



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

January 25, 2006

Richard M. Rosenblum  
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  
EXAMINATION REPORT 05000361/2005302; 05000362/2005302**

Dear Mr. Rosenblum:

On October 28, 2005, the NRC completed an examination at your San Onofre Nuclear Generating Station, Units 2 and 3 facility. The enclosed report documents the examination findings, which were discussed on October 27, 2005, with Mr. D. Breig, Station Manager, and other members of your staff. An additional meeting was held telephonically on December 13, 2005, with Messrs. K. Rauch and M. Jones to discuss the resolution of the proposed findings presented at the October 27 exit meeting.

The examination included the evaluation of 4 applicants for reactor operator licenses, 2 applicants for an instant senior operator license, and 4 applicants for upgrading their reactor operator licenses to senior operator licenses. In addition, the examination included an evaluation of a reactor operator applicant that was retaking only the written portion of the examination, which had been previously administered on April 29, 2005. The written and operating examinations were developed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9. The license examiners determined that all 11 of the applicants satisfied the requirements of 10 CFR Part 55, and the appropriate licenses have been issued.

In addition, the report documents one finding of very low safety significance (Green). If you contest the finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at San Onofre Nuclear Generating Station.

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/

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

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

Enclosure:  
NRC Examination Report  
05000361/2005302; 05000362/2005302

Chairman, Board of Supervisors  
County of San Diego  
1600 Pacific Highway, Room 335  
San Diego, CA 92101

Gary L. Nolf  
Power Projects/Contracts Manager  
Riverside Public Utilities  
2911 Adams Street  
Riverside, CA 92504

Eileen M. Teichert, Esq.  
Supervising 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  
P.O. Box 1831  
San Diego, CA 92112-4150

Ed Bailey, Chief  
Radiologic 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

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**)  
 J. Dixon-Herrity, OEDO RIV Coordinator (**JLD**)  
**ROPreports**  
 Assisting Site Secretary

SUNSI Review Completed:   Y   ADAMS:  Yes  No Initials:   ATG    
 Publicly Available  Non-Publicly Available  Sensitive  Non-Sensitive

SOE:OB	SOE:OB	OE:OB	SPE:PBD	C:OB	C:PBD	C:OB
TFStetka/lmb	PCGage	KClayton	GEWerner	ATGody	TPruett	ATGody
/RA/	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/
1/6/06	1/9/06	1/9/06	1/9/06	1/11/06	1/25/06	1/25/06

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 50-361; 50-362  
Licenses: NPF-10; NPF-15  
Report No.: 05000361/2005-302; 05000362/2005-302  
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: October 24-28, 2005 and November 7 - December 13, 2005  
Examiners: T. Stetka, Senior Operations Engineer, Operations Branch  
P. Gage, Senior Operations Engineer, Operations Branch  
K. Clayton, Operations Engineer, Operations Branch  
G. Werner, Senior Project Engineer, Project Branch D  
Approved By: Anthony T. Gody, Chief  
Operations Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

ER 05000361/2005-302; 05000362/2005-302; 10/24-28/2005; San Onofre Nuclear Generating Station, Units 2 and 3; Initial Operator Licensing Examinations.

NRC examiners evaluated the competency of five applicants for reactor operator licenses, two applicants for an instant senior operator license, and four applicants for upgrading their reactor operator licenses to senior operator licenses. In addition, the NRC examiners evaluated the competency of one applicant for a reactor operator license that was only taking the written examination. The written and operating examinations were developed by the licensee using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9. The written examination was administered by the facility and the NRC to the applicants on October 28, 2005. The NRC examiners administered the operating tests on October 24-27, 2005. One Green Finding was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. 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.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstones: Initiating Events and Mitigating Systems

Green. A Green finding was identified for the licensee's failure to conduct simulator performance testing in accordance with ANSI/ANS 3.5, 1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination." A review of the malfunction tests contained in the annual performance test book for the simulator revealed that several transient parameters did not include all necessary data. In addition, differences in transient parameters between the simulator data and the actual plant data were not documented or justified. This is considered to be a Green finding using the Operator Requalification Human Performance Significant Determination Process (SDP) because it is a requalification training issue related to simulator fidelity. The lack of data affects the ability of the simulator transient tests to detect simulator fidelity issues. It is more than minor because these issues (simulator fidelity) can contribute to human error, which can directly impact the Human Performance attribute for both the Initiating Events and Mitigating Systems Cornerstones. The objectives of these two cornerstones are 1) to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown, as well as power operations; and 2) to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, respectively. This is a finding of very low safety significance because the discrepancies have not impacted operator actions in the plant.

This is considered to be a performance deficiency because San Onofre Nuclear Generating Station has committed to conduct testing in accordance with ANSI/ANS 3.5, 1998, as endorsed by Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Revision 3, October 2001. Specifically, ANSI/ANS 3.5, 1998 specifies that certain key parameters be measured and analyzed. The ANSI standard also specifies that any differences between the simulator data and the actual plant data be analyzed and justified.

The performance deficiency is more than minor because inadequate simulator transient tests affects the ability to detect fidelity issues with the simulator, which degrade the Human Performance attribute (human error) of the Initiating Events and Mitigating Systems cornerstones (Section 4OA4.1).

B. Licensee-Identified Violations.

No findings of significance were identified.

## Report Details

### 4. OTHER ACTIVITIES (OA)

#### 4OA4 Initial Operator License Examination

##### .1 Operator Knowledge and Performance

###### a. Scope

On October 28, 2005, the licensee and 1 NRC examiner proctored the administration of the written examination to 11 applicants. One reactor operator license applicant had passed the operating test in April 2005, but failed the written examination. This applicant was granted a waiver from retaking the operating test by the NRC and was allowed to retake the written examination. The licensee staff graded the written examinations, analyzed the results, and presented the proposed grades together with their analysis to the NRC on November 7, 2005.

The NRC examination team administered the operating test to 10 applicants on October 24-27, 2005. The applicants for reactor operator licenses and for instant senior operator licenses participated in 2 dynamic simulator scenarios. The applicants for upgrading their reactor operator's license to a senior operator license participated in 1 dynamic simulator scenario. The 4 applicants for reactor operator participated in a control room and facilities walkthrough test consisting of 11 system tasks, and an administrative test consisting of 1 task in each of four areas. The 4 applicants that were upgrading their operator license to a senior operator license participated in a control room and facilities walkthrough test consisting of 5 system tasks. The applicants seeking an instant senior operator license participated in a control room and facilities walkthrough test consisting of 10 system tasks. The administrative test for all senior operator applicants consisted of performing tasks in 5 areas.

###### b. Findings

All 10 of the applicants passed all parts of the operating test. All 11 of the applicants passed the written examination. For the written examinations, the reactor operator applicants' average score was 93.2 percent and the senior operator applicants' average score was 89.5 percent. The reactor operator applicant scores ranged from 89 to 96 percent and the senior operator applicant scores ranged from 85 to 93 percent.

Chapter ES-403 and Form ES-403-1 of NUREG 1021 require the licensee to analyze the validity of any written examination questions that were missed by half or more of the applicants. The licensee conducted this performance analysis for five questions that met this criteria and submitted the analysis to the chief examiner on November 7, 2005. This analysis concluded that the five questions were valid as written. One question, senior reactor operator-only Question 99, was found to be missing some information regarding the control of shutdown systems during a fire (however, the missing

information did not affect the validity of this question). The licensee plans on modifying this question prior to future use. In addition, the licensee plans on conducting remedial training on these five questions and evaluating the training program to determine if there are weaknesses in the subjects addressed by these five questions. The licensee has entered this into their corrective action program as Action Request 051100174.

.3 Initial Licensing Examination Development

The licensee developed the examinations in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9. Licensee facility training and operations staff involved in examination development were on a security agreement.

.3.1 Examination Outline and Examination Package

a. Examination Scope

The facility licensee submitted the written and operating examination outlines on June 30, 2005. Examiners reviewed the submittal against the requirements of NUREG-1021, Revision 9. The facility licensee submitted the draft examination package on August 29, 2005. Examiners reviewed the draft submittals against the requirements of NUREG-1021, Revision 9, and provided comments to the licensee on September 28, 2005. The chief examiner conducted an onsite validation of the operating examinations and provided further comments during the week of October 3, 2005. The licensee satisfactorily completed comment resolution on October 14, 2005.

b. Findings

Examiners approved the initial examination outline with minor comments and advised the licensee to proceed with the written and operating examination development.

While the examiners considered the written examination to be adequate, they noted that the number of unacceptable questions in the overall submittal was outside the acceptable quality range of less than or equal to 20 percent expected by the NRC. Specifically, 25 percent of the 75 reactor operator questions and 28 percent of the 25 senior operator questions required replacement or significant modification. The majority of questions on the reactor operator examination that required replacement or significant modification (8 questions) involved a subject mismatch between the knowledge and abilities catalog and the examination questions. The majority of questions on the senior operator examination that required replacement or significant modification (5 questions) involved a failure to develop an "SRO Only" question. These review results were discussed with licensee representatives.

The chief examiner determined that the operating examinations initially submitted by the licensee were within the range of acceptability expected for a proposed examination.

No findings of significance were identified.

### .3.2 Simulation Facility Performance

#### a. Examination Scope

The examiners observed simulator performance with regard to plant fidelity during the examination validation week and during the examination administration week. While onsite for preparation the week of October 3, 2005, several "Personal Qualification Statement–Licensee" 398 forms were reviewed as required by NUREG-1021, Revision 9. During the review, it was determined that several applicants were taking credit for reactivity and control manipulations on the simulator instead of on the actual plant. While simulator use for reactivity and control manipulation is permitted by 10 CFR 55.46, the simulator must meet the appropriate standards of fidelity, as required by 10 CFR 55.46(c)(2). Based on this observation and the requirements of 10 CFR 55.46, the examiners expanded their review of the simulator testing. This review expansion included a review of the simulator annual performance test book.

#### b. Findings

The examiner's review of the simulator annual performance test book revealed two issues with the performance test documentation.

### .3.2.1 Failure to Conduct Simulator Testing in Accordance with ANSI/ANS 3.5, 1998

Introduction. The examiners identified a Green finding with the following two examples of failing to conduct simulator performance testing in accordance with ANSI/ANS 3.5, 1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination":

- (b) The annual simulator transient performance tests did not record all required parameters, and
- (c) Differences in key parameters between the simulator and the actual plant were not documented or justified.

Description. A review of the malfunction tests contained in the annual performance test book for the simulator revealed that several key parameters were missing their corresponding charts and were subsequently not analyzed. Average reactor coolant system temperature (Tave) was missing from 7 of the 11 transients, total steam flow was missing from 3 of the 11 transients, steam generator levels were missing from Transient Test Four (a trip of all reactor coolant pumps), and no parameters were documented for Transient Test Six (turbine trip with failure of the reactor to trip). Several other charts were missing for either the simulator or the actual plant and in some cases there was no supporting documentation or written analysis to explain these omissions. In cases where the parameters were available, it was noted that the trend of some of the parameters in the simulator were inconsistent with the trend of these same parameters in the actual plant. When the examiners requested the supporting analysis

documentation for these inconsistencies, the licensee was unable to provide the data. The 1998 version of ANSI/ANS 3.5, requires that the annual simulator performance tests be conducted, such that, the key parameters listed in Appendix B of this standard are recorded and these records be compared to actual or reference plant data (if available) or engineering data from the Final Safety Analysis Report (FSAR). If such engineering data is not available in the FSAR, the standard permits the use of a subject matter expert to determine acceptability of the test.

As stated earlier, for the malfunction or transient tests, the ANSI/ANS 3.5 standard requires that these chart comparisons have supporting documentation for the differences in trend and direction between the simulator and the actual or reference plant. The following are some examples where supporting documentation required by ANSI/ANS 3.5 was omitted.

- A pressurizer level direction difference existed between the actual plant and the simulator for the dual feed pump trip malfunction (Test 2).
- A relief valve flow rate difference existed between the simulator and the FSAR for the stuck open pressurizer relief valve malfunction (Test 10). The steady state flow rate of the pressurizer relief valve in the simulator for this malfunction is approximately 240 lbm/sec while the FSAR figure 15.6-35 displays a steady state flow rate of approximately 50 lbm/sec for this malfunction.

For each of these malfunctions, there was no corresponding discussion or analysis in the simulator annual performance test book to document the differences as required by ANSI/ANS 3.5.

Analysis. The examiners determined that the failure to adhere to ANSI/ANS 3.5, 1998 as endorsed by Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Revision 3, October 2001, was a performance deficiency because San Onofre Nuclear Generating Station has committed to conduct testing in accordance with this standard and regulatory guide. Specifically, the simulator performance testing did not meet the standards specified in ANSI/ANS 3.5, 1998, in that, (1) all required parameters during the simulator test were not recorded; and (2) simulator to actual plant differences identified during testing were not documented and justified.

The NRC has determined that traditional enforcement does not apply because the issue did not have any actual safety consequence or potential for affecting the NRC's regulatory function and did not result in any willful violation of NRC requirements or licensee procedures. The performance deficiency is more than minor because it affected the Operator Requalification attribute of the Initiating Events and Mitigating Systems cornerstones of Reactor Safety.

The finding was evaluated using the Operator Requalification Human Performance Significant Determination Process (SDP) because it is a requalification training issue related to simulator fidelity. The SDP, Appendix I, Block 12, requires the examiner to

determine if deviations between the plant and simulator could impact operator actions through negative training. Standard ANSI/ANS 3.5, 1998, defines negative training as training that either causes an operator to incorrectly respond or has the potential to cause the operator to incorrectly respond to an event. Appendix I, Block 12, of the SDP further requires the examiner to determine whether the simulator meets the performance requirements of 10 CFR 55.46.

The failure to conduct and document simulator performance testing is inconsistent with the requirements of 10 CFR 55.46, in that, simulator fidelity issues are not being identified and have the potential of causing negative training. Therefore, it can be concluded in Block 12 that deviations between the actual plant and the simulator have the potential to impact operator actions. This results in a finding of very low significance (Green). The finding was considered to be of very low safety significance because the discrepancies have not yet impacted operator actions in the plant, such that, safety-related equipment was made inoperable or that operators failed to properly respond to plant transients.

Enforcement. No violation of regulatory requirements occurred. The examiners determined that the finding did not represent a noncompliance because San Onofre Nuclear Generating Station performed some testing even though the testing was not sufficient in scope to meet ANSI/ANSI 3.5, 1998, and because no actual events have occurred that could be attributed to a lack of simulator fidelity testing. FIN 05000361;362/2005302-01, Failure to Conduct Simulator Testing in Accordance with ANSI/ANS 3.5, 1998.

### .3.2.2 Adequacy of Plant-Referenced Simulator to Conform with Simulator Requirements for Reactivity and Control Manipulation Credits

The second issue concerned the licensee's use of the simulator to meet experience requirements for applicants for initial operator and senior operator licenses in accordance with 10 CFR 55.46(c)(2)(ii). For the reactivity and control manipulations, the licensee used a single page "sign-off" sheet for documentation. For reactivity and control manipulation credit on the simulator, the regulation requires "in part" that significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence. Furthermore, ANSI/ANSI 3.5, 1998, requires that these items be performed without offsets in the simulator, without time-compression techniques, that expected alarms are generated as required in real time with no unexpected alarms generated during the scenario sequence. The documentation included as part of the simulator annual performance test book provided by the licensee to the examiners could not be used to verify each of the requirements as specified in the regulations and standards.

The safety significance of this issue could be more than minor due to the apparent failure to meet the requirements of 10 CFR 55.46(c)(2)(ii) with regard to assuring maintenance of the plant referenced simulator fidelity. Accordingly, an unresolved Item\_ was opened pending further review of the simulator in subsequent inspections. The licensee was gathering additional information and documentation for further NRC review. The licensee entered this issue into their corrective action program as Action Request AR051200698. URI 05000361;362/2005302-02, Adequacy of Plant-Referenced Simulator to Conform with Simulator Requirements for Reactivity and Control Manipulation Credits.

### .3.3 Examination Security

#### a. Scope

The examiners reviewed examination security both during the onsite preparation week and examination administration week for compliance with NUREG-1021 requirements. Plans for simulator security and applicant control were reviewed and discussed with licensee personnel.

#### b. Findings

No findings of significance were identified.

### 4OA5 Management Meetings

#### .1 Exit Meetings

The chief examiner presented the examination results to Mr. D. Breig, Station Manager, and other members of your staff on October 27, 2005. An additional exit meeting was held telephonically on December 13, 2005, to discuss the resolution of the proposed findings that were presented at the October 27 exit meeting.

The licensee did not identify as proprietary any information or materials examined during the examination.

## **ATTACHMENT**

### KEY POINTS OF CONTACT

#### Licensee

K. Rauch, Operations Training Manager  
A. Hagemeyer, Operations Training Supervisor  
M. Jones, Operations Manager  
R. Whitehouse, Training Specialist  
R. Hampton, Training Specialist

### **LIST OF ITEMS OPENED AND CLOSED**

#### Opened and Closed

05000361;362/2005302-01 FIN Failure to Conduct Simulator Testing in Accordance with ANSI/ANS 3.5, 1998

#### Opened

05000361;362/2005302-02 URI Adequacy of Plant-Referenced Simulator to Conform with Simulator Requirements for Reactivity and Control Manipulation Credits

### DOCUMENTS REVIEWED

ANSI/ANS 3.5, 1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination

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

Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Revision 3, October 2001

NRC Form 398 Personnel Qualification Statements

SONGS Annual Simulator Performance Test Book (includes steady state and malfunction tests)