one line into the plant. This requirement has not be carried over into the common switchyard. The switchyard being a relatively small target for natural phenomena (as noted above) means that if it falls victim to such an event the probability is very high that both circuits would be lost irrespective of common structures. An additional basis for acceptability of the SONGS switchyard is that it has been designed to the higher seismic acceleration levels used in the design of Units 2 and 3. We, therefore, find this aspect of the design to provide a practical level of physical independence between the two offsite circuits in accordance with the requirement of GDC 17 and to be acceptable.

3.0 ENVIRONMENTAL CONCLUSION

We have determined that the amendment does 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 amendment involves 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 this amendment.

4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does 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 be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: February 6, 1981