

February 23, 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 (SONGS), UNITS 2 AND 3 -  
ISSUANCE OF AMENDMENTS RE: AUXILIARY FEEDWATER PUMP  
OPERABILITY (TAC NOS. MA0597 AND MA0598)

Dear Mr. Ray:

The Commission has issued the enclosed Amendment No. 164 to Facility Operating License No. NPF-10 and Amendment No. 155 to Facility Operating License No. NPF-15 for San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, respectively. These amendments are in response to your application dated January 2, 1998 (PCN-482), as supplemented December 13, 1999. These amendments revise the SONGS Units 2 and 3 technical specifications relating to the auxiliary feedwater system.

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

Sincerely,  
/RA/

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. 164 to NPF-10
- 2. Amendment No. 155 to NPF-15
- 3. Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 23, 2000

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Executive Vice President  
Southern California Edison Company  
San Onofre Nuclear Generating Station  
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L. Raghavan, Senior Project Manager, Section 2  
Project Directorate IV & Decommissioning  
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Docket Nos. 50-361 and 50-362

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2. Amendment No. 155 to NPF-15  
3. Safety Evaluation

cc w/encls: See next page

San Onofre Nuclear Generating Station, Units 2 and 3

cc:

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

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. 164  
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 January 2, 1998, as supplemented December 13, 1999, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. NPF-10 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 164 , are hereby incorporated in the license. Southern California Edison Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical  
Specifications

Date of Issuance: February 23, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 164

FACILITY OPERATING LICENSE NO. NPF-10

DOCKET NO. 50-361

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.7-11

INSERT

3.7-11

✓

3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 Three AFW trains shall be OPERABLE.

- NOTES-----
1. Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.
  2. The steam driven AFW pump is OPERABLE when running and controlled manually to support plant start-ups, plant shut-downs, and AFW pump and valve testing.
- 

APPLICABILITY: MODES 1, 2, and 3,  
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam supply to turbine driven AFW pump inoperable.	A.1 Restore steam supply to OPERABLE status.	7 days <u>AND</u> 10 days from discovery of failure to meet the LCO
B. One AFW train inoperable for reasons other than Condition A in MODE 1, 2, or 3.	B.1 Restore AFW train to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet the LCO
C. Two AFW trains with two motor driven pumps inoperable in MODES 1, 2, or 3.	C.1 Restore one AFW train to OPERABLE status.	48 hours  (continued)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

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. 155  
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 January 2, 1998, as supplemented December 13, 1999, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. NPF-15 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 155 , are hereby incorporated in the license. Southern California Edison Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical  
Specifications

Date of Issuance: February 23, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 155

FACILITY OPERATING LICENSE NO. NPF-15

DOCKET NO. 50-362

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.7-11

INSERT

3.7-11

3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LC0 3.7.5 Three AFW trains shall be OPERABLE.

- NOTES-----
1. Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.
  2. The steam driven AFW pump is OPERABLE when running and controlled manually to support plant start-ups, plant shut-downs, and AFW pump and valve testing.
- 

APPLICABILITY: MODES 1, 2, and 3,  
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam supply to turbine driven AFW pump inoperable.	A.1 Restore steam supply to OPERABLE status.	7 days <u>AND</u> 10 days from discovery of failure to meet the LCO
B. One AFW train inoperable for reasons other than Condition A in MODE 1, 2, or 3.	B.1 Restore AFW train to OPERABLE status.	72 hours <u>AND</u> 10 days from discovery of failure to meet the LCO
C. Two AFW trains with two motor driven pumps inoperable in MODES 1, 2, or 3.	C.1 Restore one AFW train to OPERABLE status.	48 hours  (continued)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. NPF-10

AND AMENDMENT NO. 155 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 January 2, 1998 (PCN-482), as supplemented December 13, 1999, Southern California Edison (SCE or the licensee) proposed changes to the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 Technical Specifications (TSs) relating to the auxiliary feedwater (AFW) system. Specifically, the licensee requested a revision to TS 3.7.5, to add a note that states: "The steam driven AFW pump is OPERABLE when running and controlled manually to support plant start-ups, plant shut-downs, and AFW pump and valve testing." The staff discussed this amendment request during a phone call with the licensee on October 25, 1999, to obtain clarification of the licensee's request. The licensee provided this clarification in its letter of December 13, 1999.

## 2.0 BACKGROUND

The SONGS AFW system includes three 100 percent capacity pumps: two that are motor-driven and one that is steam turbine-driven. The steam for the turbine-driven AFW pump is supplied from both steam generators with check valves to prevent back flow to the affected steam generator on a main steam line break (MSLB) or feedwater line break (FWLB) event. The steam supply from each steam generator can be isolated automatically by air-operated valves HV-8200 and HV-8201. Steam to the AFW pump turbine is admitted through motor-operated trip/throttle valve HV-4716. The speed of the pump turbine is controlled by solenoid governor valve SV-4700, which is regulated by the AFW pump turbine control system. All automatic valves (except bypass valves) must be capable of opening upon actuation of the emergency feedwater actuation signal (EFAS), and they must be capable of closing upon actuation of a main steam isolation signal (MSIS).

During normal operating conditions, with the turbine-driven AFW pump in standby, an MSIS followed by EFAS would not pose a problem. In this situation, the MSIS will initially close steam supply valves HV-8200 and HV-8201, and when a low water level is reached in the intact steam

generator, the EFAS will open at least one of the steam supply valves to make steam available for running the turbine-driven AFW pump. The two motor-driven AFW pumps also start automatically on EFAS to supply feedwater to the intact steam generator (assuming ac power is available). However, if the turbine-driven AFW pump has already been started manually and is operating at the time the MSIS occurs, steam supply valves HV-8200 and HV-8201 will close while the trip/throttle valve remains open and the solenoid governor valve opens fully to try to maintain turbine speed. Because the steam supply is isolated, the turbine-driven AFW pump will coast to a stop until one (or both) of the steam supply valves is opened by an EFAS. In this situation, when steam is admitted to the AFW pump turbine following the EFAS, the solenoid governor valve may not be able to close fast enough to prevent an overspeed trip of the AFW pump steam turbine. Operation of the two motor-driven AFW pumps would not be affected. To address this overspeed issue, the licensee requested a revision to TS 3.7.5 to add a note that would allow the turbine-driven AFW pump to be considered operable when it is running and being controlled manually during plant startup, shutdown, and testing evolutions. Although the turbine-driven AFW pump would be susceptible (when operating in the manual mode) to overspeed trip upon MSIS initiation followed by EFAS, the licensee considers this vulnerability to be insignificant and more than offset by the increased AFW reliability that results when the turbine-driven AFW pump is operating in the manual mode.

The staff initiated a phone call with the licensee on October 25, 1999, to discuss the amendment request. During the phone call, the licensee provided the following clarifications:

The licensee's probabilistic risk analyses are consistent with the U.S. Nuclear Regulatory Commission's (NRC's) Regulatory Guide (RG) 1.174, "An Approach For Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

The turbine-driven AFW pump and associated flow control valves will respond to an EFAS when operating in the manual mode, without reliance on operator action.

The emergency operating procedures instruct the operators on actions to take to restore the turbine-driven AFW pump to service during an event, should it trip on turbine overspeed. The need to restore the turbine-driven AFW pump, and the urgency for taking such action, would depend on the specific circumstances involved.

### 3.0 EVALUATION

The licensee's submittal indicates that when the turbine-driven AFW pump is operating in the manual mode for plant startup, shutdown, and testing purposes, the pump remains available to perform its safety function for all event scenarios except for situations that involve MSIS followed by an EFAS. For these particular situations, the two motor-driven AFW pumps would not be affected, and would be available to provide emergency feedwater (assuming they are operable at the time of the MSIS/EFAS actuations). TS 3.7.5 currently allows one motor-driven AFW pump to be inoperable for up to 72 hours, and allows two motor-driven AFW pumps to be inoperable for up to 48 hours. Therefore, the plant would be most vulnerable during periods when the turbine-driven AFW pump is operating in manual mode while either one or both of the motor-driven AFW pumps are inoperable.

The licensee performed probabilistic analyses to demonstrate support for declaring the turbine-driven AFW operable when the pump is manually actuated and operating. Although it is understood that the turbine-driven AFW is operated only during brief surveillance/maintenance tests, plant startups, and plant shutdowns and not for an entire year, a sensitivity analysis was performed to compare the core damage frequency (CDF) for the pump in standby versus the pump in operating mode using a "per year" basis. The change in CDF is due strictly to the change in the failure probability of the turbine-driven AFW to start.

With the turbine-driven AFW running, the baseline probabilistic risk assessment was adjusted with the pump failure-to-start probability set to "one" for the MSLB or FWLB scenario since the pump would be susceptible to overspeed trip upon an MSIS followed by EFAS. For other initiating events, the pump failure-to-start probability was set to "zero" since the pump would be running already and could support mitigation of these events. For the turbine-driven AFW in standby mode, the baseline probabilistic risk assessment (with the nominal turbine-driven AFW pump failure-to-start probability) was used. This nominal failure probability was used for all initiating events with the turbine-driven AFW pump in standby, including MSLB/FWLB events. The results are shown in the table below:

CDF Contributions According to Turbine-Driven AFW Operational Mode: Assumed to RUN for One Year Versus Assumed To Be in STANDBY for One Year			
	Turbine-Driven AFW RUNNING (for an entire year)	Turbine -Driven AFW in STANDBY (for an entire year)	Difference
MSLB/FWLB	6.55E-7/year	6.12E-7/year	4.3E-8/year
Other Initiating Events	2.57E-5/year	2.60E-5/year	- 3E-7/year
Total CDF	2.64E-5/year	2.66E-5/year	- 2E-7/year

The results presented in the table show that CDF contribution from MSLB/FWLB initiating events is greater by about 4E-8/year for an assumed condition where the turbine-driven AFW remains running for a year than for a condition where the pump is on standby for a year. On the other hand, the CDF contribution from other initiating events (i.e., loss of main feedwater, medium and small loss-of-coolant accidents, steam generator tube rupture, and loss of offsite power--all of which require AFW and occur with much higher frequency than MSLB/FWLB) is smaller by about 3E-7/year for the pump's "run" mode than for its "standby" mode. Based on these results, the licensee inferred that having the turbine-driven AFW operating instead of having it in standby increases the pump's reliability.

In addition to the above, the licensee estimated the actual cumulative risk incurred for the weighted fraction of time that the turbine-driven AFW is in the test configuration over a year period. Based on the past experience, the licensee estimated that the pump is run in manual operation for about 500 minutes per year, resulting in an annual net cumulative CDF reduction of about 2E-10/year due to the pump running in a manual mode.

With respect to external events, the licensee asserted that CDF due to an event like an earthquake while the turbine-driven AFW is being tested would also be reduced since an external event-induced MSLB/FWLB is unlikely. This conclusion was based on the plant's individual plant examination of external events in which a seismic-induced MSLB/FWLB was screened due to the seismic ruggedness of the main steam and feedline piping. The licensee further asserted that seismic-induced events such as a loss of offsite power actually benefit by having the turbine-driven AFW initially running. Therefore, the licensee concluded that the net result of having the pump operating in test is a risk benefit.

The staff agrees, based on the licensee's analyses, that the requested TS change could be risk beneficial; however, given the uncertainties that typically exist in these analyses, the staff considers the requested change to be essentially risk-neutral.

Based on the information submitted by the licensee and clarifications that were discussed, it is the staff's understanding that the requested change to TS 3.7.5 does not adversely affect the baseline CDF for SONGS and that the methodology and criteria established in RG 1.174 are satisfied for making risk-informed changes, that the turbine-driven AFW pump and associated flow control valves will respond automatically to an EFAS when the pump is operating in the manual mode without reliance on operator actions, and that the emergency operating procedures instruct operators on actions to take to restore the turbine-driven AFW pump in a timely manner should it trip on turbine overspeed. Therefore, the NRC staff finds that the requested change to TS 3.7.5 is acceptable.

#### 4.0 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.

#### 5.0 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 2991). 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 contributors: L. Raghavan  
S. Lee

Date: February 23, 2000





UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 24, 2000

Dr. Narasi Sridhar, Element Manager  
Corrosion Science and Process Engineering  
Center for Nuclear Waste Regulatory Analyses  
6220 Culebra Road, Building 189  
San Antonio, Texas 78238-5166


SUBJECT: ACCEPTANCE OF INTERMEDIATE MILESTONE 01402.571.005, "INPUT TO SAFETY EVALUATION REPORT ON DISPOSAL CRITICALITY ANALYSIS METHODOLOGY TOPICAL REPORT"

Dear Dr. Sridhar:

Container Life and Source Term (CLST) staff have reviewed the Center report, "Input to Safety Evaluation Report on Disposal Criticality Analysis Methodology Topical Report," submitted to me along with your letter dated February 3, 2000. Your report covers many important safety aspects related to disposal criticality. The report provides the staff with a thorough and extensive evaluation of DOE's analyses of criticality scenarios, criticality configurations, and probability of critical configurations. It will be integrated into NRC's Safety Evaluation Report for Disposal Criticality Analysis Methodology that is currently being prepared.

The Center report is acceptable and fulfills the requirements set forth in the FY 2000 Operations Plans for the CLST Key Technical Issue. However, this version will not be placed in the Public Document Room. As you know, the technical discussion is going on between NRC and the Center staffs to finalize the NRC's Safety Evaluation Report. Therefore this Center report needs to be revised incorporating the technical discussion being made now before being placed in the Public Document Room. If you or the authors of this report have any questions, please contact me at (301) 415-5812.

Sincerely,

  
Tae M. Ahn  
Program Element Manager  
High-Level Waste and Performance  
Assessment Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
And Safeguards

cc: J. Linehan  
B. D. Meehan

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