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

SOUTHERN CALIFORNIA EDISON COMPANY AND

SAN DIEGO GAS AND ELECTRIC COMPANY

DOCKET NO. 50-206

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 1

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 73
License No. DPR-13

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

   A. The application for amendment by Southern California Edison Company and San Diego Gas and Electric Company (the licensees) dated July 20, 1983, as modified by letters dated September 7, 1983, October 25, 1983 and January 27, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 3.B of Provisional Operating License No. DPR-13 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 73, are hereby incorporated in the license. Southern California Edison Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

James J. Lombardo for

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 23, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 73

PROVISIONAL OPERATING LICENSE NO. DPR-13

DOCKET NO. 50-206

Revise Appendix A Technical Specifications and Bases by removing the following pages and inserting the enclosed pages. The revised pages contain the captioned amendment number and marginal lines indicating the area of change.

| REMOVE PAGES | INSERT PAGES |
|---|---|
| 34 | 34 |
| 38 | 38 |
| 38a | 38a |
| 38b | 38b |

## 3.6 CONTAINMENT

Applicability: Applies to the operating status of the containment sphere.

Objective: To ensure containment integrity.

Specification: A. Leakage

The reactor coolant system temperature shall not be increased above 200°F if the containment leakage exceeds the maximum acceptable values specified in Surveillance Standard 4.3.

B. Access to Containment

(1) Containment integrity shall not be violated unless the reactor coolant system is below 500 psig and a shutdown margin greater than 1% $\Delta k/k$ with all rods inserted is maintained for the most reactive temperature.

(2) Containment integrity shall not be violated when the reactor coolant system is open to the containment atmosphere unless a shutdown margin greater than 5% $\Delta k/k$ is maintained with all control rods inserted.

(3) Positive reactivity changes shall not be made by rod drive motion whenever the containment integrity is not intact. Boron dilution (resulting in positive reactivity) may be made when the containment integrity is not intact if a shutdown margin greater than 5% $\Delta k/k$ is maintained.

C. Internal Pressure

The reactor shall not be made critical, nor be allowed to remain critical, if the containment sphere internal pressure exceeds 0.4 psig, or the internal vacuum exceeds 2.0 psig.

Basis: The bases for the shutdown margins and 500 psig pressure are as follows:

| $\Delta k/k$ | Event | Basis for Adequacy |
|---|---|---|
| 1% (Below 500 psig) | Violation of Containment | Safety injection system disarmed; no credible automatic or operator action could cause return to criticality. |
| 5% | Open reactor coolant system | Provides adequate margin so that maintenance activities can be carried out with the reactor head removed.(1) |

## 3.8 Fuel Loading and Refueling

Applicability: Applies to fuel loading and refueling operations.

Objective: To prevent incidents during fuel handling operations that could affect public health and safety.

Specification: A. During refueling operations:

1. Radiation levels in the containment and spent fuel building shall be monitored.

2. Core subcritical neutron flux shall be continuously monitored during the entire refueling period by not less than two neutron monitors, each with continuous visual indication and one with continuous audible indication.

3. One residual heat removal pump shall be in operation.

4. With the reactor vessel head closure bolts less than fully tensioned or with the head removed, the more restrictive of the following reactivity conditions shall be met.

   a. A shutdown margin greater than 5% $\Delta k/k$.

   b. A boron concentration greater than or equal to 2,000 ppm.

5. The reactor shall be subcritical for at least 148 hours prior to movement of irradiated fuel in the reactor pressure vessel.

6. Water borated as specified in item A.4 above shall be maintained at an elevation not less than 40'3" in the refueling pool during movement of fuel assemblies and RCC's. Reference elevation is sea level, mean lower low water.

7. If any of the specified limiting conditions for refueling is not met, refueling of the reactor shall cease, work shall be initiated to correct the violated conditions so that the specified limits are met, and no operations which may increase the reactivity of the core shall be made.

B. With fuel assemblies in the spent fuel storage pool:

1. Loads in excess of 1,500 pounds shall be prohibited from travel over fuel assemblies in the storage pool.

2. Water borated as specified in item A.4 above shall be maintained at an elevation not less than 40'3" in the spent fuel storage pool. Reference elevation is sea level, mean lower low water.

3. With the requirement of B.2 above not satisfied, suspend all movement of fuel assemblies and crane operations with loads in the fuel storage areas and restore the water level to within its limits within four hours.

Basis: During refueling, the reactor refueling cavity is filled with approximately 240,000 gallons of borated water whose concentration is sufficient to maintain the reactor subcritical by greater than 5% $\Delta k/k$ or to a boron concentration greater than or equal to 2,000 ppm, whichever is more restrictive. Operation of the residual heat removal pump is provided to assure continuous mixing flow of refueling water through the reactor vessel during the refueling period.(1) Borated water injection capability is provided as per Specification 3.2 Part A in the unlikely event there is any need during the refueling period.

In addition to the above safeguards interlocks are utilized during refueling to insure safe handling.(2) These include:

(1) An interlock on the lifting hoist to prevent lifting of more than one fuel assembly at any one time.

(2) The spent fuel transfer mechanism can accommodate only one fuel assembly at a time.

The restriction on movement of loads in excess of 1,500 pounds (i.e., the nominal weight of a fuel assembly, RCC, and associated handling tool) over fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the accident analysis.

Requiring a minimum water elevation of 40'3" in the refueling pool, and similarly in the spent fuel storage pool, ensures that (1) at least 23 feet of water would be available to remove 99% of the iodine gap activity assumed to be released in the event of a dropped and damaged fuel assembly, and (2) there will be at least twelve feet of water above the top of the fuel rods of a withdrawn fuel assembly so as to limit dose rates at the top of the water in accordance with Section 4.2.6 of the facility FSA. Reference elevation is sea level, mean lower low water.

Finally, detailed written procedures are provided, and are carried out under close supervision by licensed personnel.

The minimum requirement for reactor subcriticality prior to movement of irradiated fuel assemblies in the reactor pressure vessel assures that sufficient time has elapsed to allow the radioactive decay of short-lived fission products.

References: (1) Supplement No. 1 to Final Engineering Report and Safety Analysis, Section 5, Question 8 and 9.

(2) Final Safety Analyis, Paragraph 2.9.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 73 TO PROVISIONAL OPERATING LICENSE NO. DPR-13

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-206

## 1.0 INTRODUCTION

By letter dated July 20, 1983, as supplemented by letters dated September 7, 1983, October 25, 1983 and January 27, 1984, Southern California Edison Company (SCE) (the licensee) requested an amendment to Provisional Operating License No. DPR-13 for the San Onofre Nuclear Generating Station, Unit No. 1. This amendment would authorize changes to the Technical Specifications to (1) permit boron dilution when containment integrity is not intact if a shutdown margin greater than 5% $\Delta k/k$ is maintained, and (2) change the requirement for shutdown margin while the vessel head is not fully tensioned or is removed from a boron concentration of 2900 ppm (sufficient to maintain the reactor subcritical by approximately 10% $\Delta k/k$ with all rods inserted) to the more restrictive of a shutdown margin of 5% $\Delta k/k$ or a minimum boron concentration of 2,000 ppm.

A Notice of Consideration of Issuance of Amendment to License and Proposed No Significant Hazards Consideration Determination and Opportunity for Hearing related to the requested action was published in the Federal Register on November 22, 1983 (48 FR 52826). No request for hearing or comments were received. The supplemental information submitted by letters dated October 25, 1983 and January 27, 1984 was provided in response to staff requests for clarification and for inclusion of an additional restriction in the Technical Specifications as discussed below. Thus, the supplemental information did not expand the scope of the staff's notice for opportunity for hearing.

## 2.0 DISCUSSION AND EVALUATION

### 2.1 Background

The San Onofre Unit 1 Technical Specifications prohibit positive reactivity changes by rod drive motion or boron dilution whenever the containment integrity is not intact. During extended shutdown periods compliance with this specification leads to boron concentrations in the reactor coolant system (RCS) far in excess of the level necessary to maintain the required shutdown margin. As a result of the required

weekly boric acid flow verification tests, concentrated (12%) boric acid from the boric acid tank is injected into the RCS. According to the present Technical Specification the RCS boron concentration cannot be lowered until containment integrity has been established.

The licensee requested Technical Specification changes that would delete the prohibition of boron dilution when the containment integrity is not intact and lower the minimum allowable boron concentration (from 2900 to 2000 ppm) and shutdown reactivity during refueling. The requested changes would provide greater operational flexibility during refueling and lessen the amount of liquid waste generated at the completion of the present shutdown when the boron concentration would be decreased for reactor startup. At present, the RCS boron concentration is greater than 4200 ppm, which is higher than the required concentration of the refueling water storage tank (RWST). Thus, if water from the RWST were to be introduced into the RCS, the RCS could be diluted and thus the present Technical Specification could be violated. Also, with the present Technical Specification any partial loop drainage for maintenance would necessitate adding additional boron when refilling the loops to prevent RCS dilution.

With regard to the generation of liquid waste, the licensee estimated that with the proposed RCS boron concentration of 2,000 ppm, about 33,000 gallons of waste would be generated to dilute the RCS for startup. With the existing RCS boron concentration, about 66,000 gallons of waste would be generated. With increasing concentrations this quantity would go up accordingly. It should also be noted, that the prohibition of diluting the RCS appears to be unique to San Onofre Unit 1.

## 2.2 Proposed Technical Specifications

Proposed Change No. 120 would revise Technical Specification 3.6.1.B(3) in order to allow relief from the definitive limitations imposed by this specification and still maintain restrictions that ensure an adequate shutdown margin. The proposed requirement is that boron dilution (resulting in positive reactivity addition) may be done when the containment integrity is not intact if a shutdown margin of greater than 5% $\Delta k/k$ is maintained.

Technical Specification 3.8.A.4 and its corresponding basis would be modified to require that in the refueling mode the more restrictive of a shutdown margin of 5% $\Delta k/k$ or a boron concentration of 2,000 ppm be maintained while the vessel head closure bolts are not fully tensioned or with the head removed. This specification, as proposed in the January 27, 1984 submittal, is consistent with the requirements of the corresponding Westinghouse Standard Technical Specifications (STS).

The original modification proposed by the licensee specified a 5%$\Delta$ k/k margin in the refueling mode during vessel head removal and while loading and unloading fuel. The boron concentration needed to maintain a given shutdown margin is calculated considering core conditions. During refueling, the required concentration could change as fuel is moved. In order to have a uniform concentration for Mode 6 operations, the staff determined that the licensee should modify the specification to provide a minimum boron concentration as well as a minimum shutdown margin. The licensee then resubmitted Specification 3.8.A.4 to add the additional restriction given in the Westinghouse Standard Technical Specifications.

2.3 Evaluation of Boron Dilution Analysis

Acceptability of the Licensee's proposed Technical Specification revisions is based on ensuring that, with the proposed boron concentration and shutdown margin, an inadvertent boron dilution would not result in loss of shutdown margin within a time period compatible with mitigation of the event by corrective operator action. The licensee submitted re-analyses of possible boron dilution events in mode 5 (cold shutdown) and mode 6 (refueling).

The only credible source for injecting unborated water into the RCS is the chemical and volume control system (CVCS). The source of this water would be the primary plant makeup tank (PPMUT). A maximum flow rate of 70 gpm from the PPMUT could be supplied by two primary plant makeup pumps (PPMPs). However, during refueling the charging pumps are normally lined up for addition of concentrated boric acid and the primary plant makeup pumps are normally isolated.

Simultaneous operation of both PPMPs is alarmed. The analysis submitted in the September 7, 1983 letter considered the case with both PPMPs running since this results in the highest dilution rate. The staff expressed the concern that the case with one PPMP running may be more limiting since one pump running is not alarmed whereas two pumps running is. Under refueling conditions, one PPMP could supply nearly 70 gpm to the RCS. The licensee noted in the January 27, 1984 letter that the ex-core monitor count rate alarm would be available to alert the operator to the one PPMP running case such that adequate time still exists for operator action to satisfy the Standard Review Plan criterion.

To provide bounding analyses of the boron dilution events, therefore, the licensee has assumed the following: (1) a dilution rate of 70 gpm; (2) RCS active volume of 1800 $ft^3$ representing the volume below the reactor vessel nozzles mid-plane; (3) an infinite PPMUT supply; (4) a letdown rate of 25 gpm; and (5) an initial volume control tank (VCT) level of 30%.

Should a boron dilution event develop, the operator would be alerted by several alarms and control room indication including:

1. Increase in the audible count rate from the ex-core detectors.
2. Source range high neutron count rate alarm when the count rate doubles. The licensee's analysis indicates that this alarm would be actuated approximately 40 minutes prior to criticality.
3. Alarm if both PPMPs are operating.
4. VCT high level alarm
5. Indication of a charging pump operating.
6. Flow indication on FI-1112 on the charging line.
7. Alarm and flow indication from FIT-1102A if dilution were through 716-2" - 151N (normal PPMU supply line).
8. Flow indication on FR-1102 if the dilution path were through line 2052-2" - HN1 (chemical blend bypass line).
9. Alarm on boric acid addition 5% below set point if dilution were through the chemical blend device and no boric acid were being added.

The licensee's analysis bounds both the cold shutdown and refueling modes since the minimum RCS volume possible during these modes (system drained to mid-loop) and the minimum initial boron concentration (equivalent to 5% $\Delta k/k$) was used. In the refueling mode, the minimum boron concentration must be at least 2,000 ppm, which is higher than the concentration corresponding to 5% $\Delta k/k$ used in the analysis. Also, during cold shutdown, shutdown margin is not maintained with cocked rods.

Based on the above information, we conclude that the likelihood of a boron dilution event during San Onofre Unit 1 cold shutdown and refueling would be low, and if it were to occur, the operators would have sufficient indications and alarms to terminate the event within a time period compatible with operator action. As previously noted, the source range high neutron count rate alarm would be activated approximately 40 minutes prior to criticality. Furthermore, the licensee's proposed Technical Specification 3.8.A.4 as contained in the January 27, 1984 letter is in accord with the Westinghouse STS. The available time for operator action exceeds the minimum times given in the Standard Review Plan for response to boron dilution events. The likelihood of a boron dilution event has not been increased by these TS changes. We, therefore, conclude that the licensee's proposed revisions for Technical Specification 3.6.1.B(3) and 3.8.A.4 are acceptable.

## 3.0 ENVIRONMENTAL CONSIDERATION

The staff has 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, the staff has 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

The staff 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; and (2) 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.

## 5.0 ACKNOWLEDGEMENT

This Safety Evaluation was prepared by B. Mann, L. Kopp, and C. Li.

Dated: April 23, 1984