UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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October 7, 2004

Harold B. Ray, Executive Vice President
San Onofre, Units 2 and 3
Southern California Edison Co.
P.O. Box 128, Mail Stop D-3-F
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SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION - NRC TRIENNIAL FIRE PROTECTION INSPECTION 05000361/2004008; 050000362/2004008

Dear Mr. Ray:

On October 7, 2004, 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 7, 2004, with Mr. T. Yackle and other members of your staff.

During this triennial fire protection inspection, the inspection team examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of selected examination of procedures and records, observations of activities and installed plant systems, and interviews with personnel.

Based on the results of this inspection, the NRC identified one finding that was evaluated under the risk significance determination process as having very low safety significance (Green). The NRC also determined that there was not a violation associated with this finding.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made 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//**

Linda Joy Smith, Chief
Plant Engineering Branch
Division of Reactor Safety

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

Enclosure:
NRC Inspection Report 05000361/2004008; 05000362/2004008
w/attachment: Supplemental Information

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**U.S. NUCLEAR REGULATORY COMMISSION**
**REGION IV**

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|---|---|
| Docket: | 50-361, 50-362 |
| License: | NPF-10, NPF-15 |
| Report: | 05000361/2004008 and 05000362/2004008 |
| Licensee: | Southern California Edison Co. |
| Facility: | San Onofre Nuclear Generating Station, Units 2 and 3 |
| Location: | 5000 S. Pacific Coast Hwy.<br>San Clemente, California |
| Dates: | August 9 - October 7, 2004 |
| Inspectors: | R. Mullikin, Senior Reactor Inspector, Plant Engineering Branch<br>N. O'Keefe, Senior Reactor Inspector, Plant Engineering Branch<br>D. Dumbacher, Project Engineer, Project Branch D |
| Accompanying Personnel: | S. Rutenkroger, Reactor Inspector (NSPDP) |
| Contractor: | K. Sullivan, Brookhaven National Laboratory |
| Approved By: | Linda Joy Smith, Chief<br>Plant Engineering Branch<br>Division of Reactor Safety |

Enclosure

## SUMMARY OF FINDINGS

IR 05000361/2004008, 05000362/2004008; 08/09 - 10/7/2004; San Onofre Nuclear Generating Station, Units 2 & 3; Triennial Fire Protection Inspection; Problem Identification and Resolution.

This report covered an announced inspection by three region-based inspectors, one NRC NSPDP participant, and one contractor. One finding was identified. The significance of most findings is indicated by its color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process 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 Finding

**Cornerstone: Mitigating Systems**

Green. A finding was identified related to an inadequate program to provide training for operators assigned duties as fire technical advisors. The team identified that the fire protection training program was made applicable only to the onsite fire department members. The licensed operators, who perform this advisory role to the onsite fire department, were not provided specific initial or periodic refresher training to be able to perform this role effectively, and there were only enough fire drills conducted for each fire technical advisor to participate in one fire drill every 3 years on average. No violation of regulatory requirements occurred because San Onofre Nuclear Generating Station, Units 2 and 3, were licensed before the NRC clarified fire brigade training requirements. This finding was entered into the licensee's corrective action program under Action Request 040801076.

This issue was more than minor because it affected the mitigating systems cornerstone objectives for human performance and protection from external factors (fire), which is to support the capability to prevent undesirable consequences. In Manual Chapter 0609, Appendix F, this finding was categorized as affecting fire prevention and administrative controls, and was assigned a low degradation rating based on the NRC's and licensee's fire drill observations that coordination was generally acceptable between the fire department and the operating crews. Based on this, this finding screens as having very low safety significance (Green) in a Phase 1 Initial Qualitative Screening. (Section 1R05.9)

REPORT DETAILS

1 REACTOR SAFETY

1R05 Fire Protection

The purpose of this inspection was to review the San Onofre Nuclear Generating Station's fire protection program for selected risk-significant fire areas. Emphasis was placed on verification of the licensee's post-fire safe shutdown capability. The inspection was performed in accordance with the NRC regulatory oversight process using a risk-informed approach for selecting the fire areas and attributes to be inspected. The team used the Individual Plant Examination for External Events for the San Onofre Nuclear Generating Station to choose several risk-significant areas for detailed inspection and review. Inspection Procedure 71111.05, "Fire Protection," requires selecting three to five fire areas for review. The five fire areas reviewed during this inspection were:

- Fire Area 2-AC-50-29 — Auxiliary Building, Lobby/Motor Control Area
- Fire Area 2-AR-9-76 — Auxiliary Radwaste Building, Corridor and Rooms
- Fire Area 2-AR-37-102 (Zone 102A) — Auxiliary Radwaste Building, Corridor and Rooms
- Fire Area 3-CT-(-2)-142 (Zone 142B) — Cable Tunnel
- Fire Area 2/3-TB-(-9)-148 (Zones 148E & 148F) — Salt Water Pipe Tunnel & Salt Water Pump Room

For each of these fire areas, the inspection focused on fire protection features, systems and equipment necessary to achieve and maintain safe shutdown conditions, and licensing basis commitments.

In accordance with NRC Inspection Procedure 71111.05, dated March 6, 2003, the evaluation did not include a comprehensive review of the potential impact of fire-induced failures in associated circuits of concern for post-fire safe shutdown. In response to a March 2001 voluntary industry initiative, the scope of NRC Inspection Procedure 71111.05 has been temporarily reduced pending the resolution of specific review criteria for fire-induced circuit failures of associated circuits.

Documents reviewed by the team are listed in the attachment.

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

a. Inspection Scope

The team reviewed the licensee's methodology for achieving and maintaining post-fire safe shutdown to ensure that at least one post-fire safe shutdown success path was available in the event of a fire in each of the selected areas. The principal sources of this information included: Design Basis Document DBD-SO23-TR-AR, "Appendix R Safe Shutdown Topical DBD," Revision 10, Calculation 90035AH, "Safe Shutdown Component Evaluation Calculation," Revision 6, and Calculation 90035AP, "Appendix R III.G/III.L Compliance Assessment," Revision 6. The team focused on the following functions that must be available to achieve and maintain post-fire safe shutdown conditions:

- Reactivity control capable of achieving and maintaining cold shutdown reactivity conditions,
- Reactor coolant makeup capable of maintaining the reactor coolant inventory,
- Reactor heat removal capable of achieving and maintaining decay heat removal, and
- Supporting systems capable of providing all other services necessary to permit extended operation of equipment necessary to achieve and maintain hot shutdown conditions.

To assure the licensee had properly identified the components and equipment necessary to achieve and maintain safe shutdown conditions in the fire areas selected for review, the team reviewed piping and instrumentation diagrams for the systems required for performing the functional requirements listed above. In addition, plant drawings, operating procedures, and other relevant documents were reviewed to verify the flow paths and operational characteristics of those systems relied on to accomplish the safe shutdown functions.

b. Findings

No findings of significance were identified.

.2 Fire Protection of Safe Shutdown Capability and Post-Fire Safe Shutdown Circuit Analysis

a. Inspection Scope

The team reviewed licensee documentation to verify that at least one train of equipment needed to achieve and maintain hot shutdown conditions 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 area. The evaluation included a review of cable routing data depicting the location of power and control cables associated with selected components of the safe shutdown systems. The team also reviewed the protection of diagnostic instrumentation required for safe shutdown for fires in the selected areas.

The team reviewed the licensee's methodology for meeting the requirements of 10 CFR 50.48 and 10 CFR Part 50, Appendix R, and the bases for the NRC's acceptance of this methodology as documented in NRC safety evaluation reports. In addition, the team reviewed license documentation, such as the updated final safety analysis report, submittals made to the NRC by the licensee in support of the NRC's review of their fire protection program, and deviations from NRC regulations to verify that the licensee met license commitments.

b. Findings

The licensee's safe shutdown analysis was based on assuring that a minimum set of systems and equipment would be available in the event of fire in any plant area. The primary systems relied on to achieve and maintain safe shutdown conditions included the reactor protection system, chemical and volume control system, and auxiliary feedwater system. Systems necessary to support the operation of these systems, such as ac and dc power, component cooling water, salt water cooling, and reactor equipment cooling were also identified by the licensee.

The team reviewed Abnormal Operating Instruction SO23-13-21, "Fire," Revision 8, which was the procedure credited for use in the event of fire in plant areas that do not require alternate shutdown. The team identified a number of concerns with Procedure SO23-13-21, which questioned the adequacy of the procedure to achieve and maintain safe shutdown conditions in the event of a fire. Specific concerns identified were:

**Concern 1 - Identification of Equipment Assured to Remain Available for Post-Fire Safe Shutdown:** The licensee's safe shutdown analysis identified a specific train of equipment that may be relied on for accomplishing required safe shutdown functions in each fire area. For example, Fire Area 2-AC-50-29 contained redundant trains of safe shutdown cables that were generally separated within the area on an east-west basis. As a result, the specific train of safe shutdown systems and equipment that may be relied on to achieve and maintain safe shutdown conditions will vary according to the location of the fire. In the event of a fire on the east side of this area, the licensee's analysis credited the use of Train B equipment and for a fire on the west side of this area, Train A equipment was credited. This information, however, was not translated into Procedure SO23-13-21, which would be used to mitigate the effects of a fire in this area.

In addition, although a fire in Fire Area 2-AC-50-29 could require shutdown of both operating units, the procedure did not provide a clear way for operators to identify actions that may be necessary in both units due to shared systems, rooms, etc. Procedure SO23-13-21 typically addressed actions that are applicable to either or both units but did not include the unit number in the component identifier. In the event of fire in areas such as Fire Area 2-AC-50-29, which contained equipment from both units, this lack of information (component unit identifier) could confuse operators. The lack of this information could result in significant human performance implications by causing operators to be unsure of which train would remain available for a given fire location. For example, the operator action described in Procedure SO23-13-21, Step 7.23 would remove power to two of the three charging pumps (Train A/B Swing Pump P-191 and Train B Charging Pump P-192). Performing Step 7.23, for a fire on the east side of this area, would disable Pump P-192, which was the credited train of charging capability for fire in this location.

**Concern 2 - Providing Instructions to Operators on Which Diagnostic Instrumentation Could be Relied on for a Fire in Each Fire Area:** The licensee's safe shutdown analysis was based on assuring that a minimum set of systems and equipment needed to achieve and maintain safe shutdown conditions would remain available in the event of fire in each fire area. As a result, control room instrumentation and alarms that would be available for use during a normal plant shutdown may not be available in the event of fire. Because of a lack of an assured monitoring capability (diagnostic instrumentation), the performance of certain time-critical actions could be significantly delayed beyond the specified time constraints or not performed at all. In 1996, the licensee revised Procedure SO23-13-21 from an event-based approach (take actions based on a fire location) to a symptom-based approach where operator actions were only performed in response to indications and alarms observed in the control room. Shutdown strategies that rely on operator intervention (manual operator recovery actions) to mitigate equipment maloperations and/or failures that may occur as a result of a fire, must be supported by sufficient monitoring capability (diagnostic instrumentation) to assure prompt detection of those failures that may occur and confirm proper system response. The specific diagnostic instrumentation needed for each fire area may vary with the design of the shutdown capability provided for that area. The diagnostic instrumentation assured to remain available in the event of fire in each area was not identified in Procedure SO23-13-21 or in any analysis.

**Concern 3 - Prioritizing Operator Actions Needed To Prevent Damage to Required Shutdown Equipment:** For each fire area, Procedure SO23-13-21 identified operator actions needed to assure the availability of required safe shutdown systems. For time-critical actions, such as actions needed to prevent damage to equipment relied on to achieve and maintain hot shutdown conditions, the procedure identified specific time constraints (e.g., trip charging pump in 30 minutes). However, the procedure only provided a list of actions to

be performed and did not provide any indication of which actions have a higher priority. This lack of prioritization was particularly significant for certain fire areas. For example, the team noted that fire damage in Fire Area 2-AC-50-29 could cause all three charging pumps to spuriously start in response to a false pressurizer low-level signal. This event would reduce the amount of time assumed to be available in the procedure (30 minutes) for operators to trip the charging pumps before the pumps were damaged because of air binding upon depletion of the volume control tank. Operators would be able to stop one of the pumps from the control room, although due to a lack of assured diagnostic instrumentation, indication may not be reliable for operators to know which pump to stop. Control of the other two pumps may be affected by the fire. The licensee's design engineers performed an evaluation which determined that with two pumps running, the pumps must be shut down within 22 minutes (not the 30 minutes specified in the procedure) in order to prevent draining the volume control tank and air-binding the running charging pumps. Since the action to trip the charging pumps was not identified in the procedure as a high priority and the allowed time was not bounding, damage could occur before action is taken to prevent their loss.

**Concern 4 - Providing Technical Basis for Operator Action Times Delineated in the Procedure:** The time-critical manual actions delineated in Procedure SO23-13-21, while apparently adequate for a normal shutdown scenario, did not consider the effects of fire damage in each area. For example, for a fire in Fire Area 2-AC-50-29, the procedure stated that 30 minutes was available to de-energize the charging pumps. However, spurious actuations that may result from fire in this area (such as auto-start of all 3 pumps on a false low-pressurizer level signal) could significantly alter the amount of time actually available to perform these actions. Discussions with the licensee indicated that many of these times were based on accident analyses, rather than using limitations associated with fire scenarios. This concern also applied to the manual actions for alternative shutdown areas in Procedure SO23-13-2, "Shutdown From Outside the Control Room."

**Concern 5 - Adequacy of 10 CFR 50.59 Review of Procedure Change:** Procedure SO23-13-21 was revised in 1996 and removed critical information, such as the train of safe shutdown equipment that should be relied on for each fire area. In addition, as described above, this revision altered the overall shutdown strategy from an event-based approach to a symptom-based approach without assessing and identifying the diagnostic instrumentation needed to implement this capability. On April 10, 1996, the licensee performed an unreviewed safety question screening in accordance with 10 CFR 50.59 requirements. The licensee's screening determined that a 10 CFR 50.59 safety evaluation was not required for the procedure change. However, the licensee's 2004 Directed Assessment questioned whether a 10 CFR 50.59 safety evaluation should have been performed. As a result, the apparent cause

evaluation for Action Request 040700913 was expanded to evaluate whether the 10 CFR 50.59 process was correctly implemented for the procedure change. Whether the 10 CFR 50.59 process was adequately followed during this procedure change in 1996 is unknown pending the licensee's review.

The specific concerns described above were noted by the team during a comparison of the licensee's safe shutdown analysis with Procedure SO23-13-21. After informing the licensee of these concerns, the licensee informed the team that these issues (and several other inconsistencies) had been previously identified during the performance of an evaluation of manual operator actions in 2001 and during the 2004 Directed Assessment of the Appendix R/Fire Protection Program. The 2001 assessment was initiated by the licensee in response to questions posed by the NRC during the 2001 Triennial Fire Protection Inspection. The results of this evaluation were documented in a letter dated July 1, 2001, from ERIN Engineering and Research to the licensee. The results of the directed assessment were documented in a letter dated July 14, 2004, from Tri-En Corporation to the licensee. The team determined that the directed assessment was comprehensive, including and expanding on the potential safety significance of issues identified in the 2001 assessment.

The licensee initiated Action Request 040400370 to address each issue identified during the 2004 Directed Assessment. Concurrent with the generation of this action request, the licensee's Nuclear Oversight Division commenced a separate review of Procedure SO23-13-21. This review identified discrepancies similar to those identified in the 2001 and 2004 assessments, and the licensee created an apparent cause evaluation. In addition to determining the cause of the identified discrepancies and identifying corrective actions necessary to prevent recurrence, the licensee stated that the evaluation will include the procedure change process deficiencies described above and will address the timeliness of corrective actions.

Based on the above concerns, the team could not determine whether Procedure SO23-13-21 was adequate to ensure the availability of equipment necessary to achieve a post-fire safe shutdown condition for fires outside the control room. The team could not make that determination until the licensee completes their corrective action process regarding these concerns, and the NRC reviews the licensee's conclusions. The team did not have an immediate safety concern since the licensee implemented compensatory measures in the form of roving fire watches in safe shutdown areas of both units on August 17, 2004. If a violation of NRC requirements is identified, a significance determination will be performed to determine if the violation can be considered licensee identified. Thus, the adequacy of Procedure SO23-13-21 is being tracked as an unresolved item (URI 05000361; 05000362/2004008-01, "Potentially Inadequate Safe Shutdown Procedure").

.3 Alternative Safe Shutdown Capability

a. Inspection Scope

The team reviewed the licensee's alternative shutdown methodology to determine if the licensee properly identified the components and systems necessary to achieve and maintain safe shutdown conditions from the remote shutdown panel and alternative shutdown locations in the event of a fire in the control room, requiring control room evacuation. Alternate shutdown was also required for fires in Fire Areas 2-AC-9-5 (cable spreading room), 2-AC-9-14 (cable riser gallery), 2-AC-30-26 (fan room), 2-AC-30-28 (cable riser gallery), 3-AC-9-6 (cable spreading room), 3-AC-9-7 (cable riser gallery), and 3-AC-30-21 (cable riser gallery). The team focused on the adequacy of the systems selected for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring and support system functions. The team verified that hot and cold shutdown from outside the control room can be achieved and maintained with offsite power available or not available. The team verified that the transfer of control from the control room to the alternative locations was not affected by fire-induced circuit faults by reviewing the provision of separate fuses for alternative shutdown control circuits. The team also reviewed plant technical specifications and applicable surveillance procedures to verify incorporation of operability testing of alternative shutdown instrumentation and transfer of control functions.

b. Findings

No findings of significance were identified.

.4 Operational Implementation of Alternative Safe Shutdown

a. Inspection Scope

The team reviewed the systems required to achieve alternative safe shutdown to determine if the licensee had properly identified and took positive control of the components necessary to achieve and maintain safe shutdown conditions from the remote shutdown panel. The team also focused on the adequacy of the systems to perform reactor pressure control, reactor makeup, decay heat removal, process monitoring, and support system functions. The team reviewed Abnormal Operating Instruction SO23-13-2, "Shutdown From Outside the Control Room," Revision 7. Procedure SO23-13-2 provided instructions for performing an alternative shutdown from the remote shutdown panel and for manipulating equipment locally in the plant. The team also walked through the procedure with licensed and non-licensed operators to determine its adequacy to direct safe shutdown The team verified that the minimum number of available operators, exclusive of those required for the fire brigade, could reasonably be expected to perform the procedure actions within the applicable plant shutdown time requirements, and that equipment labeling was consistent with the procedure. Also, the team verified that procedures, tools, dosimetry, keys, lighting, and communications equipment were available to support successfully

performing the procedure as intended. The team also reviewed records for training conducted on this procedure.

The team reviewed the time-critical manual actions identified by the licensee as being necessary to support alternate shutdown from outside the control room. Calculations and analyses, which provided the bases for these critical times, were also reviewed. The simulated completion times recorded during the procedure walk-through were then compared to the analytical values to verify that the procedure could be implemented as intended.

b. Findings

No findings of significance were identified. However, the resolution of a technical basis for time-critical operator actions as described in Section 1R05.2 will also be applicable to Procedure SO23-13-2.

.5 Communications

a. Inspection Scope

The team reviewed the communication systems required to implement fire fighting and operations to achieve and maintain safe shutdown. The team verified the contents of the safe shutdown lockers and the routing and reliability of the sound powered phone circuits to ensure they would be available, operable, and adequate for the performance of safe shutdown functions. The team assessed the capability of the communication systems to support the operators in the conduct and coordination of their required actions. The team observed licensee demonstration of communication tests at selected plant areas to verify clarity of reception and reliability of the sound powered phone system.

b. Findings

No findings of significance were identified.

.6 Emergency Lighting

a. Inspection Scope

The team reviewed the adequacy of emergency lighting for performing actions required by Abnormal Operating Instruction SO23-13-2, “Shutdown from Outside the Control Room,” Revision 7, which included access and egress routes. The team verified that the licensee was maintaining the 8-hour discharge capability for the emergency lighting units. The team verified that the emergency lighting units were being properly maintained through review of the maintenance history. The team also verified that the emergency lighting units were located so as to ensure the safe shutdown paths have adequate illumination for monitoring safe shutdown indications and for properly operating safe shutdown equipment.

b. Findings

No findings of significance were identified.

.7 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed the licensee's safe shutdown analysis and plant procedures for responding to fires and implementing safe shutdown activities in order to determine if any repairs were required in order to achieve cold shutdown. The updated fire hazards analysis report identified repairs to replace two instruments needed to support operation of the shutdown cooling system that might be damaged by fire. The repairs were potentially required in order to reach cold shutdown based on the safe shutdown methodology implemented. The team verified that the replacement instruments, fittings, and tools were available and calibrated, and the procedure to install it would work as intended. The team also evaluated whether cold shutdown could be achieved within the required time using the licensee's procedures and repair methods.

b. Findings

No findings of significance were identified.

.8 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 features and post-fire safe shutdown equipment, and systems. The team reviewed the items on the fire impairment list in effect at the time of the inspection and compared them to the fire areas receiving hourly fire watch rounds. The team reviewed the fire protection impairment list to verify that the impairments had been entered into the licensee's corrective action program and that corrective actions to restore the impaired equipment were timely and appropriate.

b. Findings

No findings of significance were identified.

.9 Fire Protection Systems, Features, and Equipment

a. Inspection Scope

For the selected fire areas, the team evaluated the adequacy of selected fire protection features, such as fire suppression and detection systems, fire area barriers, penetration

seals, and fire doors. The team observed the material condition and configuration of the installed fire detection and suppression systems, and fire barriers.

The team reviewed the implementation of manual fire fighting organization and training. The interface between the site fire department and the operations department was discussed with supervisors from both departments. Procedures and training documents were reviewed. The team reviewed the qualification and refresher training provided to the fire technical advisor, who was designated to fulfill the required licensed operator-equivalent experience to the fire department. The team also reviewed the mutual aid agreements in place with the Camp Pendleton Fire Department.

The team also reviewed the licensee's plans and capabilities for smoke containment and removal of smoke and hot gases associated with a fire. During plant tours, the team observed the effectiveness of the licensee's control of transient combustible material.

b. Findings

Introduction. A Green finding was identified related to a program that did not provide adequate training for operators assigned duties as fire technical advisors. The team identified that the licensed operators who perform this advisory role to the onsite fire department were not provided specific initital or periodic refresher training on the duties and responsibilities of this position in order to be able to perform this role effectively. There were only enough fire drills conducted for each fire technical advisor to participate in one fire drill every 3 years on average.

Description. The licensee had a professional fire department to meet the NRC requirements for a fire brigade. Since the incident commander was not an operator (as would typically be the case with a fire brigade), the function of the fire brigade leader discussed in applicable NRC requirements was divided between the incident commander (the fire chief or an assistant fire chief) and the fire technical advisor. The latter was an on-shift licensed operator. The duties of the fire technical advisor were delineated in Procedure SO123-XIII-4.10.3, "Fire Department Fire Fighting Response Procedures," Revision 4. The Updated Fire Hazards Analysis Report, Section 2.3.1, and Safety Evaluation Report, Supplement 5, dated February 1982, described the operations fire technical advisor as a member of the fire department.

The team identified that the licensee did not require any specific initial qualification training or participation in fire drills prior to assignment to this role. The team reviewed the scope of initial license training related to fires, and determined it was limited to abnormal operating procedures which included fire response. No training was focused on the specific identification of the fire technical advisor's responsibilities, nor on the effects of fire and fire suppressants on safe shutdown equipment, as discussed in NRC requirements for fire brigade training. Further, fire technical advisors were not individually required to either participate in fire department continuing training or receive other periodic training to support their role as fire technical advisors. Fire drill procedures required that fire technical advisors participate in fire drills, with no frequency specified. These drills were run approximately 12 times per year. Since the

licensee had assigned 37 licensed operators to fulfill the fire technical advisor role, this meant that, on average, each person would get one drill every 3 years. The licensee did not keep records on fire technical advisors' fire drill participation.

The fire protection program for San Onofre Nuclear Generating Station, Units 2 and 3, was required to include administrative procedures governing the program implementation. Guidance is contained in a list of National Fire Protection Association (NFPA) codes, including NFPA 27, "Private Fire Brigades," 1975. However, the licensee's approved fire protection training program did not discuss training requirements for fire technical advisors. According to NFPA 27, a training program for fire brigades should be established, members should be required to complete a specified program of instruction as a condition of membership in the brigade, and all members of the brigade should be trained. It goes on to state that fire drills should be held to check the ability of members to perform the operations they are expected to carry out. Later NRC requirements more clearly stated that the fire brigade training program shall consist of an initial classroom instruction program followed by periodic classroom instruction, fire fighting practice, and quarterly fire drills. Periodic refresher training shall be held to repeat classroom instruction program for all fire brigade members over a 2-year period. Each fire brigade member should participate in at least two drills per year. Individual records of training provided for each fire brigade member, including drill critiques, should be maintained for at least 3 years to ensure each member receives training in all parts of the training program. These records of training should be available for NRC review. However, the licensee's approved fire protection program did not require fire technical advisors to comply with the requirements of the other members of the fire department regarding training, nor did it contain documentation to show why it was acceptable not to comply.

The team reviewed the circumstances associated with the licensee's fire department's response to a December, 2003, electrical breaker fire in Unit 2. The following excerpt was documented in Section 02.04.a of Special Inspection Report 50-362/2001-005:

> "Seventeen minutes after entry into the Unusual Event, control room operators received a report that the fire was out. This was an erroneous report, however, because the fire chief had really directed that a report of "no flames visible" be made. For over another hour, the fire department attempted to extinguish the smoldering fire through the closed Cubicle 3A0712 cabinet door using portable extinguishers.
>
> "Based on the erroneous report, the shift manager exited the Unusual Event at 4:20 p.m. Approximately one hour later, after the fire department opened the door to the breaker cubicle, the shift manager received a report that the fire had "reflashed." At that time, the shift manager determined that he now knew the fire was not affecting, and was not adjacent to, areas and structures containing vital, safety-related, or safe shutdown equipment. Therefore, the shift manager did not re-enter the Unusual Event.

> "During the course of fighting the fire, the fire chief at the scene requested permission several times to use water on the fire. The shift manager was reluctant to grant permission, as portions of the cabinet still had 125 volt dc and low voltage ac applied to it. During the course of operator interviews, the team discovered that operators had received no training on firefighting techniques beyond the use of portable fire extinguishers, while fire department personnel had received detailed training on fighting electrical fires with water. Despite the lack of training, the shift manager was the person responsible for approving the use of water in fighting the fire. The team concluded that the lack of firefighting training for operators, in conjunction with the shift manager's responsibility to approve the use of water for firefighting, contributed to an approximate 16 minute delay in completely extinguishing the fire. The licensee viewed this as a command and control issue, entered the problem into their corrective action program, and planned to address it."

The licensee made procedure changes to grant authority to use water for fire fighting to the incident commander. However, the team concluded that the licensee did not address the lack of training provided to operators documented in that NRC report. NRC requirements specify that the fire brigade leader must have the capability to understand the effects of fire and fire suppressants on equipment, be familiar with the fire fighting strategies being used, and have sufficient training to properly use the fire fighting terminology. In the case of San Onofre, the fire technical advisor should have been able to correctly interpret the fire department communications and to quickly explain to the operations shift supervisor that use of water was correct in this case.

Based on the above information, the team concluded that the fire technical advisor was a member of the fire department. As such, individuals assigned duty as fire technical advisors should be provided with the applicable portions of the fire department training program during initial and periodic training, as well as through fire drills, to ensure these individuals were capable of performing the their duties.

Analysis. This issue was more than minor because it affected the mitigating systems cornerstone objectives for human performance and protection from external factors (fire), which is to support the capability to prevent undesirable consequences. In Manual Chapter 0609, Appendix F, this finding was categorized as affecting fire prevention and administrative controls, and was assigned a low degradation rating. In the team's judgement, coordination was generally acceptable between the fire department and the operating crews in drills based on satisfactory fire drill results, including annual drill observations by NRC resident inspectors. Thus, this finding screens as having very low safety significance (Green) in a Phase 1 Initial Qualitative Screening. This finding was entered into the licensee's corrective action program under Action Request 040801076.

Enforcement. The team concluded that no violation of regulatory requirements occurred. This was based on the wording of the requirements as they existed at the time of licensing of San Onofre Units 2 and 3. However, the intent was clear in NFPA 27 that all members of the fire brigade should receive training initially, periodically, and in regular fire drills. This code was applicable to San Onofre, Units 2

and 3. Therefore, this issue will be treated as a finding (FIN 05000361; 05000362/2004008-02, "Inadequate Program to Provide Training for Operators Assigned Duties as Fire Technical Advisors").

## 4. OTHER ACTIVITIES (OA)

### 4OA2 Identification and Resolution of Problems (71152)

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. The team also reviewed the licensee's third party directed assessment of the fire protection program performed in 2004. The team evaluated the effectiveness of the corrective actions for the identified issues.

b. Findings

No findings of significance were identified.

### 4OA6 Management Meetings

Exit Meeting Summary

On October 7, 2004, the team leader conducted a telephonic exit interview to present the inspection results to Mr. T. Yackle and other staff members who acknowledged the findings. The team confirmed that the proprietary information reviewed by the team had been returned to the licensee.

ATTACHMENT
SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee

D. Arai, Engineer, Systems Engineering
D. Axline, Engineer, Licensing
F. De Peralta, Consultant
C. Dube, Manager, Operations Procedures
J. Gregerson, Engineer, Appendix R
R. Kowal, Supervisor, Emergency Preparedness
M. Love, Manager, Maintenance
J. McGaw, Senior Nuclear Engineer, Engineering & Technical Services
D. Nunn, Vice President, Engineering and Technical Services
A. Melikian, Engineer, Design Engineering
R. Richter, Supervisor, Fire Protection
A. Scherer, Manager, Nuclear Regulatory Affairs
J. Scott, Assistant Fire Chief
M. Short, Manager, Systems Engineering
R. Waldo, Station Manager
T. Yackle, Manager, Design Engineering
J. Wambold, Vice President, Nuclear Generation

NRC

V. Ordaz, Deputy Director, DRS
C. Osterholtz, Senior Resident Inspector

## ITEMS OPENED AND CLOSED

Opened

| | | |
|---|---|---|
| 05000361; 362/2004008-01 | URI | Adequacy of Fire Safe Shutdown Procedure (Section 1R05.2) |

Items Opened and Closed

| | | |
|---|---|---|
| 05000361; 362/2004008-02 | FIN | Inadequate Program to Provide Training for Operators Assigned Duties as Fire Technical Advisors (Section 1R05.9) |

DOCUMENTS REVIEWED

The following documents were selected and reviewed by the team to accomplish the objectives and scope of the inspection and to support any findings:

Drawings

| | | | |
|---|---|---|---|
| 8-7, Revision 4 | 32173, Revision 17 | 40114B, Revision 17 | 40127G, Revision 13 |
| 8-10, Revision 1 | 32174, Revision 17 | 40123, Revision 32 | 40130A, Revision 22 |
| 8-12, Revision 4 | 32175, Revision 14 | 40124A, Revision 24 | 40130B, Revision 26 |
| 30172,Revision 8 | 32176, Revision 13 | 40124B, Revision 26 | 40130C, Revision22 |
| 30173, Revision 18 | 30101,Revision 31 | 40125A, Revision 14 | 40130D, Revision 22 |
| 30174, Revision 18 | 40111A, Revision 39 | 40127A, Revision 27 | 40150D, Revision 42 |
| 30175, Revision 13 | 40111B, Revision 30 | 40127B, Revision 33 | 40160A, Revision 39 |
| 30176, Revision 14 | 40111C, Revision 18 | 40127C, Revision 39 | 40160B, Revision 20 |
| 30577, Revision 10 | 40112B, Revision 32 | 40127D, Revision 14 | 40160C, Revision 6 |
| 36602, Revisions 1&2 | 40112D, Revision 21 | 40127E, Revision 12 | |
| 32172, Revision 6 | 40113A, Revision 16 | 40127F, Revision 33 | |

Calculations

90035A, Criteria and Methodology for 10 CFR 50 Appendix R Compliance Assessment Program for SONGS 2/3, Revision 0

90035AH, Safe Shutdown Component Evaluation Calculation, Revision 6

Calc 90035AK, Appendix R Compliance Alternative Shutdown Capability, Revision 3

Calc 90035AO, Manual Actions Feasibility, Revision 5

90035AP, Appendix R III.G/III.L Compliance Assessment, Revision 6

90035BC, Cable Report Safe Shutdown System /Component/Cable, Revision 6

Calc 90035BI, Time Line Calculation for Manual Actions, Revision 4

Calc 90035BS, SONGS 2/3 SO23-13-21 Fire Area Summary, Revision 3

Boric Acid Makeup Tank Concentration Reduction Effort Technical Bases and Operational Analysis CEN-316(S), Combustion Engineering, Inc, March 1986

DBD-SO23-TR-AR, Appendix R Safe Shutdown Topical DBD, Revision 10

Calculation —0083-042, Appendix R 72 Hour Cold Shutdown Capability, Revision 1

SONGS Unit 2/3 Appendix R Compliance Alternative Shutdown Capability, Revision 3

Action Requests (ARs)

| | | | |
|---|---|---|---|
| 960900133 | 020101004 | 031100184 | 040800766 |
| 970300653 | 020900086 | 040100655 | 040800888 |
| 990501725 | 020901249 | 040201281 | 040800898 |
| 991200302 | 020901249 | 040201450 | 040800989 |
| 991200483 | 030500613 | 040201660 | 040801074 |
| 001000250 | 030501416 | 040400370 | 040801075 |
| 010500189 | 030800401 | 040601559 | 040801076 |
| 010800501 | 030900245 | 040700913 | 040801100 |
| 011000230 | 031001129 | 040800711 | |

Audits

AUD-9, Units 2 and 3 Safe Shutdown Locker Monthly Audit, Revision 6

SCES-004-03, Fire Protection Systems, dated May 28, 2003

Fire System Impairments

| | | | |
|---|---|---|---|
| 01060059-36 | 01070004-01 | 02100065-00 | 04050041-00 |
| 01060059-36 | 01080031-00 | 04010076-01 | 04060046-00 |
| 01060075-23 | 01080032-00 | 04030046-01 | 04070077-00 |
| 01060075-23 | 01080032-00 | 04040049-00 | 04080027-00 |
| 01060075-23 | 01080033-00 | 04040049-00 | |

Procedures

Abnormal Operating Instruction SO23-13-21, “Fire,” Revisions 1, 7, & 8

Abnormal Operating Instruction SO23-13-2, “Shutdown from Outside the Control Room,” Revision 7

Health Physics Division Performance Standard MP-S-6, Revision 9

Operating Instruction SO23-6-11, “Emergency Lighting System Operation,” Revision 5

Operating Instruction SO23-6-31, “Communication Systems Operation,” Revision 4

Procedure SO123-FP-1, “Fire Protection Program,” Revision 6

Procedure SO123-XV-4.13, “Control of Work and Storage Areas Within the Protected Area,” Revision 12

Procedure LCS 3.7.104, “Fire Rated Assemblies,” Revision 4

Procedure SO23-XIII-4.200, “Units 2 and 3 Fire-Rated Assemblies Impairment Scope Identification,” Revision 2

Procedure SO23-XIII-4.400, “Units 2 and 3 Fire Detection Instrumentation and Fire Suppression Systems Impairment Scope Identification,” Revision 14

Procedure SO23-XIII-4.100, “Units 2 and 3 Fire Monitoring System (FMS) Computer Use and Impairment Scope Identification,” Revision 12

Procedure SO123-XIII-4.600, “Fire Protection Impairment,” Revision 7

Procedure SO123-XIII-7, “Firewatch,” Revision 7

Miscellaneous

2004 Licensed Operator Requalification Week 5 Simulator - Scope, Objectives, and Instructor Critique

Emergency Light Unit Function Test (Groups 1, 2, 3, 4, 5, 8, & 9), performed April 3, 2004
Letter from Engineering and Research, Inc. to the licensee, “Manual Action Summary Tables for Document 90035BS,” dated July 1, 2002

Letter from Tri-En Corporation to the licensee, “Submittal of Report TE-04-064-01, Appendix R/Fire Protection Directed Assessment,” Revision 0, dated July 14, 2004

Letter from the Licensee to the NRC transmitting responses to the NRC request for additional information on the updated fire hazards analysis, dated May 31, 1987

Letter from the licensee to the NRC which provided clarification of the licensee’s May 31, 1987 submittal requested by the NRC at the October 1987 meeting, dated November 20, 1987

Letter from the licensee to the NRC which provided the licensee’s Appendix R reassessment, dated May 31, 1988

Letter from the licensee to the NRC which provided clarification of the licensee’s May 31, 1987 submittal, dated January 21, 1988

Letter from the licensee to the NRC which provided clarification of the licensee’s May 31, 1987 and November 20, 1987 submittals, dated January 21, 1988

Letter from the licensee to the NRC: “Revision 1 to the Fire Analysis Evaluation for San Onofre Units 2 & 3,” dated June 29, 1988

Pre-Fire Plans for Units 2/3

Procedure change document for Procedure SO23-13-21, “Fire,” dated April 12. 1996

San Onofre 2&3 Updated Fire Hazards Analysis Report, Revision 18

System Health Report for Plant Lighting System, Quarter 2004-2

Training History for Procedures SO23-13-21 and SO23-13-2