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

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## 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 | Totals |
|---|---|---|---|---|---|---|---|
| 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 | Totals |
|---|---|---|---|---|---|---|---|---|
| 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 Reactor Shutdown Caused by Increased Steam Generator for Unit 2 Tube Leak.

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

PNO-V-88-047 Cavitation of the Shutdown Cooling Pump Occurred for Unit 3 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.