

February 22, 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 RE: CONDENSATE STORAGE TANK
CAPACITY (TAC NOS. MA4569 AND MA4570)

Dear Mr. Ray:

The Commission has issued the enclosed Amendment No. 162 to Facility Operating License No. NPF-10 and Amendment No. 153 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 Technical Specifications (TSS) in response to your application dated January 11, 1999 (PCN-499), as supplemented November 29, 1999.

The amendments change the minimum inventory of water maintained in the condensate storage tank (T-120) from 280,000 gallons to 360,000 gallons during plant operation Modes 1, 2, and 3.

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/

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. 162 to NPF-10
- 2. Amendment No. 153 to NPF-15
- 3. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 22, 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 RE: CONDENSATE STORAGE TANK
CAPACITY (TAC NOS. MA4569 AND MA4570)**

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The amendments change the minimum inventory of water maintained in the condensate storage tank (T-120) from 280,000 gallons to 360,000 gallons during plant operation Modes 1, 2, and 3.

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,

A handwritten signature in black ink, appearing to read "L. Raghavan", with a long horizontal line extending to the right.

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. 162 to NPF-10
2. Amendment No. 153 to NPF-15
3. Safety Evaluation

cc w/encls: See next page

San Onofre Nuclear Generating Station, Units 2 and 3

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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. 152
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 11, 1999, as supplemented November 29, 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. 162 , 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 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 22, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 162

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

3.7-16

INSERT

3.7-16

3.7 PLANT SYSTEMS

3.7.6 Condensate Storage Tank (CST T-121 and T-120)

LCO 3.7.6 The CST T-121 contained volume shall be \geq 144,000 gallons
and CST T-120 contained volume shall be \geq 360,000 gallons.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CST T-121 or T-120 contained volumes not within limit.	A.1 Verify OPERABILITY of backup water supply.	4 hours <u>AND</u> Once per 12 hours thereafter
	<u>AND</u> A.2 Restore CST T-121 and T-120 contained volumes to within limit.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4 without reliance on steam generator for heat removal.	18 hours



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. 153
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 11, 1999, as supplemented November 29, 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. 153 , 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 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 22, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 153

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

3.7-16

INSERT

3.7-16

3.7 PLANT SYSTEMS

3.7.6 Condensate Storage Tank (CST T-121 and T-120)

LC0 3.7.6 The CST T-121 contained volume shall be \geq 144,000 gallons and CST T-120 contained volume shall be \geq 360,000 gallons.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CST T-121 or T-120 contained volumes not within limit.	A.1 Verify OPERABILITY of backup water supply.	4 hours <u>AND</u> Once per 12 hours thereafter
	<u>AND</u> A.2 Restore CST T-121 and T-120 contained volumes to within limit.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4 without reliance on steam generator for heat removal.	18 hours



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 162 TO FACILITY OPERATING LICENSE NO. NPF-10

AND AMENDMENT NO. 153 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 application dated January 11, 1999, as supplemented November 29, 1999, Southern California Edison Company, et al. (SCE or the licensee), requested changes to the Technical Specifications (TSs) for San Onofre Nuclear Generating Station (SONGS), Units 2 and 3. The proposed changes would increase the required minimum inventory of water maintained in the condensate storage tank (CST) (T-120) from 280,000 gallons to 360,000 gallons during plant operation Modes 1, 2, and 3. The licensee's November 29, 1999, letter provided clarifications and additional information that were within the scope of the original Federal Register notice and did not change the staff's initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

The condensate storage and transfer system for each unit consists of two CSTs, T-120 and T-121, one condensate transfer pump, and their associated valves, piping, and instrumentation and controls. A cross-tie is provided between units to allow transfer of water from the CST system of one unit to the CST system of the other unit.

T-121, which has a capacity of 150,000¹ gallons, is designed in accordance with Seismic Category I requirements. It is sized, with the limiting single failure of an atmospheric dump valve (ADV), to provide sufficient water during a loss of offsite power (LOOP) for the auxiliary feedwater (AFW) system to maintain the reactor at a hot standby condition for 2 hours, and cool down the reactor coolant to the temperature at which the shutdown cooling (residual heat removal) system can be used to remove decay heat.

¹ TS requires a minimum of 144,000 gallons of water to be maintained in T-121 during plant operation Modes 1, 2 and 3.

T-120, which has a capacity of 500,000 gallons, is designed primarily to provide water for various non-safety-related plant services and systems (i.e., make-up source for the main condenser, chemical feed system, low-pressure turbine spray system, turbine plant cooling water tank, etc.). The safety function of the T-120 is to provide make-up water to T-121 via a gravity feed seismically qualified cross-connect line or the condensate transfer pump with appropriate valve lineups. T-120 is not designed to the Seismic Category I requirements; however, it is enclosed in a Seismic Category I concrete structure which is designed to retain sufficient water from the tank for the extended operation of the AFW system should the tank fail following a seismic event with LOOP. Following the T-120 rupture resulting from a seismic event, water is supplied to T-121 via another gravity-feed annular suction line connected between the T-120 enclosure and T-121.

The licensee stated that the minimum water inventory required to be maintained in the CST tanks is established in accordance with the guidance described in NRC Branch Technical Position (RSB 5-1) Section G, "Auxiliary Feedwater Supply."

RSB 5-1 Section G states:

The Seismic Category I water supply for the auxiliary feedwater system for a PWR [pressurized water reactor] shall have sufficient inventory to permit operation at hot shutdown for at least 4 hours, followed by cooldown to the conditions permitting operation of the residual heat removal (RHR) system. The inventory needed for cooldown shall be based on the longest cooldown time needed with either only onsite or only offsite power available with an assumed single failure.

During the original operating license application review, the staff in the Safety Evaluation Report (NUREG-0712) stated:

We require that the applicants provide an assured condensate supply sufficient for maintaining the plant at hot standby for four hours followed by cooldown to 350° F with a failure of one power operated relief valve. During the course of our review, we informed the applicants that a total of 24 hours of assured water supply (approximately 350,000 gallons) would be acceptable. This requirement necessitates the use of approximately 200,000 gallons of the condensate contained in the non-seismic Category I tank (T-120).

In order to achieve a minimum usable volume of 200,000 gallons in T-120 as required in the above-cited Safety Evaluation Report, the current TS was established to require a minimum of 280,000 gallons of water be maintained in T-120 during plant operation Modes 1, 2, and 3.

In February 1995, the licensee initiated an evaluation of potential losses² of water from T-120 following a design-basis earthquake (DBE). Results of the evaluation indicated that the minimum TS requirement of 280,000 gallons of water did not provide the assurance that

² Potential losses due the failure of non-Seismic Category I piping and isolation valves, and seismically induced spurious actuation of non-IE electrical equipment (valves and pumps) had not been properly reviewed during the initial licensing process.

200,000 gallons would be available from T-120 for 24-hour AFW pump operation to cool down the reactor coolant following a DBE with LOOP. Subsequently, in February 1996, the licensee took the following actions:

- Administratively increased the minimum water level in T-120 to 86.2 percent level (approximate 382,207 gallons).
- Revised operating procedures and abnormal operating instructions to require surveillance on each shift that the water level in T-120 is above the new minimum level, and to direct operators to perform certain actions (i.e., isolate the tank from damaged non-seismic equipment, align cross-tie to provide condensate make-up, etc.) within 30 minutes of a DBE.
- Required closing one unit's turbine plant cooling water (TPCW) make-up isolation valve, or maintaining an operator in attendance whenever the unit's condensate make-up systems are cross-tied to the other unit.

Following the above actions, the licensee performed additional calculations considering the identified potential losses of water from T-120³. Results of the calculations indicate that in order to ensure that 200,000 gallons of water would be available to satisfy the guidance described in RBS 5-1 Section G, 327,384 gallons of water is required to be maintained in T-120 during plant operation Modes 1, 2, and 3. Accordingly, the licensee proposed changes to the TS for both units to increase the minimum condensate inventory required to be maintained in T-120 from the current requirement of 288,000 gallons to 360,000⁴ gallons.

3.0 EVALUATION

The staff has reviewed the licensee's calculations presented in an attachment, "BTP RSB 5-1 Condensate Inventory," to the submittal. The staff has also evaluated the human performance aspects of the proposed operator action associated with the TS changes.

3.1 Technical Analysis

The following requirement of water for different components/systems and the potential losses of water from T-120 have been considered in the calculations:

- Water required to support cooldown of the reactor for 24 hours of operation with one ADV.
- Leakage through the T-120 concrete enclosure following a DBE and rupture of T-120.
- Losses from valve leakage in the AFW system during delivery of water to the steam generator following a DBE and LOOP.

³ See Section 3.0, "Evaluation," of this safety evaluation.

⁴ Including a margin of 32,616 gallons which can be allocated to future usage and/or losses.

- Unrecoverable water (unusable volume) in the T-120 enclosure.
- Unrecoverable water (unusable volume) in T-120.
- Steam generator shrinkage.
- Losses due to non-seismic pipe break outside the T-120 enclosure.
- Losses due to non-IE and/or mechanical control system interactions.
- Losses through the AFW pump packing.
- Loss due to make-up to the seismically induced cracking of the TPCW tank.
- Seal water loss.

Based on its review, the staff finds that the potential losses of water from T-120 following a DBE have been properly identified and that the assumptions used in the calculations for the worst-case scenario have been reasonably considered. Therefore, the staff finds results of the calculations acceptable.

3.2 Human Performance - Manual Operator Action

The licensee maintains that the proposed increase in CST water volume is sufficient to continue meeting its design basis provided that operators can manually isolate valve MU-092 within 30 minutes after the initiation of a DBE and operators can isolate valve HV-5715 within 90 minutes after the initiation of a DBE.

3.2.1 Basis and Guidance for the Evaluation

The staff used the following regulations and guidance relevant to compensatory operator actions and response times to evaluate the licensee's submittal: 10 CFR 50.59, "Changes, tests, and experiments"; NRC Information Notice 97-78, "Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times"; NRC Regulatory Guide 1.174, "An Approach For Using Probabilistic Risk Assessment In Risk-Informed Decisions On Plant-Specific Changes to the Licensing Basis"; and applicable guidance contained in NUREG-0800, Standard Review Plan, Chapter 18, "Human Factors Engineering." The staff's review focused on the use of operator actions as they were described in the documents identified in the background section of this report.

3.2.2 Finding

From a review of the licensee's January 11, 1999, submittal, including Attachment G, "Calculations," it appeared that operator action times (i.e., 30 minutes for valve MU-092 and 90 minutes for valve HV-5715) were derived from calculated tank flow losses that occur under selected accident conditions. In response to a telephone discussion with the staff on October 25, 1999, by letter dated November 29, 1999, the licensee provided additional clarifying information. In its November 29, 1999, letter, the licensee indicated that, "the manual operator actions associated with isolation of the Condensate storage tanks were walked down

and verified. The operator performing the walkdown used the Appendix R safe shutdown routes. They were dispatched from the control room and took their time. The operator signed on to a radiation exposure report form and obtained an oxygen monitor as part of the walkdown. The 30 minute actions were completed within 20 minutes and the 90 minute actions were completed within one hour." The licensee further stated that, "the 90 minutes is the assumed time it would take to close 2HV-5715, which is inside the refueling water storage tank vault. Therefore, assuming 90 minutes to close 3HV-5715 is conservative because 3HV-5715 is located outside the refueling water storage tank vault."

In addition, the licensee provided a copy of the current SONGS abnormal operating instruction (SO23-13-3), "Earthquake (Temporary Change Notice 5-2), which contains the specific steps required by the operator to safely and successfully close the valves. Attachment 1 to the procedure identified (page 8 of 30) as a "Note," that a Radiation Exposure Permit (REP) "is normally required for entry into the RWST [refueling water storage tank] vault, but for expediency in closing S2(3) 1414MU092 it may be necessary to notify HP [Health Physics] and proceed directly to the vault. The RWST Vaults are also Confined Spaces, so an O₂ monitor will be required for entry." A second "Note" in the procedure indicated that, "3T-121 Room is a Confined Space with a history of O₂ deficiency, [and] it is recommended that an SCBA [self-contained breathing apparatus] be donned in the Control Room prior to proceeding to 3HV-5715." The staff interprets the licensee's November 29, 1999, statement that, "the manual operator actions associated with isolation of the condensate storage tanks were walked down and verified..." to have included performing the actions required by the two "Notes."

In response to the staff's question related to the risk associated with the proposed introduction of manual actions to isolate valves MU-092 and HV-5715 within the allowable times, the licensee provided two probabilistic risk assessments (PRAs) for determining the increase in core damage frequency (CDF) as a result of CST T-120 flow diversion during seismic or high energy line break events inside the turbine building. In the first assessment, the impact of reduced condensate inventory following a seismic event on the time available for operators to successfully transition from hot shutdown to shutdown cooling (SDC) was assessed, crediting operator actions to initiate reactor coolant system (RCS) cooldown and SDC operation in a timely manner and considering the potential for component failures (e.g., atmospheric dump valves, SDC pumps or valves that could not be repaired prior to core damage with reduced condensate inventory). The first assessment did not credit operator action for isolating the CST T-120 flow diversion by locally closing valves HV-5715 and MU-092. Results of the first assessment indicated a potential increase in CDF of approximately 2E-6 per year (the estimate did not include the potential recovery of certain SDC system hardware failures such as motor-operated valves (MOVs) and breakers failing to open, with such failures being assumed recoverable by operators within 1-2 hours after the system failure occurs). The licensee did not perform an uncertainty analysis because it believed the analysis was conservative and the results were assumed to represent an upper bound. In a second assessment, in which operator actions required to isolate both valves were credited with 10 minutes used as "the average time taken by operators to isolate the CST T-120 flow diversion," the CDF was estimated at about 5E-7/yr. Both risk assessments were evaluated as satisfactory and the risk associated with the proposed compensatory manual actions as acceptable.

The proposed change meets the NRC's current regulatory position related to compensatory manual actions.

Based on the staff's review and evaluation of the licensee's January 11, 1999, and November 29, 1999, submittals, the staff concludes that the licensee has provided sufficient information to demonstrate that the compensatory manual operator actions are acceptable.

3.3 Summary

Based on its review of the licensee's rationale and calculations, and the licensee's proposed revision to its operating procedures relating to the manual operator actions (i.e., isolating and/or aligning the appropriate valves, secure or actuate the appropriate pumps, etc.) required following a seismic event with LOOP, the staff concludes that the proposed TS minimum volume of 360,000 gallons to be maintained in T-120, in conjunction with the 144,000 gallons maintained in T-121, will ensure that sufficient water is available to maintain the RCS at Hot Standby conditions for 24 hours including cooldown to SDC initiation following a DBE with LOOP and most limiting single failure. The licensee will make changes to the appropriate TS Bases section associated with the amendments.

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 2648). 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: D. Shum, NRR
J. Bongarra, NRR

Date: February 22, 2000