October 10, 2000

Mr. Harold B. Ray
Executive Vice President
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3 - ISSUANCE OF AMENDMENTS RELATED TO LOW POWER PHYSICS TESTING METHODOLOGY (TAC NOS. MA8307 AND MA8308)

Dear Mr. Ray:

The Commission has issued the enclosed Amendment No. 173 to Facility Operating License No. NPF-10 and Amendment No. 164 to Facility Operating License No. NPF-15 for San Onofre Nuclear Generating Station, Units 2 and 3, respectively. The amendments consist of changes to the licensing basis in response to your application dated February 23, 2000, as supplemented July 7, 2000, (PCN-508). The amendments allow measuring the worth of approximately three-fourths of the full-length control element assembly (CEA) groups each refueling cycle rather than the present methodology, which measures the worth of all full-length CEA groups each refueling cycle.

These amendments involve a revision to the Updated Final Safety Analysis Report (UFSAR) Section 4.2.1.5.2, CEA Performance Testing. Please be advised that the changes as approved by these amendments shall be reflected and submitted with the next update of the UFSAR pursuant to 10 CFR 50.71(e).

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA by Mel Fields for/

L. Raghavan, Senior Project Manager, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-361 and 50-362

Enclosures:
1. Amendment No. 173 to NPF-10
2. Amendment No. 164 to NPF-15
3. Safety Evaluation

cc w/encl: See next page

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MChatterton

*No major changes made to SE. Changes concurred by M. Chatterton on 8/28/00.

Accession No. ML003758468

OFFICE	PDIV-2/PM	PDIV-D/LA	* SRXB	OGC/nlo w/comments	PDIV-2/SC
NAME	LRaghavan:lcc	CJamerson	FAkstulewicz	R. Weisman	SDembek
DATE	10/5/00	9/15/00	8/23/00	9/29/2000	9/15/00

OFFICIAL RECORD COPY
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cc:

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Mr. Dwight E. Nunn, Vice President
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Mr. Robert A. Laurie, Commissioner
California Energy Commission
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SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

DOCKET NO. 50-361

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 173
License No. NPF-10

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Southern California Edison Company, et al. (SCE or the licensee), dated February 23, 2000, as supplemented July 7, 2000, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, Facility Operating License NPF-10 is hereby amended to authorize the licensee to incorporate certain changes to the control element assembly performance testing section of its Updated Final Safety Analysis Report (UFSAR) as set forth in the application for amendment dated February 23, 2000, as supplemented July 7, 2000, and evaluated in the staff's safety evaluation attached to this amendment.

3. This license amendment is effective as of the date of its issuance. Implementation of this amendment shall include incorporation of the changes into the UFSAR at the next update of the UFSAR in accordance with the schedule in 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Date of Issuance: October 10, 2000

SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

DOCKET NO. 50-362

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 164
License No. NPF-15

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Southern California Edison Company, et al. (SCE or the licensee) dated February 23, 2000, as supplemented July 7, 2000, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, Facility Operating License NPF-15 is hereby amended to authorize the licensee to incorporate certain changes to the control element assembly performance testing section of its Updated Final Safety Analysis Report (UFSAR) as set forth in the application for amendment dated February 23, 2000, as supplemented July 7, 2000, and evaluated in the staff's safety evaluation attached to this amendment.

3. This license amendment is effective as of the date of its issuance. Implementation of this amendment shall include incorporation of the changes into the UFSAR at the next update of the UFSAR in accordance with the schedule in 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Date of Issuance: October 10, 2000

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 173 TO FACILITY OPERATING LICENSE NO. NPF-10

AND AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. NPF-15

SOUTHERN CALIFORNIA EDISON COMPANY

SAN DIEGO GAS AND ELECTRIC COMPANY

THE CITY OF RIVERSIDE, CALIFORNIA

THE CITY OF ANAHEIM, CALIFORNIA

SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3

DOCKET NOS. 50-361 AND 50-362

1.0 INTRODUCTION

By letter dated February 23, 2000, as supplemented July 7, 2000, (PCN-508), Southern California Edison (SCE) Company (the licensee) requested revision to the licensing basis for operation of the San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, relating to its Low Power Physics Testing (LPPT) Program.

SONGS Updated Final Safety Analysis Report (UFSAR) Section 4.2.1.5.2, CEA [control element assembly] Performance Testing, describes the present LPPT program. The program involves measurement of reactivity worths of all full-length CEA groups (eight CEA groups) using either the boron exchange method or the CEA exchange method to verify adequacy of shutdown margin (SDM). The licensee proposes to measure the worth of approximately three-fourths of the full-length CEA groups each refueling cycle rather than measuring the worth of all full-length CEA groups each refueling cycle. More specifically, in the existing LPPT program, the reactivity worths of 5 CEA groups (33 individual control rods) are measured using the dilution or boration method, and 3 CEA groups (50 CEAs) are measured using the exchange method. In the proposed program option, typically, the reactivity worths of 6 CEA groups (50 - 57 CEAs) would be measured by dilution or boration each cycle, and 2 groups would not be measured. In addition, the proposed LPPT program option would also not require the explicit measurement of inverse boron worth since its value can be inferred from the performance of other tests in the LPPT program.

The licensee stated that the proposed changes involve an unreviewed safety question as defined in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.59 and require U.S. Nuclear Regulatory Commission (NRC) approval prior to implementation.

The licensee's July 7, 2000, letter provided clarifications and additional information that were within the scope of the original application and *Federal Register* notice and did not change the staff's initial proposed no significant hazards consideration determination.

2.0 EVALUATION

The physics test program that includes the LPPT is performed following each refueling outage to determine if the operating characteristics of the core are consistent with the design predictions and to provide assurance that the core can be operated as designed.

The proposed LPPT program option test sequence is identical to the present LPPT program up to the CEA worth measurement by dilution. In the proposed program, the CEA worth measurement by dilution would include measurement of CEA Regulating Groups 5, 4, 3, and 2 (same as the present program) or Groups 5, 4, 3, and 1 in alternating cycles. As with the present program, the Special Test Exception for reduced SDM is required to be invoked prior to initiation of the test. In the proposed program, the insertion of Shutdown Bank B or Shutdown Bank A would then be exchanged with the withdrawal of Regulating CEA Groups in order to establish the initial conditions for the measurement of the shutdown bank worth by boration. Regulating Group 6 would either be measured by dilution with the rest of the regulating banks or by boration with the shutdown bank.

Thus, in the LPPT option program, six of the eight full-length CEA groups are measured and two of the full-length CEA groups are not measured. CEA group worths that were not measured during one refueling outage would be measured during the subsequent refueling outage. All CEA worths would be measured using the conventional boration or dilution methodology. The minimum CEA worth to be measured is 3000 pcm [percent milli]. The inverse boron worth will be determined during the measurement of the CEA regulating groups by dilution or during the measurement of the shutdown bank by boration. In all cases, the CEA groups measured will be evenly distributed throughout the core, thus assuring adequate coverage. The NRC staff reviewed the data provided by the licensee and concluded that there was good agreement between the predicted and measured CEA worth for Cycle 5 through Cycle 10.

The NRC staff has always considered the measurement of control rod worths at the beginning of every cycle an essential part of the verification of shutdown margin. For various indirect measurement techniques, the staff has considered it essential to measure all (regulating and shutdown) control rod worths. As calculational methods have improved, it has become clear that not all control rod worths need to be measured each cycle, provided the measurement technique is a direct one such as boration or dilution. Based on industry data, the NRC has determined that if measurements for rod groups totaling roughly half of the total rod worth agree with the predictions within the acceptance criteria, and other low power physics tests are within acceptance criteria, then the total measured rod worth would agree with total predicted rod worth within the acceptance criteria. Because the licensee's proposed option involves direct measurement techniques and would represent more than half of the total worth, the proposed measurement technique with fewer banks is acceptable.

In addition, the proposed option satisfies the industry standard. American National Standards Institute/American Nuclear Society (ANSI/ANS)-19.6.1-1997, "Reload Startup Physics Tests for Pressurized Water Reactors," is the industry standard for reload physics testing. The NRC staff has recognized that following this standard constitutes an acceptable physics startup program. The ANSI/ANS standard states that when using the dilution or boration method, control rod groups having a predicted worth of at least 3000 pcm or all of the control rod groups should be

measured. The standard defines “control rod group” as a rod group that may be “partially or fully inserted in the core during normal operation.” For SONGS Units 2 and 3, Regulating Groups 3, 4, 5, and 6 would be considered control rod groups under the ANSI/ANS standard. The proposed LPPT testing option, includes measurement of all control groups and will also measure a total of at least 3000 pcm, and satisfies the ANS standard requirements. Since the proposed test program meets the conditions that NRC considers acceptable, the proposed optional program is acceptable.

In addition to the above changes to the LPPT program, the licensee proposes to delete the requirement for explicit measurement of inverse boron worth. After the dilution measurements are complete, reactor coolant system boron is allowed to equilibrate. Currently, the change in equilibrium boron concentrations from before to after the CEA measurement by dilution is determined. A direct estimate of inverse boron worth (ppm/%??) is determined from the change in boron concentration (ppm) divided by the integrated reactivity (%??) computed during the dilution measurement of CEA worths. With acceptable results (i.e., difference between measured values and predicted values is within acceptance criteria) of critical boron concentration and CEA group worths, the value of inverse boron worth can be inferred to be also acceptable. Therefore, the staff concludes that explicit measurement of inverse boron worth is not required and, therefore, can be deleted.

Based on the staff evaluation above, the staff concludes that the proposed changes to the LPPT program are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission’s regulations, the California State official was notified of the proposed issuance of the amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (65 FR 15385). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. Chatterton Date: October 10, 2000