U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos.	50-206/88-32, 50-361/88-33, 50-362/88-35
Docket Nos.	50-206, 50-361, 50-362
License Nos.	DPR-13, NPF-10, NPF-15
Licensee:	Southern California Edison Company P. O. Box 800, 2244 Walnut Grove Avenue Rosemead, California 92770
Facility Name:	San Onofre Units 1, 2 and 3
Meeting Location:	SCE Corporate Offices, Rosemead, California
Meeting Date:	December 13, 1988

Prepared by: for P. H. Johnson — 1/31/89
F. R. Huey, Senior Resident Inspector — Date Signed
San Onofre Units 1, 2 and 3

Approved By: P. H. Johnson — 1/31/89
P. H. Johnson, Chief — Date Signed
Reactor Projects Section 3

Meeting Summary

Management Meeting on December 13, 1988 (Report Nos. 50-206/88-32, 50-361/88-33, and 50-362/88-35)

A Systematic Assessment of License Performance (SALP) meeting was held on December 13, 1988 to discuss the results of the most recent SALP, covering the period October 1, 1987 through September 30, 1988. Other items of interest relating to the San Onofre Nuclear Generating Station were also discussed.

DETAILS

1. Meeting Participants

Nuclear Regulatory Commission (NRC)

J. Martin, Regional Administrator
D. Crutchfield, Acting Associate Director for Projects, NRR
D. Kirsch, Director, Division of Reactor Safety and Projects
G. Knighton, Director, Reactor Project Directorate V, NRR
R. Zimmerman, Chief, Reactor Projects Branch
G. Yuhas, Chief, Emergency Preparedness and Radiological Protection Branch
P. Johnson, Chief, Reactor Projects Section 3
C. Trammell, San Onofre Unit 1 Project Manager, NRR
D. Hickman, San Onofre Units 2/3 Project Manager, NRR
F. Huey, Senior Resident Inspector
J. Tatum, Resident Inspector
A. Hon, Resident Inspector

Southern California Edison Company

D. Fogarty, Executive Vice President
K. Baskin, Vice President, Nuclear Engineering, Safety and Licensing
C. McCarthy, Vice President, Site Manager
R. Rosenblum, Manager of Quality Assurance
D. Nunn, Manager of Nuclear Engineering & Construction
M. Medford, Manager of Nuclear Regulatory Affairs
H. Morgan, Station Manager
D. Heinicke, Deputy Station Manager
D. Herbst, Quality Assurance Manager
D. Stonecipher, Quality Control Manager
R. Krieger, Operations Manager
D. Shull, Maintenance Manager
J. Reilly, Technical Manager
P. Knapp, Health Physics Manager
K. Slagle, Material & Administrative Services Manager
D. Peacor, Emergency Preparedness Manager
P. Eller, Security Manager
J. Schramm, Operations Superintendent, Unit 1
V. Fisher, Operations Superintendent, Units 2/3
L. Cash, Maintenance Manager, Unit 1
R. Santosuosso, Maintenance Manager, Units 2/3
C. Chiu, Assistant Technical Manager
M. Wharton, Assistant Technical Manager
C. Couser, Compliance Engineer

2. Management Discussion

Mr. Martin opened the meeting by stating that the primary challenge of the SALP process is to provide increased licensee and NRC attention on the actions which are needed for sustained excellent operation of

licensed facilities. In this regard, Mr. Martin noted that during this last SALP period, the NRC and the licensee had focused significant attention and resource on the performance of engineering and technical work at San Onofre. This attention resulted in the identification of significant deficiencies (many of which were programmatic in nature) in the manner in which engineering and technical activities have been performed at San Onofre. Although SCE has initiated aggressive actions to correct the observed deficiencies, as noted during the management conference held at the site on November 2, 1988, the low SALP marks in the Engineering/Technical Support and Safety Assessment/Quality Verification areas reflect the significance of these deficiencies and the shortcomings of management involvement and quality oversight which allowed them to remain so long undetected. Mr. Martin encouraged SCE management to not only follow through with identified corrective actions, but to apply the lessons learned from the engineering program review to other areas of probable benefit. In particular, Mr. Martin noted that additional attention will be placed on licensee maintenance activities during the new SALP period.

Mr. Kirsch briefly reviewed the results of the November 25 SALP report. In particular, he noted:

1. Significant strengths were noted in Operations (particularly in the areas of trip reduction, operator knowledge and well-written procedures) and in the Radiation Protection, Emergency Preparedness and Security areas.

2. Failure to follow procedures was noted as a continuing problem in the Maintenance/Surveillance area.

3. The most significant problems were noted in the Engineering/Technical Support and Safety Assessment/Quality Verification areas, although significant improvement was noted in root cause evaluation and chemistry program implementation. In particular, major weaknesses contributing to the assignment of a Category 3 rating in these areas were observed to include:

   Engineering/Technical Support

   - Insufficient understanding of plant design
   - Inadequate control of design processes
   - Inadequate design data base

   Safety Assessment/Quality Verification

   - Insufficient management involvement/self critical attitude
   - Ineffective quality oversight group involvement
   - Inadequate safety reviews
   - Improper reportability determinations
   - Inadequately supported amendment requests

Mr. Crutchfield briefly reviewed NRR concerns with SCE licensing submittals. In particular, he noted that Unit 1 submittals had not been of the

same quality as Unit 2/3 submittals. In this regard, he noted that SCE needed to place more attention on the quality of all Unit 1 submittals and not just those needed to support continued plant operation. Mr. Knighton noted that late and inadequate event reports to the NRC were also a significant concern. In this regard, Mr. Martin added that he believed that the problem may involve a tendency on the part of the licensee to not tell the NRC about developing problems until they have the full story. He encouraged SCE to correct this problem and emphasize timely and open discussion of potential or significant plant problems with the NRC. Licensee management acknowledged this comment and stated that SCE would strive for improved communications.

Mr. Baskin stated that SCE would like to briefly review the specific corrective actions which are being pursued to improve performance in the Engineering/Technical Support and Safety Assessment/Quality Verification functional areas.

Mr. Nunn discussed specific actions being taken in the Engineering/Technical Support area. With regard to staffing, he noted that the existing level of engineering personnel was about 119, with a near-term projection of about 150 engineers. Mr. Martin questioned the ratio of engineering supervision to working engineers, noting that other successful engineering organizations seem to use a rule of thumb of engineering reviews and supervision requiring about 33% of the total engineering effort. Mr. Nunn stated that SCE was sensitive to this concern and would put emphasis on effective engineering supervision.

Mr. Rosenblum and Mr. Medford discussed the actions being taken to improve performance involving quality oversight groups and licensing activities.

The licensee's presentations were concluded with a brief presentation by Mr. Knapp on the actions being implemented by SCE to improve control of spent fuel particle contamination during the Unit 1 refueling outage, which began in late November.

In closing, Mr. Martin acknowledged the actions initiated by SCE to improve performance in the above areas and stated that he expected significant improvements would result from SCE's efforts. He noted that it is often easier to correct bad performance than to sustain excellent performance. In this regard, he emphasized the need for SCE management to maintain its level of effort in all areas impacting safe plant operation in order to provide continued excellence in this area.

Mr. Martin then led the discussion to other areas of current NRC concern. In particular, he noted that recent NRC initiatives associated with operation at reduced coolant inventory (i.e., mid-loop operation of shutdown cooling) had underscored the significant risks involved during plant shutdown periods. In this regard, Mr. Martin stated that licensees should take prompt actions to dispel any lingering attitudes by plant operating personnel that diligence can be relaxed during plant shutdown periods. He noted that recent NRR reviews have established that as much as half of the total risk of core melt is associated with plant shutdown periods. He requested that SCE management provide specific attention to

ensure that special diligence is maintained by all plant personnel during periods of mid-loop plant operation.

Mr. Martin noted that SCE was continuing to find illegal drugs within the protected areas of the plant. He emphasized that continued poor performance in this area could not only undermine NRC confidence, but might also affect public confidence in the adequacy of the licensee's drug program. Mr. Martin stated that a particularly embarrassing aspect of the problem was the continuing finds in the Unit 2/3 lube oil rooms. He stated that SCE must quickly implement effective measures to stop this problem. Mr. Slagle briefly discussed measures being taken or considered.

Southern California Edison Company
P. O. BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

KENNETH P. BASKIN
VICE PRESIDENT

TELEPHONE
818-302-1401

January 13, 1989

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596-5368

Attention: Mr. John B. Martin, Regional Administrator

Subject: Systemic Assessment of Licensee Performance (SALP)
Docket Nos. 50-206, 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 1, 2 and 3

References: A. Letter from Mr John B. Martin (USNRC) to Mr. Kenneth P. Baskin (SCE) dated November 25, 1988, same subject.

B. Letter from Mr. Kenneth P. Baskin (SCE) to Mr. John B. Martin (USNRC) dated October 3, 1988, Subject: Independent Assessment of Engineering and Technical Support for San Onofre Nuclear Generating Station Units 1, 2 and 3.

Reference A transmitted the SALP report which documents the NRC evaluation of the Southern California Edison Company's (SCE) performance in the operation of San Onofre Nuclear Generating Station Units 1, 2 and 3 for the period of October 1, 1987 through September 30, 1988. Overall SCE's performance was found to be acceptable and directed toward safe facility operation. Good performance was noted in the functional areas of Plant Operations, Radiological Controls, Emergency Preparedness, and Security. However, the report noted that SCE's performance was below average in the functional areas of Engineering/Technical Support and Safety Assessment/Quality Verification. The purpose of this letter is to describe ongoing and planned future corrective actions to improve SCE's performance in these areas.

As you are aware, SCE has recently completed an exhaustive review of engineering and technical support and is continuing to expeditiously act on the findings and recommendations to correct deficiencies in this area. Details of this review and the actions being taken were discussed in Reference B and during our November 2 and December 13, 1988 meetings. The SALP report recognized that most of these changes were initiated too late in the SALP evaluation period to allow for their impact to be fully effective and that many other changes were to be phased in over several months in 1989. SCE is confident that these actions directly address the SALP findings in the

~~8901310134~~ 4pp.

Engineering/Technical Support functional area. SCE reiterates that because of the significance and sweeping nature of the organizational changes and relocation described in Reference B, it will take some time before the new organization can reasonably be expected to achieve its full potential.

The review of engineering and technical support concluded that the major contributors to the identified problems were the complexity of the organization, heavy reliance on engineering contractors combined with inadequate allocation of SCE engineering resources, and the lack of readily accessible comprehensive design basis documentation. The principle corrective actions to address these conclusions include the reorganization and relocation of offsite nuclear support organizations, augmentation of in-house engineering resources, and the establishment of a design basis documentation (DBD) program to recapture and maintain the design basis for all three units. The DBD program plan was forwarded to you by letter dated January 9, 1989.

While these actions primarily address the problems in the Engineering/ Technical Support area, they will undoubtedly have a positive effect on improving SCE's performance in the area of Safety Assessment/Quality Verification. For example, the complex interfaces and poor definition and understanding of responsibilities in the old organization has undoubtedly contributed to problems in the Licensing and Oversight areas. Inadequate design bases documentation detracts from the ability to perform adequate safety assessments. Important considerations may be overlooked in the absence of adequate design basis documentation. In the old organization, with engineering and technical support distributed among four separate departments, adequate technical support and review of licensing submittals also was difficult to achieve consistently. Without well defined responsibilities, the oversight organizations cannot direct the need for corrective actions to the responsible parties when problems are identified. The mis-allocation of resources devoted to engineering/technical support, overlap of responsibilities and duplication of effort existing in the old organization also contributed to less effective use of oversight resources.

SALP observations in the Safety Assessment/Quality Verification functional area related to deficiencies in oversight activities, licensing and reporting. The SALP Board observed that oversight groups lack aggressiveness and miss opportunities to identify and correct significant problems before they become self evident or are discovered by others. Observed licensing and reporting deficiencies included inadequately supported or late licensing submittals, excessive time being devoted to evaluating potentially reportable situations prior to making a reportability determination, and not appraising the NRC of developing issues of potential interest.

In response to the SALP observations relating to oversight activities, an independent critical review of oversight organization effectiveness is being initiated, focusing on "missed opportunities" to identify problems at an early stage and correct them. A consultant has been retained to conduct an independent review of SCE oversight functions. The first phase of the review will consist of an assessment of the current structure and mission of the

oversight organizations. The second phase will consist of an evaluation of past examples of oversight failure as noted in the SALP report. The objective of this initiative is to determine root causes of oversight failures, implement corrective actions where indicated, and develop an ongoing process to assess future oversight performance, thereby providing a mechanism to learn from our experience.

Several actions are already underway to correct oversight difficulties based upon our own evaluations of previous performance. These actions include efforts to improve the depth and insight of oversight activities by increasing the technical capability of our staff through training and cross-training, increased real time supervisory involvement in oversight staff activities, and a reduction in after-the-fact reviews, and a greater emphasis on real time, performance based activities.

As a means to learn from our peers within the industry, one senior oversight supervisor will participate in an INPO plant evaluation approximately every three months. We believe that participation in an INPO plant evaluation is the most effective means to become familiar with both good and bad practices within the industry.

SCE is aggressively seeking to eliminate inappropriate restrictions which tend to focus oversight efforts on low payback traditional paper reviews, and reduce the flexibility necessary to allow us to focus our resources most effectively on emergent issues. In 1988, both Technical Specification and Topical Report changes were requested and approved, which increased the flexibility of the Quality Assurance efforts.

As noted above, the reorganization, will also have positive results in the Safety Assessment/Quality Verification area. The reorganization has consolidated the oversight functions of the Nuclear Safety Group, Independent Safety Engineering Group, Quality Assurance and Quality Control under a single manager, allowing better coordination of oversight activities and utilization of resources. Management changes have also been made which bring new perspectives to the oversight organizations.

In a yet to be completed change, the nuclear licensing function will be focused by transferring appropriate elements of the current Station Compliance organization to Licensing. This will provide for better coordination of the interfaces between Licensing and the Station, and SCE interfaces with NRR and Region V.

The reorganization will afford better technical support for licensing submittals. The consolidation of engineering responsibilities within the Nuclear Engineering, Safety and Licensing engineering organization will make that organization the primary source of engineering support for licensing activities. In many previous instances, licensing has contracted and overseen engineering work related to licensing activities. This had the effect of diluting licensing resources and control of the design bases. Reestablishment of engineering responsibilities in the new organization will allow licensing resources to be concentrated on licensing activities.

The appointment of a senior manager in the new organization, who is responsible specifically for licensing, will increase management oversight of licensing activities. This will provide for coordination at a higher level and prioritization of resources to improve SCE's on time performance for licensing submittals. SCE is re-examining our tracking mechanisms, and changes will be made to ensure that licensing actions are identified, tracked and given management visibility to facilitate timely responses. This action will be completed during the first quarter of 1989.

Management attention has been focused on reportability. This focus has established tighter time frames for making reportability determinations for potentially reportable situations. SCE will improve our communications with both the Resident Inspectors and the NRR Project Managers and involve them earlier in developing issues than has been the case in the past. Actions initiated by Station management late in the SALP review period to delineate timing of notification desired by the Resident Inspectors for a range of plant evolutions and events, and to heighten Station management sensitivity to early involvement of the Resident Inspectors, have already had a positive impact in this area. Responsibility for properly addressing reportability issues associated with work performed by the offsite organizations will be formally established.

SCE believes that the actions taken late in the SALP period in response to concerns related to the adequacy of technical support for SONGS directly address the deficiencies identified by the SALP report in the Engineering/ Technical Support functional area. In addition, these same corrective actions will have a positive effect on the Safety Assessment/Quality Verification functional area, and in combination with other actions which we have discussed, will result in significantly improved performance in the current evaluation period. To ensure that we continue to make adequate progress in improving performance, periodic critical assessments will be made.

If you have any questions regarding the actions we are taking, please call me.

Very truly yours,

Kenneth P Baskin

cc: U. S. Nuclear Regulatory Commission, Document Control Desk
F. R. Huey, NRC Senior Resident Inspector, San Onofre Units 1, 2 and 3

FINAL SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

50-206/88-25, 361/88-26, 362/88-28

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE NUCLEAR GENERATING STATION

OCTOBER 1, 1987 THROUGH SEPTEMBER 30, 1988

37pp.

TABLE OF CONTENTS

TABLES

I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) is an NRC staff integrated effort to collect available observations and data on a periodic basis and evaluate licensee's performance based on this information. The program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC's assessment of their facility's performance in each functional area.

An NRC SALP Board, composed of the members listed below, met in the Region V office on November 9, 1988, to review observations and data on the licensee's performance in accordance with NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance," dated June 6, 1988. The Board's findings and recommendations were forwarded to the NRC Regional Administrator for approval and issuance.

This report is the NRC's assessment of the licensee's safety performance at San Onofre for the period October 1, 1987 through September 30, 1988.

The SALP Board for San Onofre was composed of:

**D. F. Kirsch, Director, Division of Reactor Safety and Projects, Region V (Board Chairman)
**R. A. Scarano, Director, Division of Radiation Safety and Safeguards
**G. W. Knighton, Director, Project Directorate V, NRR
**R. P. Zimmerman, Chief, Reactor Projects Branch
*G. P. Yuhas, Chief, Emergency Preparedness and Radiological Protection Branch
**P. H. Johnson, Chief, Reactor Projects Section 3
*H. S. North, Acting Chief, Facilities Radiological Protection Section
*M. D. Schuster, Chief, Safeguards Section
**C. M. Trammell, Unit 1 NRR Project Manager
**D. E. Hickman, Units 2 and 3 NRR Project Manager
**F. R. Huey, Senior Resident Inspector
**C. W. Caldwell, Project Inspector
*J. E. Russell, Radiation Specialist
*G. M. Good, Emergency Preparedness Analyst
*D. W. Schaefer, Safeguards Inspector

* Denotes voting member in functional area of cognizance.
** Denotes voting member in all functional areas.

A. Licensee Activities

In general, all three units operated satisfactorily during the assessment period and were relatively free of problems. Specific operational events were as follows:

Unit 1

Unit 1 operated essentially at full power from the beginning of the assessment period until mid-February 1988. The Unit shut down on February 13, 1988 for a planned 45-day maintenance outage (no refueling). During that outage, problems with environmental qualification (EQ) of components became a major issue concerning the Unit. The resident inspectors and the licensee identified several safety related electrical components that were not properly qualified. These problems were indicative of a programmatic breakdown of design controls associated with the licensee's EQ program. The licensee initiated a comprehensive reevaluation of the EQ program which identified more than 140 additional components which were not properly included in the program. The root cause of the EQ program breakdown was determined to be inadequate design controls during the period between 1981 and 1984, and an inadequate review of electrical interactions, as required by 10 CFR 50.49 (b)(2). As a result, the licensee delayed the startup from the mid-cycle outage and instituted a comprehensive program to identify and correct all EQ deficiencies prior to restart.

Another problem developed on May 31, 1988 (during the outage) which concerned the capacity of the emergency diesel generators (D/Gs). The licensee found that the design calculations for the Unit 1 D/Gs did not have sufficient capacity to handle all post-accident loads due to D/G derating which occurred in November 1985. For corrective action, SCE obtained a Technical Specification change to increase the allowed load (effective until the next refueling outage). For long term corrective action, the licensee plans to replace necessary parts in accordance with vendor recommendations so that the capacity of the D/Gs may be raised back to the nameplate value of 6000 Kw.

These problems were resolved by the licensee and the Unit was restarted on August 5, 1988 after completion of the 174 day mid-cycle outage. The outage was extended 130 days to resolve the EQ issues discussed above. The Unit operated at full power through the remainder of the assessment period.

Unit 2

Unit 2 was in a refueling outage at the beginning of the assessment period. The outage was free of any significant problems and the Unit was restarted on December 9, 1987. Other than a manual trip due to the failure of a feedwater isolation valve in mid-December 1987, the Unit operated at power until March 16, 1988 when it was shut down as a result of steam generator tube leakage. The source of the leakage was a previously plugged tube from which the plug had fallen. This plug was replaced, others were inspected, and the plant was restarted on April 4, 1988. The Unit operated at essentially full power until May 6, when the licensee initiated a shutdown (per Technical Specification 3.0.3) as a result of both emergency chilled water (ECW) system chillers being declared inoperable due to low Freon level. The problem was corrected and the power decrease was terminated after about three hours.

The Unit resumed full power operation on May 6, 1988 and operated continuously until August 21, when an Unusual Event (UE) was declared and a shutdown was initiated due to an actuating relief valve on one of the four safety injection tanks (SITs). SCE terminated the UE after completion of the controlled reactor shutdown. The licensee corrected the source of the problem, which was a roughly machined surface between the valve stem and the stem guide. Similar corrective action was taken for one other SIT relief valve (Unit 3 SIT relief valves were inspected and found to be acceptable). The Unit was subsequently restarted on August 23, and operated at full power for the remainder of the SALP period.

Unit 3

The Unit operated at full power at the beginning of the SALP period until a reactor trip occurred on October 11 due to influx of seaweed into the main condenser. The Unit was restarted the next day and operated at full power until January 23, 1988, when the Unit was shut down for 16 days due to a main generator hydrogen leak. Except for a manual trip on February 20, prompted by a spurious engineered safety features actuation, the Unit operated at full power until April 30, 1988, when the licensee shut it down to begin the Cycle 4 refueling outage.

On June 22, 1988, with the Unit shut down, approximately one foot of water was inadvertently siphoned from the spent fuel pool to the reactor cavity due to failure (during initial plant construction) to install a vacuum breaker in the purification system piping which extends to the bottom of the fuel pool. A second event occurred on June 23, while licensee personnel were preparing to transfer water from the reactor cavity to the spent fuel pool, because personnel left a temporary pump unattended in a primed condition. For corrective action, the licensee instituted precautions and controls to prevent siphon paths. For the long term, a design modification was planned to install vacuum breakers in Unit 2/3 spent fuel pool purification suction piping as originally specified in the FSAR.

On July 7, 1988, during draindown of the reactor vessel, cavitation of the operating low pressure safety injection (shutdown cooling) pump occurred on two occasions due to blocking of a reference level sensing port (this caused the reactor vessel level indication to read incorrectly). The draindown was terminated until the problem was identified. Operator attentiveness was credited for avoiding a potentially serious problem, (a loss of shutdown cooling condition) although the event identified a need for improved control of maintenance activities.

Unit 3 was restarted on August 16, 1988 after completion of the 3-1/2 month maintenance outage. The restart had been delayed approximately one month to complete repairs to a shutdown cooling isolation valve and replace seals on a reactor coolant pump. The Unit was subsequently shut down on August 26 to correct unisolable tube leakage in a fifth point feedwater heater. The Unit was returned to service on August 29, after repair of the heater, and operated at full power for the remainder of the assessment period.

B. Direct Inspection and Review Activities

Approximately 5480 on-site inspection hours were spent in performing a total of 36 inspections by resident, region-based, headquarters, and contract personnel. Inspection activity in each functional area is summarized in Table 1.

II. SUMMARY OF RESULTS

A. Effectiveness of Licensee Management

Notable licensee achievements were observed during this SALP period, including a significant reduction in the number of reactor trips and relatively low forced outage rates of 7% and 5% for Units 2 and 3, respectively. Plant performance included a number of notable strengths. However, several weaknesses were also observed during the assessment period. The most significant of these weaknesses concerned engineering and technical support activities, licensing activities, and a lack of aggressiveness of safety oversight groups in identifying engineering/technical deficiencies.

The performance of the Plant Operations staff was very effective during this period, with strengths observed in staffing and professionalism. The alertness of control room operators was credited on one occasion with averting a potential loss of shutdown cooling flow caused by poor control of maintenance activities. The licensee also demonstrated an aggressive radiological controls program which served as an industry leader in several respects. Effective management controls, ample and capable staffing, and self-critical attitudes also provided good overall performance in the Emergency Preparedness and Security areas.

The Board considered the licensee to have an effective Maintenance and Surveillance program, although weaknesses were observed in the control of maintenance activities and in compliance with maintenance procedures and instructions. Weaknesses were also observed in the Engineering/Technical Support functional area. The licensee was found to have a depth of personnel and material resources in this area, and performed many program requirements in an effective manner. However, a number of significant engineering and technical problems (discussed in Section IV.F) were manifested during this SALP period which reflected adversely on the quality of engineering work and the effectiveness of the administrative controls which govern it. While it is true that some of the problems were identified by more aggressive engineering or quality verification performance, and actually resulted from poor engineering work during prior SALP periods, a need for improved engineering/technical performance was clearly indicated. Also apparent was a need to improve the completeness and correctness of the plant's design basis documentation.

Other assets in the Safety Assessment/Quality Verification functional area included an improved root cause assessment program and an effective program for monitoring plant performance. However, several significant weakness were noted in program implementation in this functional area. In particular, the quality assurance organization and the quality oversight groups showed insufficient aggressiveness in identifying problems in the plant engineering and technical support area, and in the identification of significant safety issues in general. In addition, in a number of cases, the licensee's timeliness and adequacy of licensing submittals and timeliness of reportability evaluations were inadequate.

The weaknesses noted above were discussed during periodic meetings with licensee management. These discussions emphasized a need for a self-critical attitude by SCE in addressing areas of weakness, particularly during the early portion of the SALP period. In a manner indicative of such a self-critical attitude, senior SCE management recognized the significance of the observed weaknesses in the Engineering/Technical Support and Safety Assessment/Quality Verification areas and initiated comprehensive actions late in the SALP period to provide improvement in these areas. These involved a corporate reorganization to put all such activities under one Vice President, plans to move the department closer to the San Onofre Station, and a review and updating of the plant's design basis documents. These actions, if vigorously pursued, should significantly improve the quality of engineering and safety assessment programs which support San Onofre.

B. Results of Board Assessment

Overall, the SALP Board found the performance of NRC licensed activities by the licensee to be acceptable and directed toward safe operation of the San Onofre Station. The SALP Board has made specific recommendations in most functional areas for licensee management consideration. The results of the Board's assessment of the licensee's performance in each functional area, including the previous assessments, are as follows:

	Functional Area	Rating Last Period*	Rating This Period	Trend *
A.	Plant Operations	1	1	None
B.	Radiological Controls	2	1	None
C.	Maintenance/ Surveillance	2	2	None
D.	Emergency Preparedness	1	1	None
E.	Security	2	1	None
F.	Engineering/Technical Support	2	3	None
G.	Safety Assessment/ Quality Verification	2	3	None

No trend was apparent for any of the functional areas during this period.

* Maintenance and Surveillance were separate functional areas during the last SALP period. However, both areas received a rating of 2 during the last assessment. Safety Assessment/ Quality Verification is a new functional area this period. It is similar to, but more comprehensive than, the Quality Programs and Administrative Controls Affecting Safety functional area which it replaced. Other functional areas rated separately during the last SALP period, such as Fire Protection and Training, were evaluated as appropriate within the scope of the functional areas listed above.

** The trend indicates the SALP Board's appraisal of the licensee's direction of performance in a functional area near the close of the assessment period such that continuation of this trend may result in a change in performance level. Determination of the performance trend is made selectively and is reserved for those instances when it is necessary to focus NRC and licensee attention on an area with a declining performance trend, or to acknowledge an improving trend in licensee performance. It is not necessarily a comparison of performance during the current period with that in the previous period.

C. Changes in SALP Ratings

The licensee's overall performance was observed to have improved in the Radiological Controls and Security areas during the period due to the strong performance exhibited by these organizations, as discussed in Paragraphs IV.B and IV.E. The licensee's performance in the Engineering/Technical Support area declined from Category 2 to Category 3 during this period, based primarily upon a number of significant engineering problems which were observed by the licensee and the NRC during the period, as discussed further in Paragraph IV.F. Performance in the Safety Assessment/Quality Verification functional area also declined from Category 2 to Category 3, due primarily to inadequately supported licensing submittals, improper reportability determinations, and a perceived lack of aggressiveness by quality oversight groups in identifying problems with engineering/technical activities, as discussed in Paragraph IV.G.

III. CRITERIA

Licensee performance is assessed in selected functional areas, depending on whether the facility is in a construction or operational phase. Functional areas normally represent areas significant to nuclear safety and the environment. Some functional areas may not be assessed because of little or no licensee activities or lack of meaningful observations. Special areas may be added to highlight significant observations.

The following evaluation criteria were used, as applicable, to assess each functional area:

1. Assurance of quality, including management involvement and control.

2. Approach to resolution of technical issues from a safety standpoint.

3. Responsiveness to NRC initiatives.

4. Enforcement history.

5. Operational events (including response to, analysis of, reporting of, and corrective actions for events).

6. Staffing (including management).

7. Effectiveness of the training and qualifications program.

However, the NRC is not limited to these criteria and others may have been used where appropriate.

On the basis of the NRC assessment, each functional area evaluated was rated according to three performance categories. The definitions of these performance categories are as follows:

Category 1: Licensee management attention and involvement are readily evident and place emphasis on superior performance of nuclear safety or safeguards activities, with the resulting performance substantially exceeding regulatory requirements. Licensee resources are ample and effectively used so that a high level of plant and personnel performance is being achieved. Reduced NRC attention may be appropriate.

Category 2: Licensee management attention to and involvement in the performance of nuclear safety or safeguards activities are good. The licensee has attained a level of performance above that needed to meet regulatory requirements. Licensee resources are adequate and reasonably allocated so that good plant and personnel performance is being achieved. NRC attention may be maintained at normal levels.

Category 3: Licensee management attention to and involvement in the performance of nuclear safety or safeguards activities are not sufficient. The licensee's performance does not significantly exceed that needed to meet minimal regulatory requirements. Licensee resources appear to be strained or not effectively used. NRC attention should be increased above normal levels.

IV. PERFORMANCE ANALYSIS

The following is the Board's assessment of the licensee's performance in each of the functional areas, plus the Board's conclusions for each area and its recommendations with respect to licensee actions and management emphasis.

A. Plant Operations

1. Analysis

During the SALP period, approximately 1800 hours of direct inspection effort were applied in the Plant Operations area. Plant Operations continued to be a licensee strength. The licensee was noted to have had several significant accomplishments in the operations area during this SALP period. The most significant was the reduction in the number of reactor trips. Other strengths were also observed regarding operator knowledge and the adequacy of procedures. The primary areas in which improvement appeared warranted involved enhancement of control over the work authorization process and improved interface among the operating, maintenance, and technical organizations.

The resident inspectors observed licensee operation of the units on a daily basis, including random backshift hours. Operations staffing was observed to be adequate and control room operators were consistently observed to be knowledgeable, attentive to plant conditions, and professional in their conduct. One example of exemplary performance was the prompt recognition and mitigation of an incipient loss of shutdown cooling during the Unit 3 refueling outage when the reactor coolant system was being drained to mid-loop. Although this indicated a weakness in Operations control of maintenance activities, the alertness of the control room operators was credited with preventing a potential loss of shutdown cooling flow. This event is discussed further under Maintenance/ Surveillance, Section IV.C.

The licensee's approach to the resolution of operational safety issues was generally sound. The licensee's Trip Reduction Program, initiated in 1986, has been effective in achieving a goal of not more than one unplanned reactor trip per reactor year. Performance improved significantly during this SALP period (a total of 3 trips this period compared to 16 trips last period). Unit 1 experienced no reactor trips during 190 days of power operation. Unit 2 experienced one manual trip (due to failure of a feedwater isolation valve) during 268 days of power operation, and Unit 3 experienced one automatic trip (low condenser vacuum due to influx of seaweed) and one manual trip (prompted by a spurious ESF actuation) during 235 days of power operation.

A sense of conservatism was generally exhibited by the Operations Staff when dealing with safety significant problems. A specific exception involved improper followup and operability determinations following observed low Freon levels on Unit 2/3 emergency chillers. The low Freon level was not properly understood or corrected for approximately one month, eventually contributing to inoperability of both emergency chillers. This indicated a weakness in interface among operations, maintenance, and technical organizations, since the plant

operators had ample opportunities to resolve questions with cognizant station technical personnel.

Inspection activities during the SALP period identified one Severity Level IV violation associated with the Plant Operations area. This involved failure to comply with a Unit 1 procedure for maintaining the operability of the auxiliary feedwater (AFW) backup nitrogen system.

During this SALP period, a total of ten LERs were issued in the Plant Operations area. For Unit 1, three LERs were issued during the period. Of these, two were due to equipment failure and one was the result of an inadequate procedure. Five Plant Operations LERs were issued for Unit 2. Of these, two were the result of operator error and three were the result of equipment failures. Two operations related LERs were issued for Unit 3; one was for a plant trip due to low condenser vacuum following an excessive influx of seaweed, and the other concerned an inadvertent containment purge isolation system (CPIS) actuation due to inadequate communication between operations and health physics personnel.

On-line performance for the three units declined slightly during the 365 day SALP period compared to the last SALP period. However, this was largely due to licensee corrective actions resulting from Unit 1 EQ design problems. During the period, Units 1, 2, and 3 had unplanned outage rates of 36% (up from 9% last period), 7%, and 5%, respectively. It is noteworthy that none of the trips or unplanned outages resulted from operator error.

The licensed operator training program was characterized by excellent performance during the SALP period. This was evidenced by a high pass rate of 92 percent (22 passes of 24 candidates) on replacement examinations. The facility also received a satisfactory evaluation for the Units 2/3 Requalification program from a pilot Requalification Program Evaluation conducted under a proposed change to Examiners Standard ES-601, "Requalification Program Evaluation". The facility expended a large amount of manpower and produced a quality product for its voluntary participation in this pilot evaluation. Their efforts included preparing job performance measurements, simulator scenarios, and a two-part written examination. The preparation of this material involved many changes from prior practice and required the production of entirely new material. The licensee had an acceptable pass rate of 86 percent (10 passes of 12 examinees) for this Requalification Program Evaluation.

The Board concluded that the licensee's approach to plant operation was generally conservative and safety conscious. There was consistent evidence of prior planning and assignment of priorities. Briefings ("tailboard meetings") were observed to be conducted with involved personnel prior to plant

evolutions and testing. A specific strength was observed concerning operating procedures, which were noted to be consistently well written, understood and implemented. Decision making was usually at a level that ensured adequate review. An exception was the licensee's improper use of Special Orders as interim emergency procedures for handling postulated ESF single failure events. The licensee took prompt corrective action when this deficiency was pointed out by the resident inspectors. In this and other cases, interface by the NRC generally showed the various levels of licensee management to be professional and responsive. In addition, plant housekeeping conditions were observed to be improving.

2. Conclusion

Performance Assessment - Category 1.

3. Board Recommendations

The Board recommends that the licensee continue management emphasis on trip reduction, procedure compliance, attention to detail by equipment operators, and housekeeping. Action should also be taken to strengthen the interface among Operations, Maintenance, and Technical personnel in a manner which will provide a more conservative approach to the resolution of plant problems.

B. Radiological Controls

1. Analysis

This functional area was reviewed routinely during the assessment period by both regional and resident inspection staff. Over 620 hours of direct inspection effort were expended in this area. Strengths identified included a comprehensive management control system, a highly qualified staff, a fully accredited training and qualification program, and a commitment at the highest levels of management to quality performance. Housekeeping was effective, and contaminated areas were minimized. Observed weaknesses included minor deficiencies involving the implementation of a quality assurance program for auditing the use of packages of greater than type A quantities of radioactive material, the posting of a radiation and a high radiation area, and the failure of a maintenance worker to follow Health Physics (HP) requirements which resulted in an exposure in excess of the quarterly whole body limit. None of these problems appeared to indicate any programmatic weakness in radiological controls.

The management control system was considered a strength in the Radiological Controls area. The HP division instituted a specific organization, during this period, to assure prior planning and assignment of priorities to the HP aspects of outage work. HP policies were well stated and disseminated

through routine staff meetings, a monthly newsletter, and monthly luncheons at which the HP Manager directly interacted with the line staff. Corporate management was frequently and effectively involved in site activities and performed monthly audits of specific aspects of the HP program. Corrective actions for identified deficiencies were typically effective and the licensee was responsive to expressed NRC concerns (e.g., the licensee's efforts to deal with radioactive gaseous effluents which were in excess of the national average). Management review of HP problems has been addressed by an Operational Excellence Forum, which included all site managers. A management tour program was instituted this assessment period which assured that all site management performed weekly inspections of ongoing work.

The staff was also considered a strength in the HP area. Positions were well defined and authorities and responsibilities were clearly delineated. The staff was highly qualified technically, with six certified health physicists on-site and one at the corporate office. Professional industry activities were supported monetarily and encouraged by management. Experience levels of personnel were high and the turnover rate was low. During the period, the staff demonstrated a clear understanding of technical issues, notably in their implementation of an industry benchmark hot particle control program. In addition, conservatism was generally exhibited in problem resolution.

Three violations were identified during this assessment period, as indicated in Table 2. Most were isolated occurrences which did not indicate any programmatic deficiency, and all were expeditiously and comprehensively corrected. During this SALP period there were few significant operational HP events, but there were numerous monitor failures and spurious engineered safety features (ESF) actuations. These events were promptly and adequately reported. However, technical resolution of these events was slow. Also of concern was the fact that the licensee has been slow to complete the program for validation, verification, and documentation of safety affecting software in the HP area.

The licensee's training program has been fully accredited by the Institute for Nuclear Power Operations and was considered a strength. The instructors were primarily National Registry of Radiological Protection Technologists (NRRPT) certified, and were found to have implemented a well defined program of routine, job specific, and mock-up training. A complete program for contract technician training and qualification was also implemented which required satisfactory completion prior to the conduct of work. All SCE HP technicians were American National Standards Institute (ANSI) qualified with the exception of one person. In addition, management encouraged and supported training of technicians to become NRRPT certified. A program for feedback was also established to provide input of

operational problems and concerns to the Training Department for use in periodic retraining of personnel. Procedures and policies were clearly defined and followed. In the few instances where policies were not followed and deficiencies were subsequently identified, there were no indications that inadequate training was the cause.

Another strength in this functional area was the licensee's demonstrated commitment to quality performance. The site instituted a Performance, Recognition, Innovation, Dedication, Excellence (PRIDE) program to reward and recognize employees and groups which contributed to the achievement of goals in, among others, the reduction of radioactive waste and occupational exposure. There was also a Productivity Improvement Program (PIP) which recognized and rewarded management and Operations personnel for exceptional contributions to quality service specifically in the area of limiting personnel exposure and improving access control to radiological areas. In addition to these site-wide programs, there were internal HP incentive programs to acknowledge exceptional contributions by line personnel (The Silver Dollar Program) and for contributions in the area of dose minimization (ALARA awards).

The Quality Assurance organization also demonstrated expertise in the HP area and provided independent critical review of the program, particularly in the area of radioactive material control and the Radiation Exposure Permit program. The licensee took exceptional efforts to deal with the root cause of the hot particle and elevated gaseous effluent problems discussed previously by performing audits of their fuel supplier's fabrication facilities in order to minimize or eliminate fuel integrity problems. The licensee also took the lead in obtaining authorization from the vendor to institute and implement elevated pH, coordinated Lithium/Boron chemistry. (The use of elevated pH chemistry has been shown to minimize radiation field increases in European power plants.)

As a result of the licensee's efforts discussed above, San Onofre was well below the 1987 average collective dose for PWRs of 371 person-rem per reactor. Despite having major outages at all units, the average collective dose was 232 person-rem per reactor. This also surpassed the 1990 INPO occupational exposure goal of 288 person-rem per reactor. In addition, the licensee surpassed the 1990 INPO solid radioactive waste goal of 213 cubic meters per reactor by producing only 109 cubic meters per reactor for 1987.

2. Conclusion

Performance Assessment - Category 1.

3. Board Recommendations

The licensee is encouraged to continue efforts to expeditiously resolve problems with process and effluent monitoring instrumentation and with safety-affecting software validation, verification, and documentation; and to assure active participation of all site organizations in a quality Health Physics program.

C. Maintenance/Surveillance

1. Analysis

During the SALP period, approximately 1260 direct inspection hours were applied in the area of Plant Maintenance and Surveillance. Strengths were observed in the scheduling and performance of surveillances, implementation of the chemistry program, and the effective use of a comprehensive computer-based maintenance system. Weaknesses identified during the period primarily involved procedural deficiencies (i.e., lack of detailed work instructions and acceptance criteria) and procedure compliance by maintenance personnel.

The NRC routinely monitored licensee maintenance and surveillance activities, paying particular attention to the adequacy of issued procedures and compliance with those procedures. Evaluations were also made of the adequacy of licensee programs to ensure followup and trending of failed surveillances, proper clearance of equipment, timely performance of required maintenance and surveillances, proper quality control of safety related materials, and adequate post-maintenance testing. A specific strength was noted in the scheduling of surveillances in that very few were missed of several thousand required to be performed during the period. Staffing of maintenance and surveillance activities was considered adequate.

The SCE staff exhibited superior performance in water chemistry control during this assessment period. The licensee was effective in identifying and reducing impurities in secondary water systems, such as in limiting dissolved oxygen ingress for protection of condensate and feedwater components. The licensee was also considered an industry leader in the use of in-line ion chromatography methods for continuous measurement of secondary water ionic impurities at the ppb level.

Licensee management was actively involved in the scheduling and coordination of maintenance and surveillance activities, and the licensee was considered to be responsive in addressing NRC concerns. Significant industry leadership was shown in initiatives related to preventive and predictive maintenance activities. Action was also taken to improve reactor coolant system (RCS) isolation valve leak rate surveillance procedures, improvements were made in station rigging practices, procedural

changes were made to improve surveillance of penetrations during mid-loop operation, and several improvements were made in hydrostatic testing practices. In addition, the licensee took timely action to resolve concerns expressed in the previous SALP report relative to control of accelerated maintenance activities and trending of surveillance activities. However, with regard to the latter, considerable involvement was required by the licensee's QA organization before an acceptable program was developed by the station.

A principal weakness observed during this SALP period involved procedure compliance by maintenance personnel. Inspection activities identified four violations involving failure to follow procedures. One Severity Level IV violation applicable to Unit 2 was cited for failure to comply with maintenance procedures for control of measuring and test equipment. Two Severity Level IV violations applicable to Unit 3 involved failure to comply with maintenance procedures for transfer of water to the spent fuel pool and failure to comply with an engineering surveillance procedure during containment integrated leak rate testing. In addition, a Severity Level IV violation applicable to Units 2 and 3 involved failure to comply with procedures for documenting nonconforming conditions during the conduct of maintenance activities.

Weakness was observed at times in the control of maintenance activities. One notable example involved maintenance work inside the Unit 3 pressurizer, which required the reactor coolant system to be drained to mid-loop. Without questioning the possible effect, maintenance personnel working inside the pressurizer inserted a mounting device for a videocamera (used for radiation exposure control) into a pressurizer nozzle. Since the reference leg tubing for the reactor vessel level indicating system was connected to this nozzle, this caused the reactor level to be indicated incorrectly as the level was being lowered. A potentially serious problem was averted by the alertness of the control room operators, however, as discussed in Section IV.A, Plant Operations.

The NRC also noted a number of additional examples of inadequate procedures and inattentiveness on the part of maintenance personnel. For example, a Unit 1 emergency diesel generator was inadvertently started as a result of inattention to equipment clearance boundaries; numerous foreign material exclusion (FME) problems were encountered during the Unit 3 refueling outage; steam generator cold leg channel heads were overflowed on Unit 3 when maintenance instructions were not adhered to; and welding rods were not properly controlled during pressurizer heater replacement work on Unit 3. Improvements were noted in housekeeping during maintenance activities, but additional improvements are warranted during major outages.

During the SALP period, there were a total of 21 LERs issued in the area of maintenance and surveillance. Of these 21 LERs, 11 involved personnel error and 8 involved inadequate procedures. Only 3 of the LERs involved procedure noncompliance. The LERs adequately described the major aspects of the events and the corrective actions taken or planned to prevent recurrence.

2. Conclusion

Performance Assessment - Category 2.

3. Board Recommendations

Licensee management should continue to emphasize a high standard of performance by maintenance supervision and maintenance personnel. Measures for exercising control over the conduct of maintenance activities should be strengthened. The licensee should also continue efforts to improve the quality of maintenance and surveillance procedures and to ensure complete adherence to them. Site management should focus special attention on documentation and evaluation of discrepant conditions, and on the criteria used for nonconformance report initiation.

D. Emergency Preparedness

1. Analysis

Region V conducted two emergency preparedness (EP) inspections during this appraisal period. One inspection addressed followup on previous inspection findings and the other addressed the routine inspection program. An annual emergency exercise was not observed during this SALP period. Approximately 60 hours of direct inspection effort were expended in the EP functional area. Strengths identified during this assessment period were management support of the EP program, organization and staffing levels of EP personnel, and use of industry events to make program enhancements. One weakness was identified with regards to the effectiveness of training in the EP functional area.

The inspections conducted during this appraisal period showed a significant strength in licensee management support of the EP program. Resources have been used to upgrade the Interagency Telephone System, to provide a card reader system for the Emergency Operations Facility (EOF), to improve accountability, and to redesign the Technical Support Centers to improve information flow.

A strength was also identified in that the licensee has demonstrated initiative in the handling of technical issues, particularly when operational events have occurred. For example, the licensee revised the emergency classification procedures to include emergency action levels (EALs) which address the loss of Reactor Coolant System (RCS) heat removal

capability, and to address situations wherein the plant conditions meet the criteria of an EAL, but the operational mode does not apply. The fact that the licensee revised these procedures as a result of two events (one occurred at SONGS and the other occurred at another Region V facility) showed that the licensee recognized the benefits associated with lessons learned from industry and their application to San Onofre.

Another strength was identified in that SCE has shown improvement in responsiveness to NRC initiatives. During the licensee's 1987 annual EP exercise, problems associated with exercise control and over-simulation were identified. Since then, the licensee developed a formal drill controller training program and adopted methods (i.e., the use of props) to increase realism during drills and exercises. Weaknesses identified during the 1987 exercise involved contamination control in the Operations Support Center, notifications of in-plant workers, and radiological controls in the EOF. Results from the 1988 exercise, which was conducted in October, just outside the SALP period, indicated that the licensee's corrective actions taken after the 1987 exercise were effective.

A weakness involving EP training was identified during this assessment period. Inspections conducted during this appraisal period indicated that the licensee's training program for emergency response personnel needed critical examination. The licensee had a training program that included computer based instruction (CBI). This training was coupled with a quarterly integrated drill program to provide experience in handling EP related events. However, despite these programs, interviews with a number of Shift Superintendents revealed weaknesses in their knowledge level and licensee performance during the 1987 exercise showed a slight declining trend. In response to this weakness, recent discussions between licensee training personnel and the NRC revealed that the CBI portion of the training program was being revised to be more performance based. It was considered that this effort and the action taken to increase realism during drills should improve the quality of training in the EP area.

One violation primarily associated with the Safety Assessment/ Quality Verification area was also related to Emergency Preparedness. This violation, identified during an Emergency Preparedness inspection, involved the failure of the Quality Assurance organization to perform a required 12-month audit of Emergency Preparedness. This indicated a need for additional QA commitment to the EP program.

During the appraisal period, some staffing and organizational changes occurred that affected the EP Division. In particular, the station EP organization was changed to functionally report to the Operations Department and a new manager was assigned to the Nuclear Affairs and Emergency Planning (Corporate EP) organization. It is considered that both of these changes have

had positive effects. Corporate and Station EP have been working well as a team and the staffing has appeared to be quite stable.

2. Conclusion

Performance Assessment - Category 1.

3. Board Recommendations

Licensee management is encouraged to continue improvements to the EP training program. In addition, licensee management is encouraged to maintain a consistent association between the EP and QA organizations as a result of the failure to audit EP activities.

E. Security

1. Analysis

During this SALP assessment period, Region V conducted three physical security inspections at the San Onofre Nuclear Generating Station. A total of approximately 240 hours of direct inspection effort were expended by regional inspectors. In addition, the resident inspectors provided continuing observations in this area. There were no material control and accounting inspections conducted during this assessment period. Significant strengths identified included management involvement in activities that led to the reduction of security events, and the experience levels and effectiveness of the licensee's security staff. The previously identified Regulatory Effectiveness Review (RER) finding pertaining to specific vital area barriers remains unresolved pending a change in NRC requirements.

A strength evident during this assessment period was the licensee's ability to maintain a high assurance of quality in the overall security program at San Onofre. In addition, the involvement of the licensee's Station management in assuring this quality was evident. The resources available to manage and maintain this program were fully adequate and effectively utilized, and resulted in an overall high level of performance. The procedures for the Security Division were complete, well stated and explicit. The licensee's remedial measures to correct self-identified deficiencies were effectively addressed in the root cause assessment for each deficiency, and actions have provided lasting corrective measures. Of particular note was the licensee's expansion and improvement of their established Centralized Screening Program. Background screening was completed for all contract employees (as well as licensee employees) seeking access to the protected area. This expanded background screening included even those contract employees who arrived on site with an employment verification letter. As a result, the licensee's expanded efforts exceeded the minimum requirements of the approved security plan and improved the overall quality of the security program.

Another strength identified during this period was security management's continuing efforts to effectively coordinate with other plant staff in the identification and resolution of safety/security concerns at San Onofre. On-duty plant operators continued to carry an accountable set of keys for all locked and alarmed vital areas, which ensured their immediate entry to all vital areas in the event of an emergency.

The experience and effectiveness of the licensee's security staff supporting the overall security program was considered a strength. Key positions were identified and responsibilities were well defined. The Security Department's Training and Qualification program was effective, well defined, and implemented with dedicated resources. During annual refresher training, a high degree of realism was achieved through use of MILES (Multiple Integrated Laser Enhancement System) laser-equipped weapons.

No violations against the security program were cited during this SALP period, and the licensee reported only eight security events. These numbers showed a significant reduction in comparison to the previous SALP period in which three violations were identified and 115 security events were reported. The eight security events occurred after a change in the requirements of 10 CFR 73.71(c). As a result, they were reported in the Licensee Event Report (LER) format. These events were security computer failures (3), drug-related events (2), loss of security keys (1), unlocked vital area portal (1), and miscellaneous events (1). The licensee's applied corrective measures, based upon their root cause analyses, appeared complete and effective.

In September 1984, prior to the August, 1986 NRC policy statement on Fitness for Duty of nuclear power plant personnel, the licensee implemented a Substance Abuse Program. As initially implemented, this program included random drug screening tests. However, in January 1987, a Federal District Court issued an injunction which limited the licensee to conduct only announced annual drug screening tests. With this injunction still in effect, the licensee's Drug Screening Program at San Onofre consisted primarily of Pre-Access Drug Screening, Annual Drug Screening, For-Cause Drug Testing and an Employee Assistance Program. Additionally, the licensee has expanded this Program to include the use of drug detection dogs inside the protected area, and random searches of employees and their vehicles when entering the owner controlled area.

During this assessment, four information notices related to security were issued. The licensee's actions in response to these notices, were found to be appropriate.

2. Conclusion

Performance Assessment - Category 1.

3. Board Recommendation

Licensee management is encouraged to continue their effective support of the overall security program.

F. Engineering/Technical Support

1. Analysis

During the SALP period, approximately 580 hours of direct inspection effort were applied to the Engineering/Technical Support area. In addition to continuing coverage by the resident inspectors, a regional Safety System Functional Inspection (SSFI) team performed an inspection in this area. The major weakness in this area involved the discovery of significant inadequacies in the control of design and engineering work, largely resulting from a poorly defined plant design basis and insufficient attention to plant design details. In contrast, a strength observed during the latter part of the SALP period involved the self-critical attitude demonstrated by senior SCE management in acknowledging the need for improved performance in this area, and the planned engineering reorganization, which has been initiated to provide the needed improvements.

The SALP Board considered the licensee to have a capable corporate engineering staff. Improvement was perceived in the quality of engineering work performed during the latter part of this assessment period through the self-imposed evaluation of several safety systems. Increased licensee and NRC emphasis on the quality of engineering activities led to the identification of notable weaknesses which were manifested in several significant safety-related engineering problems. Specific examples included several single-failure vulnerabilities in Unit 1 ESF systems; excessive post-accident loading (in excess of Technical Specification limits) of Unit 1 diesel generators; excessive loading of Unit 1 charging pump motors (due to incorrect use of pump performance curves); inadequate 18-month testing of safety related batteries (in response to a Nuclear Safety Concern); and the programmatic breakdown of design controls associated with environmental qualification (EQ) of Unit 1 electrical equipment (resulted in a $150,000 civil penalty).

The principal causes of these various problems were inadequate administrative controls governing engineering activities, insufficient attention to the quality of engineering work, inadequate documentation and understanding of the plant design basis by cognizant engineering and technical personnel, and limited engineering resources. Although station and corporate management were involved in engineering work and in the resolution of engineering problems, they were not fully effective in the overall implementation and coordination of engineering and technical work.

The SSFI conducted by the NRC in May - June 1988 identified further weaknesses in the licensee's controls affecting

engineering and technical work. The results of this inspection, which assessed the operational readiness of the component cooling water (CCW) and salt water cooling (SWC) systems, indicated that SCE did not fully understand the basic design of the systems reviewed; did not have ready access to accurate system design information; and had not performed engineering work in a complete and technically accurate manner.

The licensee was generally responsive to NRC initiatives. An example noted during the period was the engineering evaluation of several important plant systems which SCE performed in advance of the SSFI. This comprehensive evaluation identified many of the deficiencies subsequently noted by the NRC's inspection.

In addition to the engineering problems discussed above, the SSFI team and other inspections observed weakness in the interface between the Operations and Engineering/Technical organizations which resulted in extended periods needed to resolve plant system problems. Examples included problems with the Unit 2/3 CCW system, low Freon levels in Unit 2/3 emergency chillers, and repetitive and generally spurious actuations of ESF systems and cable spreading room deluge systems. The SSFI team also concluded that the licensee had not reported, as required, three different deficient conditions associated with the CCW and SWC systems.

While the staffing devoted to the Station Technical organization appeared to be adequate, the SSFI findings and other observations indicated that the corporate organizations relied heavily on contractors for the accomplishment of engineering work, particularly on Units 2 and 3. This resulted in some cases in a loss of corporate memory on system design considerations due to turnover of cognizant contractor personnel. Accountability for engineering work was also lacking, with corporate engineering assets reporting to three different vice presidents. While effective technical training was provided in some areas, it was noted to be deficient in others; e.g., the SSFI team noted that engineers had insufficient knowledge of how and where to obtain available design information.

NRC inspection efforts identified six enforcement items related to the Engineering and Technical Support area. These included a Severity Category B EQ violation ($150,000 civil penalty), as discussed earlier; two Severity Level IV violations involving design and testing deficiencies in the Unit 2/3 CCW and SWC systems; one Severity Level IV violation involving improper separation of electrical cables; one Severity Level IV violation associated with improper testing of Unit 2/3 main steam safety valves; and one Deviation involving improper installation of Unit 2/3 CCW system radiation monitors.

A total of 31 LERs were associated with Engineering and Technical Support activities. More than half of these (18) involved spurious actuations of engineered safety features (ESF), including containment, fuel building, toxic gas, and control room isolation systems. The remaining 13 LERs involved violations of plant technical specifications or degraded plant safety resulting from system design inadequacies or errors by engineering and technical support personnel.

In response to the SSFI findings and the significant problems discussed above, SCE management undertook a major reassessment of the engineering and technical organizations and the controls and methods used in their accomplishment of engineering work. This led to several significant recommendations which were being implemented as the SALP period closed. These included (1) the consolidation of all corporate engineering assets under a single vice president; (2) relocation of the engineering organization to Irvine, significantly closer to the site; (3) strengthening of in-house engineering capabilities to permit less reliance on contractors for engineering/design work; and (4) a comprehensive review and updating of the plant's design basis documents. The licensee expects these actions to significantly improve the quality of engineering and technical work done by SCE.

2. Conclusion

Performance assessment - Category 3.

3. Board Recommendations

The licensee is encouraged to expeditiously complete the implementation of identified improvements in the corporate engineering organization, and to ensure that necessary and accompanying improvements are made to administrative controls affecting engineering and technical work. Plans for updating the plant's design data base and strengthening in-house engineering capabilities should also be aggressively pursued.

G. Safety Assessment/Quality Verification

1. Analysis

During the SALP period, approximately 860 hours of direct inspection effort were applied to Safety Assessment/Quality Verification. Some strengths were noted during the SALP period, predominantly in improvement of the root cause evaluation process and in the initiation of proactive measures to monitor and improve plant performance. However, several significant areas of weakness were noted in this functional area, including insufficient QA involvement in identifying significant problems, inadequate safety reviews, improper reportability determinations, and inadequately supported amendment requests.

Several significant weaknesses associated with licensing activities were noted during this period. These indicated insufficient understanding of NRC requirements or the plants' licensing basis, or a lack of thoroughness in the preparation of licensing submittals, or a non-conservative approach to the resolution of safety issues. Examples included the following:

- The licensee did not demonstrate a thorough understanding of how to apply the regulatory requirements specified in 10 CFR 50.59 to the licensing basis of the units (e.g., the licensee's inappropriate handling of the proposed transshipment of spent fuel from Unit 1 to Units 2 and 3).

- SCE's submittals to NRR were frequently late. Examples of late submittals included responses to requests for additional information concerning the spent fuel transshipment, the proposed nuclear instrumentation upgrades, the Unit 1 cask drop analysis, ESF single failure information, information concerning TMI item III.D.3.4, and five items concerning the Systematic Evaluation Program (SEP).

- The licensee notified the NRC in September 1988 that a report of reactor vessel specimen test results would be late. The specimen was removed on September 20, 1987, but the letter was not sent to the NRC until September 20, 1988. The extension required by Appendix H to 10 CFR 50 was not requested.

- The licensee was slow to respond to NRR recommendations that a "slow" start (24 seconds or longer) be used for all Unit 1 TDI diesel generator starts performed for maintenance or surveillance purposes. The purpose of the recommendation was to minimize transient stresses on the crankshaft, which was vulnerable to cracking at the lubricating oil holes. NRR subsequently required crankshaft inspections to be conducted, and made slow starts a license condition in August 1988.

- In response to main steam isolation valve (MSIV) failure at another facility which demonstrated a possible common mode failure mechanism, SCE performed a boroscopic examination of a Unit 3 MSIV and a root cause analysis of the failures. However, SCE was reluctant to disassemble a Unit 3 MSIV even though Unit 2 (in power operation) was also potentially affected. After SCE was persuaded to disassemble one of the MSIVs, the findings did not support the results of their boroscopic examination. Consequently, the initial reports of these two efforts were contradictory.

- In 1981, Unit 1 experienced a common-mode failure of the hydraulically-operated safety injection pump discharge valves, and subsequently committed to study long-term design improvements. This commitment was subsequently withdrawn, however, based upon a cost-benefit analysis, and SCE did not propose a cost-effective alternative until encouraged to do so.

Inspection activities during the period resulted in the identification of six enforcement items. Specific enforcement topics included one Severity Level IV violation for failure to maintain a feedwater isolation valve operable; one Severity Level IV and one Severity Level V violation for failure to perform required quality assurance audits (involving the emergency preparedness and radiation protection areas); two Severity Level IV violations (one with 3 instances) for failure to make required licensee event reports; and one Deviation for failure to implement an FSAR commitment for spent fuel pool siphon breakers. The violations involving failure to make required reports indicated that excessive attention was given to establishing that a situation was not reportable rather than conservatively reporting it and supplementing or canceling the report when analyses were completed. Some enforcement actions discussed under the Engineering/Technical Support area also reflected on this area due to insufficient or untimely involvement by QA and/or licensing personnel -- e.g., the Unit 1 environmental qualification violation and the Unit 2/3 CCW system design violations.

A total of 12 LERs were associated with Safety Assessment/ Quality Verification activities. All but one of these LERs were primarily applicable to the Engineering and Technical Support functional area. However, they also reflected adversely on this functional area, since they involved missed opportunities for the licensee's quality assurance organization and safety oversight groups to identify and correct the problems. These events included:

- Unit 1 single failure problems
- Unit 2/3 CCW design problems
- Unit 2/3 steam safety valve setpoint problems
- Unit 1 diesel generator electrical load problems
- Unit 2/3 battery service test problems
- Unit 2 spent fuel pool siphon problem
- Unit 2/3 emergency chiller Freon problems
- Unit 1 environmental qualification problems

The NRC observed some positive initiatives by SCE during the SALP period. For example, the licensee undertook an ambitious effort to monitor the performance of safety-related instrumentation, with the ultimate goal of establishing a reliability-based surveillance requirement. The program appeared to be well thought-out and should contribute to industry/NRC efforts to improve Technical Specifications. The

licensee was also cooperative with the NRC in an information exchange related to an NRC study on Technical Specifications surveillance requirements. Another licensee initiative was the establishment of a performance-based inspection training program for QC inspectors, similar to the methodology used by the NRC to increase inspection effectiveness. For Units 2 and 3, the licensee initiated a program which uses a generic probabilistic risk assessment (PRA) study to determine the safety gains to be realized from improved system reliability.

Quality program activities appeared to be adequately staffed, and the licensee made progress in correcting deficiencies observed during the previous SALP period. For example, the licensee's root cause assessment program was overhauled and appeared to be more effective in identifying and correcting the root causes of plant events. Also, the licensee implemented an extensive audit of the design control process which identified several significant problems and recommended organizational and other changes to provide improved performance.

During the SSFI that was conducted in May and June 1988, the team observed activities of several of the quality oversight groups in order to determine their effectiveness. These groups were the Nuclear Safety Group (NSG), the Nuclear Control Board (NCB), the QA organization, the On-Site Review Committee (OSRC), and the Independent Safety Engineering Group (ISEG).

As a result of this review, the team found that the NSG and OSRC were conducting adequate reviews of plant activities, so that technical specification requirements were being met. The NCB (not required by Technical Specifications) complemented NSG activities by providing a vehicle for senior management oversight of nuclear safety functions. The site QA group had recently initiated a plan to conduct detailed technical audits, which initially included an extensive design control audit involving three full-time and eight part-time auditors for more than 5500 man-hours. This audit identified 71 needed corrective actions. The SSFI found that the ISEG was effective in fulfilling its functions as described in the technical specifications and had exercised some proactive influence for the betterment of plant operation and safety by early identification of problems.

Significant problems that were identified during the SALP period indicated the need for closer evaluation of oversight group performance. In that regard, shortly after the end of the SALP period, the NRC performed a review of QA audits and surveillances that were conducted in 1988. The review indicated that some significant problems were identified during the performance of these audits and surveillances. However, for the most part, findings were of minimal significance and there was a perception that QA was not sufficiently aggressive in probing to the depths necessary to effectively assess the adequacy of programs.

As noted above, principal shortcomings in this area during the SALP period were weaknesses in licensing activities and insufficient involvement by the quality assurance organization and safety oversight groups in the plant engineering area. Almost every inquiry into this area by the NRC or the licensee identified significant weaknesses in the control and implementation of engineering work. The Board acknowledged that senior licensee management had recognized this deficiency and implemented actions to correct the basic problems. The Board noted that the recent restructuring of the licensee's Nuclear Engineering, Safety, and Licensing (NES&L) Department also changed the organization and management of the various quality assurance and quality oversight groups. The potential gains resulting from these changes will be evaluated closely during the next SALP period.

2. Conclusion

Performance assessment - Category 3.

3. Board Recommendations

The licensee should give significant additional emphasis to insightful definition and aggressive performance of quality audits and safety reviews. Management should focus attention on effective implementation of the NES&L reorganization and other actions to improve the weaknesses discussed. More thorough review should also be provided for licensing submittals to ensure proper consideration of NRC requirements and applicable design bases.

V. SUPPORTING DATA AND SUMMARIES

A. Enforcement Activity

Three resident inspectors were onsite during the SALP assessment period. Thirty-six inspections, including a team Safety System Functional Inspection (SSFI) in May and June 1988, were conducted during this period for a total of 5437 inspector hours. A summary of inspection activities is provided in Table 1 along with a summary of enforcement items from these inspections. A description of the enforcement items is provided in Table 2. During this SALP period, one escalated enforcement item ($150,000 civil penalty) was identified, concerning environmental qualification of Unit 1 safety related electrical equipment.

B. Confirmation of Action Letters

No Confirmation of Action Letters were issued during this assessment period.

C. Other

An Office for Analysis and Evaluation of Operational Data (AEOD) review of licensee events at San Onofre is included as Attachment 1. AEOD reviewed the LERs and significant operating events for quality of reporting and effectiveness of identified corrective actions.

TABLE 1

INSPECTION ACTIVITIES AND ENFORCEMENT SUMMARY

Functional Area		Inspection Hours	Percent of Effort	Enforcement Items* Severity Level I	II	III	IV	V	D***
A.	Plant Operations	1802	33.14				1		
B.	Radiological Controls	622	11.44				2	1	
C.	Maintenance/ Surveillance	1262	23.21				4		
D.	Emergency Prep.	60	1.10						
E.	Security	247	4.54						
F.	Engineering/ Technical Support	584	10.74			1**	4		1
G.	Safety Assessment/ Quality Verif.	860	15.82				4	1	1
	Totals	5437	100.00			1	15	2	2

* Severity levels are discussed in 10 CFR 2, Appendix C. Two deviations (one each in areas F and G) were identified during this SALP period.

** This violation was a Category B violation concerning EQ.

*** Denotes deviations discussed in Table 2

This information is current through inspection reports 206/88-23; 361/88-24; and 362/88-26.

TABLE 2

ENFORCEMENT ACTIVITY

Unit 1

Inspection Report No.	Subject	Severity Level	Functional Area
88-03	Failure to make proper safety system operability determinations	IV	A
88-06	Failure to post a high radiation area	IV	B
88-07	Failure to conduct an audit of the Emergency Preparedness program #	V	G
88-10	Environmental qualification deficiencies	B	F/G
88-23	Whole body exposure in excess of the quarterly limit	IV	B

Applies to Units 1, 2, and 3.

Unit 2

Inspection Report No.	Subject	Severity Level	Functional Area
87-25	Failure to post a radiation area	V	B
87-31	Failure to report steam generator safety valve inoperability ##	IV	G
88-03	Failure to document nonconforming conditions during maintenance ##	IV	C
88-03	Failure to comply with Technical Specification requirement for testing main steam safety valves ##	IV	F
88-10	Failure to report component cooling water system design deficiencies ##	IV	G
88-10	Failure to include analyses of adverse effects of earthquakes on the design of equipment ##	IV	F/G

Table-2, Enforcement Items (Continued)

Inspection Report No.	Subject	Severity Level	Functional Area
88-10	Failure to include saltwater cooling valves in the in-service testing program ##	IV	F
88-10	Deviation - Mode of operation of component cooling water provides no monitoring ability for the loop containing the letdown heat exchanger ##		F
88-15	Inadequate control of M&TE (two examples)	IV	C/G
88-15	Deviation - Fuel pool purification piping not installed in accordance with the FSAR ##		G
88-18	Train A and B cables in direct contact with one another in a post accident panel	IV	F

Applies to Units 2 and 3.

Unit 3

Inspection Report No.	Subject	Severity Level	Functional Area
87-25	Continued operation with a main feedwater isolation valve and ADS valves inoperable	IV	G
88-04	Inadequate QA audit program for radioactive transportation packages	IV	G
88-20	Failure to comply with procedures for temporary spent fuel pit transfer pumps	IV	C
88-22	Failure to adequately control the performance of an integrated leak rate test	IV	C

Functional Areas
A - Plant Operations
B - Radiological Controls
C - Maintenance/Surveillance
D - Emergency Prep.
E - Security
F - Engineering/Technical Support
G - Safety Assessment/Quality Verification

TABLE 3A - Unit 1

SYNOPSIS OF LICENSEE EVENT REPORTS (LERs)

Functional Area & Totals	SALP Cause Code* A	B	C	D	E	X	
A. Plant Operations				1	2		3
B. Radiological Controls	1						1
C. Maintenance/ Surveillance	4			2	1		7
D. Emergency Prep.							
E. Security						1	1
F. Engineering/ Technical Support	4	1					5
G. Safety Assessment/ Quality Verif.					1		1
Totals	9	1		3	4	1	18

* Cause Code
A - Personnel Error
B - Design, Manufacturing or Installation Error
C - External Cause
D - Defective Procedures
E - Component Failure
X - Other

Functional Areas
A - Plant Operations
B - Radiological Controls
C - Maintenance/ Surveillance
D - Emergency Prep.
E - Security
F - Engineering/ Technical Support
G - Safety Assessment/ Quality Verif.

The above data are based upon LERs 87-15 through 88-14.

TABLE 3B - Unit 2

SYNOPSIS OF LICENSEE EVENT REPORTS (LERs)

Functional Area & Totals	SALP Cause Code* A	B	C	D	E	X	
A. Plant Operations	2				3		5
B. Radiological Controls	1			1			2
C. Maintenance/ Surveillance	5			5			10
D. Emergency Prep.							
E. Security							
F. Engineering/ Technical Support	5	18					23
G. Safety Assessment/ Quality Verif.							
Totals	13	18		6	3		40

* Cause Code
A - Personnel Error
B - Design, Manufacturing or Installation Error
C - External Cause
D - Defective Procedures
E - Component Failure
X - Other

Functional Areas
A - Plant Operations
B - Radiological Controls
C - Maintenance/ Surveillance
D - Emergency Prep.
E - Security
F - Engineering/ Technical Support
G - Safety Assessment/ Quality Verif.

The above data are based upon LERs 87-22 through 88-26.

TABLE 3C - Unit 3

SYNOPSIS OF LICENSEE EVENT REPORTS (LERs)

Functional Area & Totals		SALP Cause Code* A	B	C	D	E	X	
A.	Plant Operations	1		1				2
B.	Radiological Controls	1						1
C.	Maintenance/ Surveillance	2			1	1		4
D.	Emergency Prep.							
E.	Security							
F.	Engineering/ Technical Support	1	2					3
G.	Safety Assessment/ Quality Verif.							
	Totals	5	2	1	1	1		10

* Cause Code
A - Personnel Error
B - Design, Manufacturing or Installation Error
C - External Cause
D - Defective Procedures
E - Component Failure
X - Other

Functional Areas
A - Plant Operations
B - Radiological Controls
C - Maintenance/ Surveillance
D - Emergency Prep.
E - Security
F - Engineering/ Technical Support
G - Safety Assessment/ Quality Verif.

The above data are based upon LERs 87-17 through 88-09.

ATTACHMENT 1

Unit 1

Licensee Event Reports (LERs)

The Analysis Branch of the Office for Analysis and Evaluation of Operational Data (AEOD) reviewed 17 LERs issued by Southern California Edison, not including revisions, for Unit 1 during the assessment period from October 1, 1987 through September 30, 1988. The review included LERs numbered as follows:

- 87-015 to 88-013

The LER review followed the general instructions and procedures of NUREG-1022. The specific review criteria and the findings were as follows:

1. Significant Operating Events

The following four occurrences were determined to be potentially significant by the AEOD screening process:

- LER 87-15, concerning single failures of engineered safety features systems pertaining to decay heat removal, main steam line break mitigation, and steam generator overfill.

- LER 87-16, involving failure of four air operated valves to function due to solenoid valve failures, rendering independent trains in multiple systems inoperable.

- LER 88-01, referring to environmental qualification program deficiencies.

- LER 88-09, regarding electrically loading both emergency diesel generators in excess of the Technical Specification maximum allowable kilowatt loading.

2. Causes

Root causes associated with the 17 events included:

- Three personnel errors
- Four procedural/administrative errors
- Four design/installation/fabrication
- Six undetermined

These events evaluated did not appear to involve related occurrences, and no causes were found to be prominent. However, on two occasions (LERs 87-17 and 87-18) voluntary entry into Technical Specification 3.0.3 occurred.

Attachment 1 (Continued)

3. LER Quality

The LERs reviewed adequately described all the major aspects of the events, including component or system failures that contributed to the event and corrective actions taken or planned to prevent recurrence. The reports were reasonably complete, well written and easy to understand. Root causes were identified, as appropriate, and previous similar occurrences were properly referenced in the LERs. However, many LERs indicated the root cause was unknown pending further investigations (e.g., LERs 87-16, 87-17, 88-04, 88-06, 88-08, and 88-09). Updated LERs were then to be issued at the conclusions of the investigations. As of the date of this evaluation performed by AEOD, none of the supplemental reports were received by the NRC.

Units 2 and 3

1. LER Review

San Onofre submitted about 34 reports and four updates for Unit 2 and about eight reports for Unit 3 during this assessment period. Unit 2 promised updates for LERs 87-02, 87-24, 88-05, 07, 08, 09, 11, 13, and 17 which have not been received. Unit 3 has one outstanding update, 88-02. Our review included the following LER numbers: Unit 2, 87-18 to 87-31 and 88-01 to 88-20; Unit 3, 87-17 and 88-01 to 88-07.

One LER was classified as significant, 88-17 for Unit 2 concerning the siphoning of the spent fuel pool.

The causes were the following:

- Six personnel errors for Unit 2 and two for Unit 3
- Four maintenance errors for Unit 2 and none for Unit 3
- Six design/installation errors for Unit 2 and none for Unit 3
- Eight procedural/administrative errors for Unit 2 and four for Unit 3
- Six causes unknown for Unit 2 and one for Unit 3
- Four equipment failures for Unit 2 and one for Unit 3

The majority of the LERs were concerned with actuations of the toxic gas isolation system, fuel handling building isolation system, control room isolation system, and the containment isolation system. These problems were recurring and have been for a long time. Because of this, the arguments for the causes given were not persuasive. That is to say, the root cause for these spurious problems was probably not known.

The LERs adequately described the major aspects of the events, including component or system failures that contributed to the event and the corrective actions taken or planned to prevent recurrence. The reports were well written. Updated LERs provided new information, denoting the portion of the report that was revised by a vertical line in the right hand margin.

2. Preliminary Notifications (PNs)

The Region wrote a number of PNs during this period concerning the two plants. No LER could be found for three of these which may have been reportable.

PNO-V-88-022 for Unit 2 — Reactor Shutdown Caused by Increased Steam Generator Tube Leak.

PNO-V-8-002 Unit 3 — Reactor shutdown Commenced for More Than 48 Hours for Due to Alarms on the Main Generator Hydrogen Detraining Unit.

PNO-V-88-047 Unit 3 — Cavitation of the Shutdown Cooling Pump Occurred for During Drain Down of the Reactor Vessel.

3. 10 CFR 50.72 Reports

A review of reports made pursuant to 10 CFR 50.72 identified no reporting deficiencies.

GENERAL PURPOSE FINANCIAL STATEMENTS

Combined Balance Sheet — All Fund Types and Account Groups.

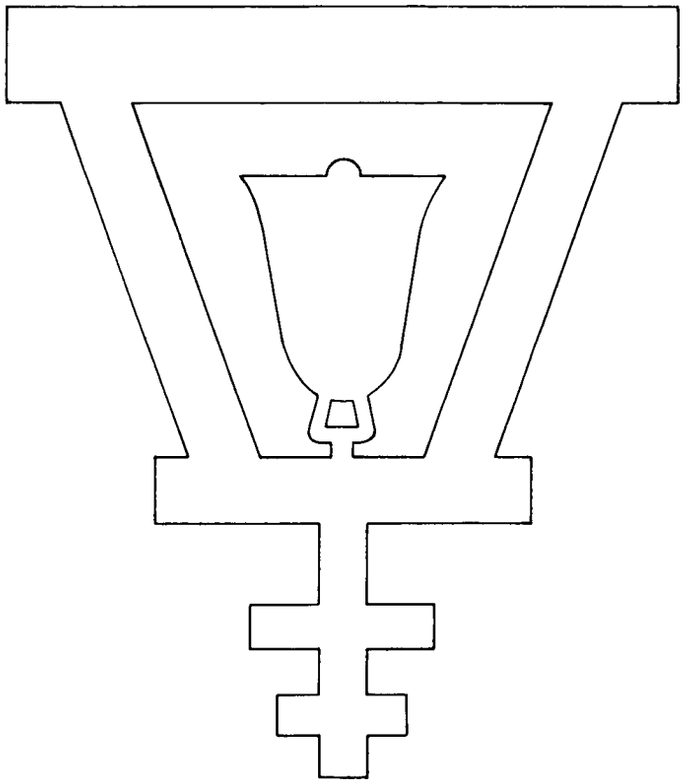
Combined Statement of Revenues, Expenditures and Changes in Fund Balances — All Governmental Fund Types.

Combined Statement of Revenues, Expenditures and Changes in Fund Balances — Budget and Actual — Governmental Fund Types.

Combined Statement of Revenues, Expenses and Changes in Retained Earnings — All Proprietary Fund Types.

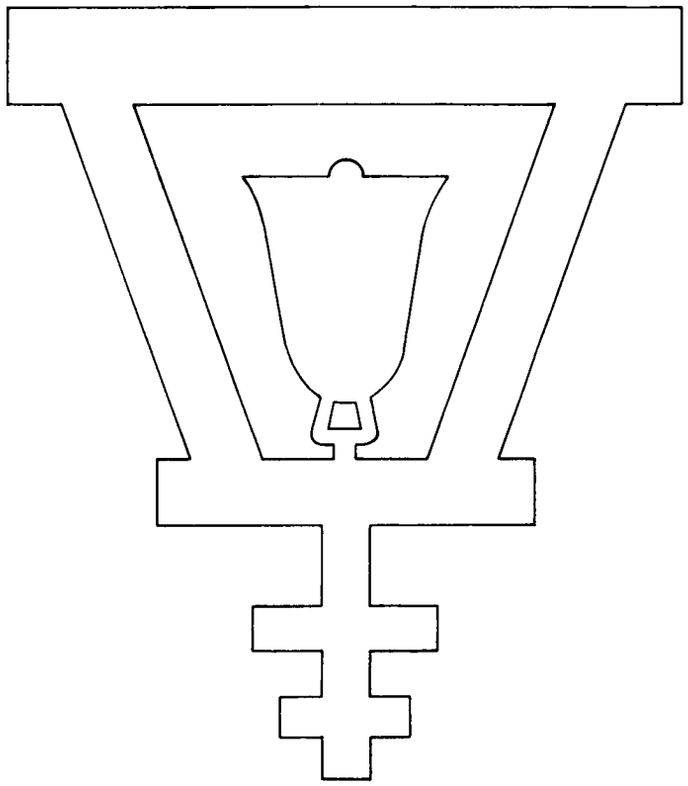
Combined Statement of Changes in Financial Position — All Proprietary Fund Types.

Notes to Financial Statements.



GENERAL FUND

The **General Fund** is used to account for resources traditionally associated with a government which are not required legally or by sound financial management to be accounted for in another fund.



SPECIAL REVENUE FUNDS

Special Revenue Funds are used to account for specific revenues that are legally restricted to expenditure for particular purposes.

Library Fund — To account for the operations of the City and Riverside County Public Library System.

Traffic Safety Fund — To account for the financial transactions as prescribed by State of California statute on California Vehicle Code Fines.

Special Gas Tax Fund — To account for the construction and maintenance of the road network system of the City. Financing is provided by the City's share of state gasoline taxes which state law requires be used to maintain streets.

Housing and Community Development Fund — To account for Federal grants received from the Department of Housing and Urban Development (HUD). The grants are used for the development of a viable urban community by providing decent housing, a suitable living environment, and expanding economic opportunities, principally for persons of low and moderate income.

Redevelopment Agency Fund — To account for the portion of Redevelopment tax increment monies which California Redevelopment Law requires to be set aside for the development of low and moderate income housing.

Air Quality Improvement Fund — To account for qualified air pollution reduction programs funded by South Coast Air Quality Management District.

Citrus Grove Management Fund — To account for the maintenance and operations of citrus groves purchased to preserve the citrus industry in the City's greenbelt area. Additional citrus groves will be purchased as revenues from operations become available.

DEBT SERVICE FUNDS

Debt Service Funds are used to account for the accumulation of resources and payment of general long-term debt obligations of the City and related entities.

Debt Service Fund — To accumulate monies for the payment of interest and principal on long-term debt obligations of the City. Debt Service is financed via special property tax assessments.

Parking Authority of the City of Riverside Lease Revenue Bond Fund — To accumulate monies for the payment of interest and principal on lease revenue bonds sold by the Authority. Debt service is financed via lease payments from the City.

Riverside Civic Center Authority Lease Revenue Bond Fund — To accumulate monies for the payment of interest and principal on the City of Riverside's portion of lease revenue bonds sold by the Authority. Debt service is financed via lease payments from the City.

Riverside Municipal Improvements Corporation — To accumulate monies for the payment of interest, principal and trustee fees on certificates of participation issued by the Corporation. Debt service is financed via lease payments from the City.

Riverside Redevelopment Agency Tax Allocation Bond Fund — To accumulate monies for the payment of interest and principal on tax allocation bonds sold by the Agency. Debt service is financed via property tax increment revenues.

CAPITAL PROJECTS FUNDS

Capital Projects Funds — are used to account for the acquisition and construction of major capital facilities other than those financed by proprietary funds.

Capital Outlay Fund — To account for the construction and installation of street and highway capital improvements in the City, including improvements funded by the ½% sales tax approved by Riverside County voters in 1988.

Special Capital Improvements Fund — To account for the acquisition, construction and installation of capital improvements and Community Facilities Districts within the City.

Storm Drain Fund — To account for the acquisition, construction and installation of storm drains in the City.

Parking Facilities Replacement Fund — To account for the acquisition, construction and installation of replacement parking facilities in the City from funds received in the sale of land assigned to City of Riverside Parking Authority.

Transportation Fund — To account for the construction and installation of street and highway improvements in accordance with Articles 3, 8, and 6.5 of the Transportation Development Act of 1971 of the State of California.

Riverside Municipal Improvements Corporation Fund — To account for the capital acquisitions from the proceeds of the sale of certificates of participation on behalf of the Corporation.

Redevelopment Agency Fund — To account for the acquisition, relocation, demolition and sale of land for those portions of the City designated in need of redevelopment related activities.

ENTERPRISE FUNDS

Enterprise Funds are used to account for operations that are financed and operated in a manner similar to private business enterprises. The intent of the City is to determine that the costs of providing services to the general public on a continuing basis are financed or recovered primarily through user charges or that the periodic determination of net income is appropriate for accountability purposes.

Electric Fund — To account for the operations of the City's electric utility which renders services on a user charge basis to residents and businesses.

Water Fund — To account for the operations of the City's water utility which renders services on a user charge basis to residents and businesses.

Airport Fund — To account for the operations of the City's airport and the Riverside Airport Lease Company debt service accounts.

Refuse Fund — To account for the operations of the City's solid waste and sanitation program which provides for the collection and disposal of solid waste on a user charge basis to residents and businesses.

Sewer Fund — To account for the operations of the City's sewer system which renders services on a user charge basis to residents and businesses.

Transportation Fund — To account for the operations of the City's Senior Citizens Transportation System in accordance with Article 4 of the Transportation Development Act of 1971 (SB 325) of the State of California. Urban Mass Transportation Act Funds are also accounted for in this fund.

INTERNAL SERVICE FUNDS

Internal Service Funds are used to account for the financing of goods and services provided by one City department to other City departments on a cost-reimbursement basis.

Workers' Compensation Fund — To account for the operations of the City's self-insured workers' compensation program.

Unemployment Compensation Fund — To account for the operations of the City's self-insured unemployment compensation program.

Public Liability Fund — To account for the operations of the City's self-insured liability program.

Central Stores Fund — To account for the operations of the City's centralized supplies inventory, including receiving and delivery services provided to City departments.

Central Garage Fund — To account for the maintenance and repair of all city-owned vehicles and motorized equipment, except for Police and Fire vehicles.

AGENCY FUNDS

Agency Funds are used to account for assets held by the City in a fiduciary capacity for individuals, private organizations, or other governmental units. The Agency Funds are custodial in nature and do not involve measurement of results of operations.

Deferred Compensation Fund — Established in accordance with Internal Revenue Code Section 457 and is offered to eligible employees.

Special Deposits Fund — To account for deposits held by the City as trustee for specific projects.

1911 Act Improvement Fund — To account for neighborhood Assessment District collections.

Payroll Clearing Fund — To account for payroll related activities.

ABC Cities Trust Fund — To account for Power Agency of California funds for the cities of Azusa, Banning and Colton.

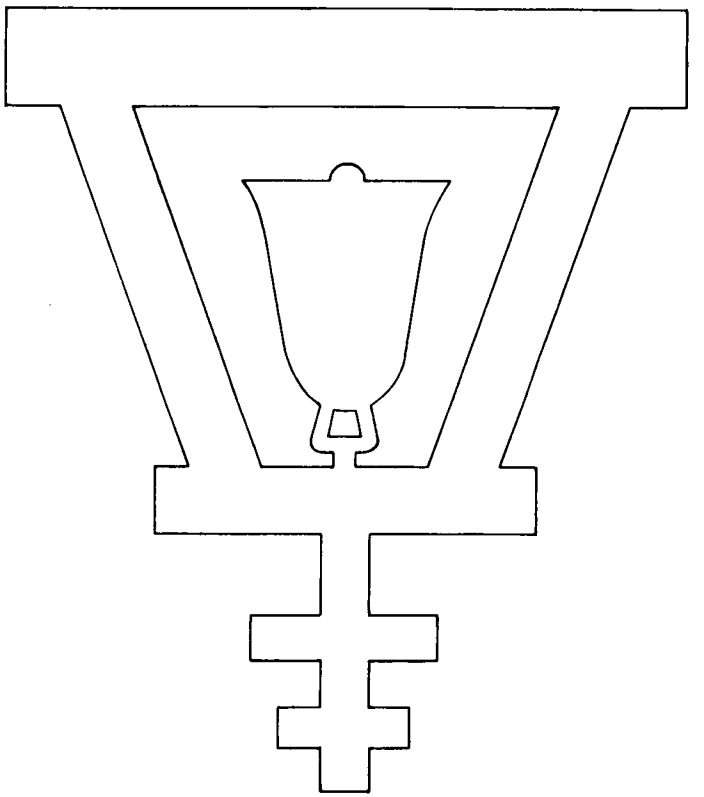
ACCOUNT GROUPS

GENERAL FIXED ASSETS

The **General Fixed Assets Account Group** is used to account for the cost of fixed assets that are used in the performance of general government functions and that are not accounted for in the Enterprise or Internal Service Funds of the City.

GENERAL LONG-TERM OBLIGATIONS

The **General Long-Term Obligations Account Group** is used to account for the unmatured long-term indebtedness of the City and the City's Redevelopment Agency.



STATISTICAL SECTION

Statistical Information is included to provide detailed data on applicable physical, economic, and social characteristics. The information will provide a broader and more complete understanding of the City and its financial affairs.