



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
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ARLINGTON, TEXAS 76011-8064**

November 13, 2001

Harold B. Ray, Executive Vice President  
Southern California Edison Co.  
San Onofre Nuclear Generating Station  
P.O. Box 128  
San Clemente, California 92674-0128

**SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION, UNITS 2 AND 3 - NRC  
TRIENNIAL FIRE PROTECTION INSPECTION REPORT 50-361/01-15;  
50-362/01-15**

Dear Mr. Ray:

On October 5, 2001, the NRC completed an inspection at your San Onofre Nuclear Generating Station, Units 2 and 3. The enclosed report documents the inspection findings, which were discussed on October 5, 2001, with Mr. D. E. Nunn, Vice President, Engineering and Technical Services, and other members of your staff. A formal inspection exit was held via teleconference on November 9, 2001, with Mr. N. Quigley, Manager, Maintenance Engineering, and other members of your staff.

In this inspection, the NRC evaluated the effectiveness of activities conducted under your license as they related to implementation of your NRC-approved Fire Protection Program. Based on the results of this inspection, the NRC did not identify any findings.

In accordance with 10 CFR 2.790 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/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

Charles S. Marschall, Chief  
Engineering and Maintenance Branch  
Division of Reactor Safety

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

Enclosure:  
NRC Inspection Report  
50-361/01-15; 50-362/01-15

cc w/enclosure:  
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Electronic distribution from ADAMS by RIV:

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/RA/	/RA/	/RA/	/RA/	/RA/
11/5/01	11/5/01	11/6/01	11/5/01	11/6/01
C:EMB	C:PBB	C:EMB		
CSMarschall	KMKennedy	CSMarschall		
/RA/	/RA/	/RA/		
11/6/01	11/7/01	11/13/01		

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**ENCLOSURE 1**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 50-361; 50-362

Licenses: NPF-10; NPF-15

Report No.: 50-361/01-15; 50-362/01-15

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 1 - 5, 2001

Team Leader R. L. Nease, Senior Reactor Inspector  
Engineering and Maintenance Branch

Inspectors: R. P. Mullikin, Senior Reactor Inspector  
Engineering and Maintenance Branch

W. C. Sifre, Project Engineer  
Project Branch C

Accompanying Personnel: J. L. Taylor, Reactor Inspector  
Engineering and Maintenance Branch

E. L. Horace, Student Engineer  
Technical Support Staff

J. L. LaChance, Contractor  
Sandia National Laboratories

Approved By: Charles S. Marschall, Chief  
Engineering and Maintenance Branch

## SUMMARY OF FINDINGS

IR 05000361-01-15, IR 05000362-01-15; on 10/01/2001-10/05/2001; Southern California Edison; San Onofre Nuclear Generating Station, Units 2 & 3; Triennial Fire Protection Inspection

The inspection was conducted by a team of three regional inspectors, one contractor, and two accompanying NRC Region IV personnel. Based on the results of the inspection, no findings of significance were identified.

### **Cornerstone: Initiating Events and Mitigating Systems**

- No findings of significance were identified

## Report Details

### 1. REACTOR SAFETY

#### 1R05 Fire Protection

The purpose of this inspection was to review the San Onofre Nuclear Generating Station fire protection program for selected risk significant fire areas. Emphasis was placed on verification that the post-fire safe shutdown capability and the fire protection features provided for ensuring that at least one post-fire safe shutdown success path is maintained free of fire damage. The inspection was performed in accordance with the new Nuclear Regulatory Commission (NRC) reactor oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The team used the licensee's "Individual Plant Examination of External Events for San Onofre Nuclear Generating Station, Units 2 & 3," to choose several risk-significant areas for detailed inspection and review. The fire areas chosen for review during this inspection were:

- 2-AC-50-35, Unit 2 Switchgear Room 2B;
- 2-AC-50-29, Unit 2 Lobby/Motor Control Room;
- 2-PE-45-3A, Unit 2 Electrical Penetration Room (45 foot elevation);
- 2-PE-63-3B, Unit 2 Electrical Penetration Room (63 foot elevation); and
- 2-TK-30-161A, Unit 2 Auxiliary Feedwater Pump Room.

For each of the selected fire areas, the team focused the inspection on the fire protection features and on the systems and equipment necessary for the licensee to achieve and maintain safe shutdown conditions in the event of a fire in those fire zones.

#### .1 Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

##### a. Inspection Scope

The team reviewed the licensee's piping and instrumentation diagrams, safe shutdown equipment list, Title 10 of the Code of Federal Regulations (CFR), Appendix R safe shutdown design basis document, and the post-fire safe shutdown analysis to verify whether the licensee's shutdown methodology had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions for equipment in the fire areas selected for review. The team focused on the following functions that must be ensured to achieve and maintain post-fire safe shutdown conditions: (1) reactivity control capable of achieving and maintaining cold shutdown reactivity conditions, (2) reactor coolant makeup capable of maintaining the reactor coolant level within the level indication in the pressurizer, (3) reactor heat removal capable of achieving and maintaining decay heat removal, (4) supporting systems capable of providing all other services necessary to permit extended operation of equipment necessary to achieving and maintaining hot shutdown conditions, and (5) process monitoring capable of providing direct readings to perform and control the above functions.

b. Findings

No findings of significance were identified.

.2 Fire Protection of Safe Shutdown Capability, Fire Protection Systems, Features, and Equipment

a. Inspection Scope

The team verified that at least one post-fire safe shutdown success path was free of fire damage in the event of a fire in the selected fire areas. Specifically, the team examined the separation of safe shutdown cables, equipment, and components within the same fire areas, and reviewed the licensee's methodology for meeting the requirements of 10 CFR Part 50, Appendix R, Section III.G. In addition, the team reviewed license documentation, such as NRC safety evaluation reports, licensee 10 CFR Part 50, Appendix R submittals, and deviations from NRC regulations to verify that the licensee met license commitments.

b. Findings

No findings of significance were identified.

.3 Post-Fire Safe Shutdown Circuit Analysis

a. Inspection Scope

On a sample basis, the team verified that cables for equipment required to achieve and maintain hot shutdown conditions in the event of fire in selected fire areas had been properly identified and either adequately protected from the potentially adverse effects of fire damage or analyzed to show that fire-induced faults (e.g., hot shorts, open circuits, and shorts to ground) would not prevent safe shutdown. During the inspection a sample of redundant components associated with systems required to achieve and maintain hot shutdown conditions were selected for review. The sample included components associated with the auxiliary feedwater, safety injection, reactor coolant system makeup, component cooling water, salt water cooling systems and reactor head and pressurizer head vent valves. From this list of components, the team reviewed cable routing data depicting the routing of power and control cables associated with each of the selected components. Additionally, the team verified, on a sample basis, that circuit breaker coordination and fuse protection were acceptable as a means of protecting the power sources of the designated safe shutdown equipment.

b. Findings

No findings of significance were identified.



.4 Alternative Safe Shutdown Capability

a. Inspection Scope

The team reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions from stations other than the control room. The team also evaluated the adequacy of the systems to perform reactor pressure control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

b. Findings

No findings of significance were identified.

.5 Operational Implementation of Alternative Shutdown Capability

a. Inspection Scope

The team performed a walkdown of the actions defined in Procedure SO23-13-2, "Shutdown From Outside the Control Room," Revision 6. This procedure documented the method for performing an alternative shutdown of the plant from outside the control room by manipulating certain equipment located in various areas of the plant. The team evaluated the ability of the operators to perform the procedural actions within applicable plant shutdown time requirements and verified that equipment labeling was consistent with the procedure.

The team reviewed the training program and interviewed several licensed and non-licensed personnel to verify their training included the alternative safe shutdown capability.

b. Findings

No findings of significance were identified.

.6 Communications

a. Inspection Scope

The team reviewed the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire department duties. The team verified that communications via the use of plant radios, plant paging and public address system, and sound-powered phone communication systems would be available.

b. Findings

No findings of significance were identified.

.7 Emergency Lighting

a. Inspection Scope

The team reviewed the emergency lighting system required for safe shutdown activities in the selected fire areas to verify it would provide for adequate access to perform manual actions required to achieve and maintain hot shutdown conditions. The team evaluated the adequacy of emergency lighting for access and egress routes and for performing actions required in Procedure SO23-XIII-22, Revision 7-1, "Emergency Lighting System Test," at control stations and plant monitoring locations. The team reviewed repetitive tasks for testing and test data trending to verify that the individual battery operated units were capable of supplying sufficient illumination. The team reviewed vendor data to verify operability under maximum ambient temperatures and to verify that the battery powered supplies were rated with at least an 8-hour capacity. The team reviewed routine preventive maintenance to ensure that the 8-hour battery powered lights were being maintained as required.

b. Findings

No findings of significance were identified.

.8 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed licensee procedures to determine whether repairs were required to achieve cold shutdown and to verify that the repair material was available onsite. The team verified that the licensee had pre-staged equipment necessary to perform the repairs in lockers as required by procedure. The team also reviewed monthly audit records for the maintenance of the lockers and their contents.

b. Findings

No findings of significance were identified.

.9 Fire Protection Systems, Features, and Equipment

- a. For the selected fire areas, the team evaluated the adequacy of fire protection features, such as fire suppression and detection systems, fire area barriers, penetration seals, and fire doors. To do this, the team observed the material condition and configuration of the installed fire detection and suppression systems, fire barriers, and construction details and supporting fire tests for the installed fire barriers. In addition, the team reviewed license documentation, such as NRC safety evaluation reports, and deviations from NRC regulations and National Fire Protection Association code to verify that fire protection features met license commitments.

b. Findings

No findings of significance were identified.

.10 Compensatory Measures

a. Inspection Scope

The team verified, by sampling, that adequate compensatory measures were put in place by the licensee for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems or features (e.g., detection and suppression systems, or passive fire barrier features).

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES (OA)**

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed a sample of condition reports to verify that the licensee was identifying fire protection-related issues at an appropriate threshold and entering those issues into the corrective action program.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

On, October 5, 2001, at the conclusion of the team's onsite inspection, the team leader debriefed Mr. D. E. Nunn, Vice President, Engineering and Technical Services, and other licensee staff members on the preliminary inspection results.

On November 9, 2001, a teleconference exit meeting was held with Mr. N. Quigley, Manager, Maintenance Engineering, and other licensee staff members, during which the team leader characterized the results of the inspection.

The licensee was asked whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

KEY POINTS OF CONTACT

Licensee

D. Arai, System Design Engineer  
M. Jones, Operations Assistant Superintendent  
J. Kim, Senior Electrical Engineer  
J. McGaw, Senior Nuclear Engineer  
A. Melikian, System Design Engineer  
R. Morales, Fire Protection Specialist  
N. El-Akily, Engineer, Systems and Analysis Group  
D. Niebruegge, Manager, Maintenance Engineering Support  
D. Nunn, Vice President, Engineering  
R. Richter, Supervisor, Fire Protection Engineering  
E. Torres, Design Engineer

NRC

J. Kramer, Resident Inspector, San Onofre Nuclear Generating Station  
C. Osterholtz, Senior Resident Inspector, San Onofre Nuclear Generating Station  
P. Qualls, Fire Protection Specialist, Office of Nuclear Reactor Regulation

**LIST OF DOCUMENTS REVIEWED**

The following documents were selected and reviewed by the inspectors to accomplish the objectives and scope of the inspection.

CALCULATIONS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E4C-098	4KV Switchgear Protective Relay Setting Calculation	1
E4C-099	SR 480V Power Circuit Breaker Settings	1
E4C-112	Class 1E 480V MCC Protection Calculation	0
90035AH	Safe Shutdown Component Evaluation Calculation	6
90035BS	Post-fire Safe Shutdown Analysis	3
M-DSC-378	Hydrodynamic Torque Calculation for 2/3HV6200, 6201, 6202, 6203, 6500, & 6501	0
M-0074-019	Auxiliary Feed Water Pump Room Thermal Response, No Fans	0
M-74-06	Auxiliary Feed Water Pump Room Heat Load Calculation	1

M-75-73	CCW Pump Room Maximum Temperature - No HVAC	0
M-73-64	ESF Battery Rooms - Hydrogen Buildup	1

ENGINEERING REPORTS

<u>Number</u>	<u>Title</u>	<u>Revision</u>
01-0310-1579	SONGS 2/3 Appendix R Time and Manpower Study	1
90035A	SONGS 2/3 Appendix R Compliance Assessment Manual Action Feasibility	1
90035B1	SONGS 2/3 Time Line Calculations for Manual Actions	1

DRAWINGS

<u>Drawing Number</u>	<u>Title</u>	<u>Revision</u>
30216	Elementary Diagram Unit 2 - Elec Aux - 4.16 KV Bus 2A04 Tie Brkr (3A04)	17
30219	Elementary Diagram Unit 2 - Elec Aux - 4.16 KV Bus 2A04 Feeder Brkr (2B04)	10
30226	Elementary Diagram Unit 2 - Elec Aux - 4.16 KV Bus 2A06 Tie Brkr (3A06)	18
30229	Elementary Diagram Unit 2 - Elec Aux - 4.16 KV Bus 2A06 Feeder Brkr (2B06)	7
30256	Elementary Diagram Unit 2 - Electrical Auxiliaries - Bus 2B04 Supply Breaker	10
30258	Elementary Diagram Unit 2 - Elect Aux - Bus 2B04 MCC 2BD Feeder Breaker	7
30259	Elementary Diagram Unit 2 - Elect Aux - Bus 2B04 MCC 2BY Feeder Breaker	7
30260	Elementary Diagram Unit 2 - Elect Aux - Bus 2B04 MCC 2BE Feeder Breaker	6
30261	Elementary Diagram Unit 2 - Elect Aux - Bus 2B04 MCC BQ Feeder Breaker	8
30269	Elementary Diagram Unit 2 - Electrical Auxiliaries - Bus 2B06 Supply Breaker	10

<u>Drawing Number</u>	<u>Title</u>	<u>Revision</u>
30271	Elementary Diagram Unit 2 - Elect Aux - Bus 2B64MCC 2BH Feeder Breaker	8
30272	Elementary Diagram Unit 2 - Elect Aux - Bus 2B06 MCC 2BJ Feeder Breaker	5
30273	Elementary Diagram Unit 2 - Elect Aux - Bus 2B06 MCC 2BZ Feeder Breaker	8
30582 Sheets 1 & 2	Elementary Diagram Unit 2 - Reactor - Reactor Head & Pressurizer Head Vent Valves	7
30583 Sheets 1 & 2	Elementary Diagram Unit 2 - Reactor - Reactor Head & Pressurizer Head Vent Valves	8
30715	Elementary Diagram Unit 2 - Reactor Auxiliaries - Charging Pump P191	19
30716	Elementary Diagram Unit 2 - Reactor Aux - CCW Surge tank HV6225	6
30717	Elementary Diagram Unit 2 - Reactor Aux - CCW Surge tank HV6505	8
30723	Elementary Diagram Unit 2 - Reactor Auxiliaries - Salt Water Clg Pump P112	24
30724	Elementary Diagram Unit 2 - Reactor Auxiliaries - Salt Water Clg Pump P113	21
30725	Elementary Diagram Unit 2 - Reactor Auxiliaries - Salt Water Clg Pump P114	23
30747 Sheet 1	Elementary Diagram Unit 2 - Reactor Auxiliaries - Charging Pump P190	16
30747 Sheet 2	Elementary Diagram Unit 2 - Reactor Auxiliaries - Charging Pump P190, P 191 & P192	5
30748	Elementary Diagram Unit 2 - Reactor Auxiliaries - Charging Pump P191	20
30749	Elementary Diagram Unit 2 - Reactor Auxiliaries - Charging Pump P192	20
30758	Elementary Diagram Unit 2 - Reactor Auxiliaries - Boric Acid Makeup Pump P174	11
30759	Elementary Diagram Unit 2 - Reactor Auxiliaries - Boric Acid Makeup Pump P175	13

<u>Drawing Number</u>	<u>Title</u>	<u>Revision</u>
30760	Elementary Diagram Unit 2 - Reac Aux - BA Makeup Tank to Charging Pump Suct HV9235	13
30761	Elementary Diagram Unit 2 - Reac Aux - BA Makeup Tank to Charging Pump Suct HV9240	14
31080	Elementary Diagram Unit 2 - Plant Auxiliaries - 480V Mot Encl Htrs (MCC 2BY)	9
31494	Elementary Diagram Unit 2 - Annunciator and Tripping Bus 2A04	15
32723	Elementary Diagram Unit 3 - Reactor Auxiliaries - Salt Water Clg Pump P112	17
36602 Sheet 1	Fire Protection Zones Legend & Index Unit 2/3	1
36602 Sheet 12	Fire Zones Penetration & Fuel Bldg. Unit 2 Elevation 45'-0"	1
36602 Sheet 13	Fire Zones Penetration & Fuel Bldg. Unit 2 Elevation 63'-6"	1
36602 Sheet 26	Fire Zones Control Bldg. Unit 2/3 Elevation 50'-0"	2
2PE04	Unit 2: Penetration and Fuel Handling Elevation 45'-0"	2
2PE05	Unit 2: Penetration and Fuel Handling Elevation 63'-6"	3
2TK11	Unit 2: AFW - Pump Room, Pipe Tunnel, Refueling Water& Condensate Storage Tanks Elevation (-)2'-6" to 30'-6"	2
23AC23	Unit 2/3: Auxiliary Control Elevation 50'-0"	3

PROCEDURES

<u>Number</u>	<u>Title</u>	<u>Revision</u>
SO23-13-2	Shutdown From Outside the Control Room	6
SO23-13-21	Fire	6
SO23-3-2.6	Shutdown Cooling System Operation	17
SO23-3-2.6.1	CS/SDC/SFP Cooling Crosstie Operation	4

CABLE ROUTING DATA

<u>Component</u>	<u>Component</u>	<u>Component</u>	<u>Component</u>
2FY-9253	2HV-0296A	2HV-0296B	2HV-0297A
2HV-0297B	2HV-0298	2HV-0299	2HV-4712
2HV-4713	2HV-4715	2HV-4730	2HV-6225
2HV-6495	2HV-6497	2HV-6505	2HV-8150
2HV-8151	2HV-8152	2HV-8153	2HV-9201
2HV-9235	2HV-9336	2HV-9337	2HV-9339
2HV-9240	2HV-9367	2HV-9368	2HV-9378
2HV-9379	2HY-4714-2	2HY-4731-1	2HY-6201
2HY-6203	2HY-9200	2HY-9205	2LV-0227B
2LV-0227C	2P-015	2P-016	2P-024
2P-025	2P-026	2P-112A	2P-113B
2P-114B	2P-141	2P-174	2P-175
2P-190	2P-191	2P-192	2P-307A
2TV-9267			

ACTION REQUESTS

AR-SONGS-980800768	AR-SONGS-001000916	AR-SONGS-001201243
AR-SONGS-980800844	AR-SONGS-001001370	AR-SONGS-010100006
AR-SONGS-980801287	AR-SONGS-001001441	AR-SONGS-010100935
AR-SONGS-980801522	AR-SONGS-001001685	AR-SONGS-010101533
AR-SONGS-980900375	AR-SONGS-001001894	AR-SONGS-010102074
AR-SONGS-980900897	AR-SONGS-001001983	AR-SONGS-010200259
AR-SONGS-980900938	AR-SONGS-001002005	AR-SONGS-010200353
AR-SONGS-980901567	AR-SONGS-001002544	AR-SONGS-010400095
AR-SONGS-980901953	AR-SONGS-001100013	AR-SONGS-010400311
AR-SONGS-980902043	AR-SONGS-001101540	AR-SONGS-010400674
AR-SONGS-981000543	AR-SONGS-001101556	AR-SONGS-010401358
AR-SONGS-981100518	AR-SONGS-001101590	AR-SONGS-010500552
AR-SONGS-981200728	AR-SONGS-001101598	AR-SONGS-010501339
AR-SONGS-981201309	AR-SONGS-001101639	AR-SONGS-010800584
AR-SONGS-001000777	AR-SONGS-001001370	AR-SONGS-011000229
AR-SONGS-011000021	AR-SONGS-011000226	AR-SONGS-011000130
AR-SONGS-011000232	AR-SONGS-011000228	AR-SONGS-011000023
AR-SONGS-011000230		

FIRE PROTECTION INFORMATION SYSTEM - IMPAIRMENT FORMS

01010045-00	01060059-05	01080036-00	01080105-03
01090028-00	01090030-00	01090045-00	



MISCELLANEOUS DOCUMENTS

"Individual Plant Examination of External Events for San Onofre Nuclear Generating Station, Units 2 & 3," dated December 1995.

DCN # ABG-17707, Design Change Notice for "Saltwater Cooling System Design Basis Document, DBD-SO23-410," Revision 5, SCE, 05/04/01.

DBD-SO23-TR-AR, "Appendix R Safe Shutdown Topical DBD," Revision 9.

DBD-S023-390, "Chemical & Volume Control System," Revision 6.

Regulatory Guide 1.189, "Fire Protection for Operating Nuclear Power Plants," Nuclear Regulatory Commission, April 2001.

Licensee Event Report, LER No. 2000-006-01, May 26, 2000.

"Unresolved Item 50-361/88-22-01, Requirement to Provide Cooling to Reactor Coolant Pump Seals," IR 90-01, February 16, 1990.

NRC Safety Evaluation Report dated June, 29, 1988.

Letter from George W. Knighton, NRC to Kenneth P. Baskin, Southern California Edison (SCE), and James C. Holcombe (SDGE), "Issuance of Amendment No. 43 to Facility Operating License NPF-10 and Amendment No. 32 to Facility Operating License NPF-15 San Onofre Nuclear Generating Station, Units 2 and 3," N4002858, March 27, 1986.

Letter from M.O. Medford, SCE, to the NRC, "Appendix R Audit Open Items," December 1, 1988.

Letter from M.O. Medford, SCE to the NRC, "Appendix R Deviation Request And Open Items," November 21, 1988.

Letter from R.M. Rosenblum, SCE to NRC, "Reactor Coolant Pump Seals, Requested Information," December 27, 1989.

NRC memorandum from Ashok Thadani to William Travers, "Closeout of Generic Safety Issue 23, 'Reactor Coolant Pump Seal Failure,'" November 8, 1999.