



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005

February 15, 2007

Richard M. Rosenblum  
Senior Vice President and  
Chief Nuclear Officer  
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 - NRC  
INSPECTION REPORT 05000361/2006010; 05000362/2006010

Dear Mr. Rosenblum:

On August 18, 2006, the US Nuclear Regulatory Commission (NRC) completed an inspection at your San Onofre Nuclear Generating Station, Units 2 and 3. The enclosed inspection report documents the inspection results, which were discussed on February 15, 2007, with Mr. Rauch and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license associated with your plant-referenced simulator. Specifically, this inspection focused on addressing an unresolved item (URI 05000361;362/2005302-02) related to the use of the plant simulator for the administration of both the operating test and experience requirements. The inspectors reviewed selected procedures and records and observed simulator testing.

Despite some analysis and documentation issues associated with Cycle 13 simulator testing, the inspectors agreed with your determination that the San Onofre Nuclear Generating Station simulator models for Cycle 13 had adequate fidelity for use in the administration of both the operating test and experience requirements (control manipulation credits) and met the requirements contained in 10 CFR 55.46(c)(3).

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Dwight D. Chamberlain, Director  
Division of Reactor Safety

Dockets: 50-361; 50-362  
Licenses: NPF-10; NPF-15

Enclosure:  
Inspection Report 05000361/2006010; 05000362/2006010  
w/Attachment - Supplemental Information

cc w/enclosure:  
Chairman, Board of Supervisors  
County of San Diego  
1600 Pacific Highway, Room 335  
San Diego, CA 92101

Gary L. Nolf  
Assistant Director-Resources  
City of Riverside  
3900 Main Street  
Riverside, CA 92522

Mark L. Parsons  
Deputy City Attorney  
City of Riverside  
3900 Main Street  
Riverside, CA 92522

Ray W. Waldo  
Southern California Edison Company  
San Onofre Nuclear Generating Station  
P.O. Box 128  
San Clemente, CA 92674-0128

David Spath, Chief  
Division of Drinking Water and  
Environmental Management  
California Department of Health Services  
P.O. Box 942732  
Sacramento, CA 94234-7320

Michael R. Olson  
San Onofre Liaison  
San Diego Gas & Electric Company  
8315 Century Park Ct. CP21G  
San Diego, CA 92123-1548

Director, Radiological Health Branch  
State Department of Health Services  
P.O. Box 997414 (MS 7610)  
Sacramento, CA 95899-7414

Mayor  
City of San Clemente  
100 Avenida Presidio  
San Clemente, CA 92672

James D. Boyd, Commissioner  
California Energy Commission  
1516 Ninth Street (MS 34)  
Sacramento, CA 95814

Douglas K. Porter, Esq.  
Southern California Edison Company  
2244 Walnut Grove Avenue  
Rosemead, CA 91770

James T. Reilly  
Southern California Edison Company  
San Onofre Nuclear Generating Station  
P.O. Box 128  
San Clemente, CA 92674-0128

Daniel P. Breig  
Southern California Edison Company  
San Onofre Nuclear Generating Station  
P.O. Box 128  
San Clemente, CA 92674-0128

Southern California Edison Company

-4-

A. Edward Scherer  
Southern California Edison Company  
San Onofre Nuclear Generating Station  
P.O. Box 128  
San Clemente, CA 92674-0128

Brian Katz  
Southern California Edison Company  
San Onofre Nuclear Generating Station  
P.O. Box 128  
San Clemente, CA 92674-0128

Electronic distribution by RIV:

Regional Administrator (**BSM1**)

DRP Director (**ATH**)

DRS Director (**DDC**)

DRS Deputy Director (**RJC1**)

Senior Resident Inspector (**CCO1**)

Branch Chief, DRP/D (**TWP**)

Senior Project Engineer, DRP/D (**GEW**)

Team Leader, DRP/TSS (**RLN1**)

RITS Coordinator (**KEG**)

DRS STA (**DAP**)

V. Dricks, PAO (**VLD**)

D. Cullison, OEDO RIV Coordinator (**DGC**)

**ROPreports**

Site Secretary (vacant)

SUNSI Review Completed: Y\_\_\_\_\_ADAMS: ☒ Yes    ☐ No    Initials: \_ATG\_  
☒ Publicly Available    ☐ Non-Publicly Available    ☐ Sensitive    ☒ Non-Sensitive

| OE:OB         | OE:OB/RI | OE:IOLB/NRR        | C:PBD   | C:OB    | D:DRS         |
|---------------|----------|--------------------|---------|---------|---------------|
| KDClayton/lmb | PPresby  | LVick              | TPruett | AGody   | DDChamberlain |
| /RA/          | /RA/     | <b>Non-concur*</b> | /RA/    | /RA/    | /RA/          |
| 8/18/06       | 8/19/06  | 10/19/2006         | 9/1/06  | 2/15/07 | 2/15/07       |

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

\* **ML0629204872**

\* **ML070460459**

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 50-361; 50-362

Licenses: NPF-10; NPF-10

Report No.: 05000361/2006010; 05000362/2006010

Licensee: Southern California Edison Co.

Facility: San Onofre Nuclear Generating Station, Units 2 and 3

Location: 5000 S. Pacific Coast Hwy.  
San Clemente, California

Dates: Onsite inspection was March 13 - 17, 2006  
In office inspection was March 6 through August 18, 2006

Inspectors: K. D. Clayton, Operations Engineer, Operations Branch, Region IV  
P. Presby, Operations Engineer, Operations Branch, Region I

Additional Review By: L. Vick, Operations Engineer, Initial Operator Licensing Branch  
Office of Nuclear Reactor Regulation

Approved By: Anthony T. Gody, Chief  
Operations Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000361/2006010; 05000362/2006010; March 13 - August 18, 2006; San Onofre Nuclear Generating Station, Units 2 and 3: Biennial Licensed Operator Requalification (Simulator Specific) Inspection (IP 71111.11B).

The report covered an 23-week period of onsite and offsite inspection by two operations engineers. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### NRC-Identified and Self Revealing Findings

No findings of significance were identified.

## REPORT DETAILS

### 1 REACTOR SAFETY

#### 40A5 OTHER

1. (Closed) Unresolved Item (URI) 05000361;362/2005302-02, Adequacy of Plant-Referenced Simulator to Conform with Simulator Requirements for Reactivity and Control Manipulation Credits.

- a. Inspection Scope

#### Purpose

This inspection addressed an unresolved item documented in NRC Examination Report 05000361;362/2005302 dated January 25, 2006. Specifically, the inspectors assessed the adequacy of the San Onofre Nuclear Generating Station simulator facility for use in reactivity/control manipulation credits on an initial operator license application NRC Form 398, "Personal Qualification Statement–Licensee," as prescribed in 10 CFR 55.46, "Simulation facilities." The inspection was conducted through a review of the licensee's implementation of a preselected number of simulator scenarios and other performance-based tests on the simulator and an in-office review of a sample of the documentation for control manipulations, unit performance testing, and transient testing.

#### Background

While conducting onsite preparations for an initial licensing examination the week of October 3, 2005, the inspectors reviewed data provided on NRC Form 398, "Personal Qualification Statement - Licensee," for selected operator license candidates as required by NUREG-1021, "Operator License Examination Standards for Power Reactors," Revision 9. During the review, the inspectors noted that five operator license candidates used the simulator extensively for meeting the significant control manipulation requirements in 10 CFR 55.31(a)(5). Of the 25 reactivity credits required for these five operators, 22 credits were taken on the simulator instead of the actual plant. Use of the simulator for control manipulations is permitted, provided the licensee's simulator meets the requirements of 10 CFR 55.46(c)(3). Accordingly, the inspectors expanded the pre-examination review to verify that the simulator met the requirements of 10 CFR 55.46(c)(3). This review focused on the licensee's implementation of simulator testing in accordance with ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination." Specifically, the inspectors reviewed 100 percent of the 2005 simulator testing records, which included all transient and unit performance tests. The review identified one green finding associated with the adequacy of simulator transient test documentation, which was documented in NRC Examination Report 05000361;362/2005302. In addition to the green finding, the inspectors identified an unresolved item (URI 05000361;362/2005302-02) associated with adequacy of documentation of the scenarios associated with the control manipulations. Specifically, the inspectors identified that the licensee had retained a single-page sign-off sheet and a copy of the actual procedure used by the operator candidates as the documentation required by 10 CFR 55.46(d)(1) for their



scenario-based tests. Some of these scenario-based tests were used to validate the actual control manipulation scenarios used by the aforementioned operator candidates. This method of documenting scenario-based tests had been observed at other facilities in the past and was the subject of considerable industry effort to improve documentation of scenario-based tests at the time of the inspectors review. To verify that the simulator had no significant fidelity issues under conditions similar to the aforementioned control manipulations, the inspectors reviewed additional documentation which allowed a limited assessment of simulator fidelity under conditions similar to those used for the control manipulations. Specifically, the limited assessment conducted by the inspectors included a comparison of simulator performance to the reference plant data collected during startups. Despite the identified documentation issues, the inspectors found that the simulator demonstrated adequate fidelity. Because no actual simulator fidelity issues were identified during the initial review that affected the planned examination, the initial license examination was conducted using the plant-referenced simulator. During the examination, the applicants who demonstrated that they could safely operate the facility and passed the examination, were issued licenses.

#### Followup Inspection

In order to address the unresolved item associated with documentation issues, the inspectors conducted an onsite inspection in March 2006. While onsite, the inspectors re-reviewed the raw data from the simulator and the reference plant for Cycle 13 and conducted an independent analysis. While conducting this review, the inspectors discussed the need for the licensee's training staff to modify their data collection methods to avoid the corruption they experienced in their original graphs, which was responsible for creating confusion in understanding the validity of their testing. In addition, the inspectors reviewed the fidelity of the simulator during low power physics testing for both Cycles 13 and 14.

The inspectors observed the licensee operate the simulator during selected control manipulations. The randomly selected scenarios were:

- Scenario 1: 3 to 18 percent power increase
- Scenario 2: 80 to 92 percent power increase

The inspectors controlled Scenario 1 by using actual plant data provided by the licensee in order to match the time for the control rod pulls and boron dilutions. However, the plant data used in the test was not correct and the test had to be rerun the following week. Scenario 2 also could not be performed during the inspection week, because the simulator had just undergone a major modeling upgrade and the corresponding initial condition set for the simulator had not been created prior to the onsite portion of the inspection. These tests were ran the following week by the licensee and the results were submitted to the inspectors with the licensee's analyses and conclusions. The inspectors performed independent analyses to verify the results and confirm the licensee's conclusions.

b. Findings

Following the re-review of Cycle 13 data, the inspectors found that the simulator demonstrated adequate fidelity when compared to the reference plant for Cycle 13. The review of low power physics testing identified some differences between the simulator and the reference plant, however, the inspectors found that the identified differences between the simulator and the reference plant were transparent to the operators, would not affect training or testing, and were minor. The inspectors agreed with the licensee's conclusions that no significant fidelity issues existed in the data sets sampled for Cycle 14.

Overall, the inspectors found that the San Onofre Nuclear Generating Station simulator model fidelity was acceptable for use in the administration of both the operating test and experience requirements in 10 CFR 55.31(a)(5) as described in 10 CFR 55.46(c)(3). The inspectors agreed with the licensee's determination that simulator fidelity was adequate, and that significant control manipulations could be completed without procedural exceptions, simulator performance exceptions, or deviations from the approved training scenario. In addition, the inspectors agreed with the licensee's conclusion that the San Onofre Nuclear Generating Station plant-referenced simulator utilized thermal-hydraulic models that adequately replicated the most recent core load.

No findings of significance were identified and the unresolved item was closed.

4OA6 Meetings, Including Exit

On March 17, 2006, the inspectors briefed Mr. K. Rauch and other members of his staff on the results of the onsite portion of the licensed operator requalification simulator inspection. A final telephonic exit was held with Mr. K. Rauch on February 15, 2007. The licensee acknowledged the conclusions presented in both the briefing and the final exit.

The inspectors confirmed that proprietary information was not provided or examined during this inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

### Licensee Personnel

K. Rauch, Operations Training Manager  
A. Hagemeyer, Operations Training Supervisor  
J. Holt, Nuclear Regulatory Affairs

## LIST OF ITEM CLOSED AND DISCUSSED

### Closed

|                        |     |                                                                                                                               |
|------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------|
| 5000361;362/2005302-02 | URI | Adequacy of Plant-Referenced Simulator to Conform with Simulator Requirements for Reactivity and Control Manipulation Credits |
|------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------|

## LIST OF DOCUMENTS REVIEWED

### Procedures

SIMTAG-400, "SONGS Simulator Core Physics Testing"

NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9

Plant Physics Data Book, Cycles 13 and 14

Reactivity manipulation packages for all 21 manipulation credits

Five applicants' Initial Operator License Application Forms (NRC Form 398)

Simulator and Plant packages for 3 to 18 percent power increase (Cycle 13), two runs

Simulator and Plant packages for 80 to 92 percent power increase (Cycle 13)

ANSI/ANS 3.5-1998, "Nuclear Power Simulators for Use in Operator Training"

ANSI/ANS 19.6.1-1997, "Reload Startup Physics Tests for Pressurized Water Reactors"

SO23-XXXVII-1, "Low Power Physics Testing," Revision 3, used for Cycles 13 and 14

All Transient Test packages for 2005 and 2006 annual performance tests

All Steady State Test packages for 2005 and 2006 annual performance tests