U. S. NUCLEAR REGULATORY COMMISSION

REGION V

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

FOR

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

PALO VERDE NUCLEAR GENERATING STATION

REPORT NOS. 50-528/86-31, 50-529/86-30 AND 50-530/86-24

EVALUATION PERIOD: 10/1/85 - 9/30/86

SALP BOARD ASSESSMENT CONDUCTED:

NOVEMBER 5, 1986

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I. INTRODUCTION

1. Purpose and Overview

The Systematic Assessment of Licensee Performance (SALP) is an integrated effort by the NRC staff to collect available observations and data on a periodic basis and evaluate licensees' performance based on this information. SALP is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. SALP is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to licensee management to promote quality and safety of plant construction and operation.

An NRC SALP Board, composed of the members listed below, met in the Region V office on November 5, 1986, to review the collection of performance observations and data to assess the licensee's performance in accordance with the guidance of NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance," dated July 25, 1986. A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's safety performance at the Palo Verde Nuclear Generating Station, Units 1, 2, and 3 for the period October 1, 1985 through September 30, 1986.

2. SALP Board for Palo Verde

Board Members:
D. F. Kirsch, Director, Division of Reactor Safety and Projects (Board Chairman)
A. E. Chaffee, Deputy Director, Division of Reactor Safety and Projects (Board Co-Chairman)
J. L. Montgomery, Chief, Nuclear Materials Safety and Safeguards Branch
F. Wenslawski, Chief, Emergency Preparedness and Radiological Protection Branch
L. F. Miller, Chief, Reactor Projects Section II
G. P. Yuhas, Chief, Facilities Radiological Protection Section
M. D. Schuster, Chief, Safeguards Section
S. A. Richards, Chief, Engineering Section
R. F. Fish, Chief, Emergency Preparedness Section
R. P. Zimmerman, Senior Resident Inspector
J. Ball, Resident Inspector
G. Knighton, NRR Project Director
E. A. Licitra, NRR Project Manager
H. North, Senior Radiation Specialist
G. Temple, Emergency Preparedness Analyst

II. CRITERIA

The following evaluation criteria were applied for each of the nineteen functional areas as appropriate:

1. Management involvement in assuring quality.
2. Approach to resolution of technical issues from a safety standpoint.
3. Responsiveness to NRC initiatives.
4. Enforcement history.
5. Reporting and analysis of reportable events.
6. Staffing (including management).

To provide a consistent assessment of licensee performance, attributes were applied for each of the above criterion that described the characteristics of Category 1, 2 and 3 performance, in accordance with NRC Manual Chapter 0516, Part II and Table 1, as follows:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used so that a high level of performance with respect to operational safety and construction quality is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and are concerned with nuclear safety. Licensee resources are adequate and are reasonably effective so that satisfactory performance with respect to operational safety and construction quality is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear to be strained or not effectively used so that minimally satisfactory performance with respect to operational safety and construction quality is being achieved.

III. Summary of Results

Overall, the Board found the licensee's performance to be acceptable and directed toward safe facility operation. The Board found that the licensee's performance has declined somewhat since the last SALP evaluation in the areas of security and safeguards, and licensing activities. The licensee's performance was found to have improved in the area of emergency preparedness. Weaknesses still exist in assuring the quality of parts and components supplied by vendors. Specific performance assessments are given below:

		Performance Category		
	Functional Areas	Previous SALP Period	Current SALP Period	Trend*
1.	Plant Operations	2	2	Not Apparent
2.	Radiological Controls	2	2	Not Apparent
3.	Maintenance	2	2	Improving
4.	Surveillance	2	2	Not Apparent
5.	Fire Protection	1	1	Not Apparent

6.	Emergency Preparedness	2	2	Not Apparent
7.	Security and Safeguards	2	3	Improving
8.	Outages	1	1	Not Apparent
9.	Quality Programs and Administrative Controls	2**	2	Not Apparent
10.	Licensing Activities	2	2	Declining
11.	Training and Qualification Effectiveness	2	1	Not Apparent
12.	Containment and Other Safety Related Structures	2	2	Not Apparent
13.	Piping Systems and Supports	2	2	Not Apparent
14.	Safety Related Components	2	2	Not Apparent
15.	Auxiliary Systems	2	2	Not Apparent
16.	Electrical Equipment and Cables	2	2	Not Apparent
17.	Instrumentation	1	1	Not Apparent
18.	Preoperation Testing	1	1	Not Apparent
19.	Startup Testing	2	2	Improving

* The trend indicates the SALP Board's perception of the licensee's performance during the current assessment period, weighted heavily by observable trends occurring late in the assessment period. It is not necessarily a comparison of performance during the current period with the previous period.

** This area was considered by the board to be a marginal Category 2 rating, with significant deficiencies.

IV. Performance Analyses

1. Plant Operations - Units 1 and 2

During the assessment period, plant operations were inspected on a routine basis by the resident inspectors and the regional inspection staff. Approximately 2840 hours of direct inspection effort were expended at Units 1 and 2.

Operational Events - Unit 1

Unit 1 completed the power ascension test program and declared commercial operation on February 13, 1986. During the power ascension phase of operation, eight unscheduled reactor trips were experienced. Four of the trips were attributed to equipment malfunctions, three were attributed to design deficiencies, and one was attributed to personnel error. Since commercial operation, eight reactor trips have been experienced, three of which were due to an overly conservative steam generator low flow trip setpoint (design). One additional design deficiency, two equipment malfunctions, one personnel error and one procedural inadequacy accounted for the remaining five trips. Several of the trips were complicated by

design problems resulting in loss of forced circulation and unavailability of non-safety related loads for a short duration.

Thirty-two Unit 1 LERs were submitted to the NRC concerning plant operations during the assessment period. Component failure was the leading cause of the LERs with fifteen reports followed by eight personnel error reports. The high personnel error rate is considered to be poor performance in this area.

Operational Events - Unit 2

During this period, Unit 2 plant operations began with the issuance of the low power license on December 9, 1985. Previously the plant had been completing the surveillance tests and maintenance required for license issuance.

Eighteen Unit 2 LERs were submitted to the NRC during the assessment period. The largest percentage of the reportable problems was associated with personnel error. The three major contributors were: the failure to follow procedures; component failures; and design, manufacturing or installation errors. Improvement in reducing the number of personnel errors has been slow and still requires continued management attention and action.

The experience level and knowledge of the operating organization at Unit 2 has improved with plant operations. Some plant problems, such as accelerated reactor coolant pump seal degradation, a reactor trip and engineered safety features actuation on low pressurizer pressure due to a rapid plant cooldown, and burnout of pressurizer heaters due to low pressurizer water level, could be attributed to inexperienced personnel or unfamiliarity with equipment performance. In the case of the pump seal degradation, the problem was attributable to an unsound engineering recommendation to backflush the seal injection strainer.

Of the nine unplanned reactor trips which occurred during the period, two were related to personnel error, six were the result of equipment malfunctions and one was caused by a design deficiency. One reactor trip, associated with a partial loss of the power supply to Units 1 and 2 because of a malfunctioning current transformer on a startup transformer feeding both units, was triggered by a loss of a load center in Unit 2. The load center was lost when water from a leaking feedwater vent valve dripped on top of the load center and caused a phase-to-phase short. A load center with better sealing may have prevented this dual reactor trip.

Routine observations of the plant operating staff at both units indicated that operators consistently understood plant conditions and were aware of ongoing work activities. Control room demeanor and attitude continued to exhibit professionalism. Control Room

logs and records were complete and well maintained. However, the logging of Technical Specification action statement entry and exit times lacked consistency between the tracking methods at times.

During the evaluation period, Palo Verde, Unit 1 was critical 4,018.9 hours out of a possible 7,728 hours, or about 52% of the period. Unit 2 was critical 2,198.6 hours out of a possible 3,969.25 hours, or 55% of the period. The Unit 1 availability factor was 50.01% for the period of commercial operation. This is below the national average of 68.5%.

Review of the data for the evaluation period, indicated that automatic actuation of the Reactor Protection System resulted in 3.98 trips per 1,000 critical hours for Unit 1 (16 trips for the reporting period), and 4.09 trips per 1,000 critical hours for Unit 2 (nine trips for the reporting period). Recent data for 1986, indicates an average of 1.20 trips per 1,000 critical hours (1.25 for CE plants) for the industry as a whole including old and new plants. For more than four months of the evaluation period, Unit 1 was in the Power Ascension Test Phase of operation, while Unit 2 was in the Low Power or Power Ascension Test Phase for almost all of the evaluation period. Comparisons with data for new plants indicate that the number of trips for both units were somewhat greater than the average. In addition, relative to new plants, Unit 1 had an average number of ESF actuations, while Unit 2 had more than the average number. For Unit 1, seven of the trips occurred from 100% power (6 of the 7 while in commercial operation). These data for operational experience indicate that both units at Palo Verde are experiencing significantly more transients than the 1986 industry average, and somewhat more with respect to other new plants.

There was one Severity Level IV Violation of regulatory requirements issued at Unit 1 during the assessment period for failure to maintain the containment power access purge isolation valves closed to the maximum extent possible. The licensee's corrective action was prompt and effective. No violations were issued at Unit 2.

The licensee's efforts related to the resolution of technical issues has generally been effective. Examples included the adjustment of steam generator low flow trip setpoints, elimination of steam generator low level trips related to a steam pressure feedback mechanism, replacement of the balance of plant engineered safety features connector pins, and elimination of power supply losses from plant multiplexer malfunctions. In each of the above cases licensee actions effectively corrected the problem.

In several instances, however, the resolution of technical issues reflected an incomplete understanding of the root cause of the problem. Significant NRC attention was focused on the licensee's need to improve the post trip review process as well as the need to perform comprehensive determinations of the root causes of equipment problems. For example, several component problems resulting in gas binding of the charging pumps were not readily identified during the licensee's technical review. The licensee's ability to identify and

correct problems in a timely manner improved substantially in the latter months of the assessment period.

The licensee's responsiveness to NRC initiatives was generally positive. Two such responses included inspection of balance of plant piping systems for possible water hammer following significant plant transients and the incorporation of independent verification of critical checks associated with the implementation of certain plant protection system surveillance tests. One major activity, in response to the NRC, was associated with root cause analyses and post trip reviews. The actions initially initiated by the licensee to improve root cause analyses and post-trip reviews were not immediate, nor fully effective, and required many discussions with the NRC. At the end of the assessment period, significant improvements were evident as a result of the licensee's actions in these areas. Additionally, during the previous SALP period, a large number of Control Room nuisance alarms and lighted annunciators existed for extended periods of time. Although progress was clearly evident in reducing the number of normally lighted annunciators in both units, an excessive number of alarm conditions still existed at the conclusion of the current SALP period.

The licensee's staffing to support plant operations was considered adequate. The licensee maintained a separate staff for the purpose of revising and reviewing plant procedures. This function served both Units 1 and 2 and was effective in maintaining operating consistency and assuring corrective actions were applied to both units. The six shift reactor operating staffs at both units exceeded the requirements of the Technical Specifications, in that several of the shifts had an additional licensed operator and an auxiliary operator crew of five instead of two. The units were supported by qualified Radiation Protection and Chemistry personnel, shift technical advisors, radwaste operators and a member of the operating staff who coordinated plant maintenance activities at each unit. These organizations were directed by a full compliment of supervision and management. Formal operator training and requalification programs were established and functioning. The competence of the operating staff was considered adequate and improved significantly since the units were put into operation. The licensee's review system was effective in identifying plant problems and reporting them to the NRC in a timely manner. The quality of the reports submitted during the latter portion of the assessment period were improved over those issued early in the period. Some deficiencies, however, were still identified by the inspectors and brought to the attention of the licensee.

Licensee management has been intimately involved in improving the quality of plant operations. This was evident from observation of plant management in the plant on a daily basis. Management has also been observed in the plant following plant trips and during abnormal plant operating conditions. Plant problems and their resolutions were followed closely by plant management. Communication among plant management, related to discussions of operating and

organizational issues, plant problems, engineering reviews, and NRC concerns, was readily evident.

Plant management policies toward safety were positive and were reflected by the plant staff during the performance of work activities.

Housekeeping and cleanliness controls were considered acceptable. Management involvement in assessing plant conditions was evident. Problems with a relatively large number of leaking valves in the radiologically controlled area was still evident this SALP period although some improvement was noted. Additionally, the licensee initiated efforts to decontaminate relatively large portions of the Auxiliary Building, demonstrating management's desire to improve housekeeping in radiological areas.

Conclusion

Performance Assessment - Category 2.

Performance was generally consistent throughout the assessment period; no clear trend was observed. Routine operational activities were performed in a professional, safety conscious manner. At the conclusion of the assessment period, some improvement was observed regarding weaknesses identified with the licensee's post-trip review process, problem solving techniques, and root cause analyses. Organizational response to plant performance began showing signs of integrated actions and maturity.

Board Recommendation

Management should continue to take an aggressive attitude towards applying the lessons learned at one unit to the other units. Post-event reviews and problem solving techniques should be performed in a consistently conservative manner to ensure the proper attitude is clearly established for evaluating off-normal events during future plant operation. The reduction of personnel errors and procedural adherence problems should also be given high priority. These recommendations apply to all units, especially while bringing Unit 3 into operation. The responsibility of assuring plant policies and procedures are followed should be transmitted down in the organization to ensure worker and first line supervisors are sufficiently sensitive to management's commitment to quality. The reduction of unnecessary Control Room lighted annunciators should continue to receive a high degree of attention. Management should communicate regularly with other facilities to share experiences and learn from industry problems. This avenue should also be pursued during equipment troubleshooting efforts when difficulties are encountered.

2. Radiological Controls

During this SALP period a total of eight inspections, including two mobile laboratory supported confirmatory measurement inspections,

were conducted. A total of 440 hours of inspection effort were devoted to preoperational, startup and operational inspections in the areas of radiation protection, environmental protection, waste management and confirmatory measurements. In addition, the resident inspection staff provided continuing observations in these areas.

During the appraisal period one Severity Level IV violation was identified, related to the licensee's failure to properly calibrate and maintain operable the Technical Specification required Unit 1 containment atmosphere particulate monitor. This represents an improvement over the last SALP period, during which one Severity Level III violation was identified. No deviations were identified during the appraisal period.

Licensee management has demonstrated continuing support of the staff's radiation protection and ALARA activities as indicated by management's response to alleged work delays caused by radiation protection activities, support of ALARA in acquiring special shielding for reactor coolant pump (RCP) work and radiation protection management's frequent plant tours during outage activities. During the appraisal period proposed staffing plans had been submitted to upper management. The staffing plan was approved in October, 1986, however, it is not clear when the plan will be implemented. Numerous observations of routine radiation protection activities by resident inspectors and regional radiation specialists consistently found implementation that met, and frequently exceeded, minimum regulatory requirements.

The licensee's approach to the resolution of technical issues from a safety standpoint is generally conservative and technically sound. The response to such issues, however, has not been as timely as necessary in all cases, as evidenced by the delay in correcting the problem with the Unit 1 containment atmosphere particulate monitor. In the case of efforts to limit exposures during Unit 1 RCP and low pressure safety injection (LPSI) pump seal replacement, the actions were both timely and effective.

Responsiveness to NRC initiatives has improved as evidenced by the review of the partially completed documentation of the Unit 2 biological shield survey and the timely completion of the Unit 2 radiation monitoring system calibrations in accordance with the licensee's commitments concerning the Justification for Interim Operation.

During the previous appraisal period a total of sixteen reportable events occurred in this functional area in connection with Unit 1, of which five were identified as attributable to personnel error and six to component failure. The other five reports were related to various miscellaneous matters. In the current appraisal period a total of ten reportable events were identified in connection with Unit 1 of which eight were attributable to personnel error. It was noted that although an overall increase in reportable events attributable to personnel error occurred during the current SALP period at Unit 1, all such events occurred during the first five

months of operation during this SALP period. No such events were reported for the last seven months of the period. Only two events attributable to personnel error were reported for Unit 2 during the current appraisal period.

In addition, six reportable events attributable to Unit 1 component failure were reported during the last SALP period, while none were identified for either Unit 1 or 2 during the current SALP period. Based on this analysis it appears that licensee actions to improve personnel performance and to identify and correct equipment problems are proving successful in this functional area.

The previous SALP report identified the failure of the Radiation Exposure Management (REM) and Chemical Radiological Analytical Computer System (CRACS), and personnel intensive compensatory measures were instituted to support operations in the areas of exposure control and effluent records management. During the current appraisal period the licensee has taken actions designed to provide state-of-the-art computer based records management systems in these areas.

Licensee staffing of management, operations, and support personnel in this functional area appeared adequate, based on current staffing levels and the proposed staffing plan. Staffing adequacy, however, is dependent on the eventual upper level management decisions with regard to the staffing plan implementation.

Conclusion

Performance Assessment - Category 2

Board Recommendations

Continued management support and dedication to the development of a high quality program which requires attention to detail and adherence to procedures is encouraged. Timely implementation of the recently approved staffing plan is considered important in terms of overall performance, especially when considering the future Unit 3 operation.

3. Maintenance - Units 1 and 2

The maintenance program was inspected on a routine basis by the resident inspectors and periodically by the regional inspection staff throughout the SALP period. Approximately 230 hours of direct NRC inspection was performed in Unit 1 and 80 hours in Unit 2.

The previous SALP identified several NRC concerns which were further reviewed during this assessment period. One concern dealt with the spread of contamination caused by a relatively large number of packing leaks from ECCS motor operated valves in radiologically controlled areas. A number of these valves continued to leak in both units and, although work has been performed on the valves, further attention is necessary. Another concern was in the area of

a lack of spare parts. On occasion, Unit 3 was being used as a source of needed components for the other units due to a shortage of spare parts in the warehouse. This problem has been reduced as a result of efforts by licensee management to improve the warehouse inventory control. A large number of temporary modifications was also listed as a concern during the previous SALP. A review of the current temporary modification status indicated that the number of outstanding modifications decreased and the number of safety related modifications was a very small percentage of the total modifications. Although improvement in these areas of previous concern was evident, additional attention is still warranted by management.

The Work Control group and Maintenance Control Center were an effective aid to ensure proper prioritization, planning and conduct of maintenance activities. Work to be completed was authorized and clearly defined in the work packages, including Quality Control (QC) participation and radiological control requirements. Completed work documents were reviewed by the licensee to provide assurance that work was completed in accordance with requirements. NRC observations verified that maintenance work was performed by qualified personnel in accordance with plant procedures. The preventive maintenance program was also considered effective in maintaining equipment operable and identifying equipment degradation.

The maintenance staff's approach, including supervisor attitudes, toward resolving technical issues from a safety standpoint was conservative and timely. The licensee's maintenance staff was also responsive to NRC identified concerns. Corrective actions were initiated in a timely manner by management when concerns were brought to their attention. An example of this occurred when the NRC expressed a concern over the number of personnel errors during the performance of maintenance activities. The NRC inspector suggested that pre-work briefings be held between the work supervisor and the work technician and that these briefings be formalized. The suggestion was quickly implemented and included as standard practice in the implementation of work control packages. These briefings appear to have been effective.

Evidence of an adequate management approach to resolving technical issues included revision of the governing maintenance work control procedure. This was accomplished in an effort to strengthen administrative controls associated with the performance of maintenance activities which was induced by several occurrences where procedures were not followed and personnel errors occurred. Following implementation of the revised work control procedure and an increased emphasis by Maintenance management regarding technical responsibility and procedure adherence, the rate of personnel errors diminished at the conclusion of the appraisal period.

Nine LERs (five in Unit 1, four in Unit 2) were submitted in the maintenance area. Six of the LERs resulted from personnel errors.

Two Severity Level IV violations were issued for: 1) failure to verify installation of a Unit 1 temporary modification in accordance with administrative control procedures; and 2) for inadequate corrective action regarding foreign material being located in Unit 2 relays in the engineered safety feature relay cabinets. A Severity Level V violation was also issued for failure to perform a 10 CFR 50.59(a) review before an activity was performed at Unit 1.

The licensee is currently staffing a sufficient crew to maintain 24 hour coverage for all areas of the Maintenance Department. Each unit has specifically assigned mechanical, electrical and instrumentation and control technicians. Additionally, the Maintenance Control and Work Control Centers are also manned 24 hours a day.

A relatively large backlog of maintenance work orders existed throughout the assessment period for the operating units. Corrective maintenance work orders, which were not required to maintain power operation, or to satisfy Technical Specifications, were found to be outstanding for long periods of time.

The day-to-day, as well as longer term, maintenance planning was accomplished by the outage management group (OMG). The functioning of this group, which had a licensed senior reactor operator on the staff, relieved the shift operations personnel of the responsibility to spend time in the maintenance coordination area; thus allowing the operators to devote additional attention to plant operations. Daily meetings, involving all appropriate organizational units, were held to plan and schedule maintenance work. Work activities were prioritized, assigned responsibility, and tracked to completion.

Management's continued involvement in assuring a high quality maintenance program was noted during the period. Plant management stressed the need for supervisors to observe maintenance activities for compliance with plant procedures and to assure that maintenance personnel understood the effect of their work on plant systems.

Conclusion

Performance assessment - Category 2. An improving trend was evident during the assessment period. Maintenance activities were effectively implemented through the use of a computer tracking system and work control group which prescreened tasks to ensure they did not compromise plant safety. Personnel errors were considered high; however, improvment was noted at the conclusion of the SALP period.

Board Recommendation

Management should continue to emphasize the reduction of personnel errors and improved procedural adherence during the performance of maintenance related activities. Management needs to focus the necessary attention on reducing the sizeable backlog of outstanding maintenance work orders. Staffing levels should be assessed with

appropriate consideration given to the existing backlog, as well as placing a third unit into operation.

4. Surveillance - Units 1 and 2

During the SALP period, direct NRC inspection effort of approximately 240 hours on Unit 1 and 90 hours on Unit 2 were utilized to assess the surveillance activities. These inspections were performed on a routine basis by the resident inspectors and periodically by the regional inspection staff.

During the SALP period, the licensee initiated the surveillance testing program for Unit 2, incorporating experiences learned at Unit 1. In general, the surveillance program was found to be effectively implemented through administrative and technical procedures which were clear, sufficiently detailed and revised accordingly when improvements were needed. The performance of surveillance tests was carried out in a controlled, professional manner by knowledgeable, trained personnel. Communication, including pretest briefings between the test performers and Control Room operators, was considered acceptable. Equipment malfunctions identified during testing were well documented and work requests were promptly initiated.

Review of LERs from both operating units revealed similar problems between units, as well as relatively similar percentages compared to the previous SALP period. For both units, thirty-one of the 118 LERs (26%) submitted during the assessment period were related to the surveillance testing program. Eleven of the thirty-one (35%) reported occurrences were due to exceeding the Technical Specification time limits, a continuing problem; ten of the thirty-one (32%) involved inadvertent actuations of safety related equipment caused by improper performance of the surveillance activity due to personnel errors and failure to follow procedures; and, seven of the thirty-one (23%) reports were caused by inadequate review.

One Severity Level IV Violation and one Severity Level V Violation were issued following repetitive failures to follow procedures while performing surveillance tests in Unit 2.

The licensee's approach to resolving technical matters demonstrated a proper awareness of potential safety significant items, and generally provided timely disposition of problems, with sound technical approaches. The use of administrative programs such as the Technical Specification Component Condition Record and the Engineering Evaluation Request provided the vehicles for tracking and implementing technical reviews in an organized fashion.

Staffing levels, as well as experience and qualification of plant personnel were considered adequate for two unit operation. However, when considering the expected extra workload following the anticipated licensing of Unit 3, and the fact that the scheduling of surveillances was performed manually, the potential for scheduling

errors resulting in a missed surveillance appears more likely than if the scheduling was computer assisted. Management's involvement in assuring quality was generally evident; although corrective action for noted problem areas was somewhat slow in achieving improvement and was not fully effective in some cases. The previous SALP period identified program weaknesses which resulted in missed or late surveillances; however, the safety consequences were considered minor. The licensee's corrective action was not fully effective in that some weaknesses were still evident at the conclusion of this appraisal period. For example, similar to the previous SALP period, continuing problems were noted in satisfying conditional Technical Specification surveillance requirements which were required to be performed in conjunction with, or following a given activity (i.e. component manipulation, grab sample with in-line radiation process monitor out of service), rather than on a fixed interval, such as monthly. Problems associated with a relatively large number of personnel errors and instances of failure to adhere to plant testing procedures were also raised by the NRC. Although the licensee was responsive to NRC concerns in these areas, there remains the need for continuing a high degree of management overview. The type of program implementation weaknesses, which during the very early phases of plant operation were not considered unreasonable or unexpected by the NRC, were viewed at the conclusion of this appraisal as difficulties which could have been expected to have improved beyond the current status.

Conclusion

Performance assessment - Category 2. No clear trend was observed during the SALP period. Performance did not significantly improve since the prior appraisal, and with an additional unit operating, some of the same problems were repeated and corrective actions have not been fully effective. Weaknesses which resulted in missed or late surveillances, identified in the previous SALP report, were still evident. Personnel errors during the performance of testing activities and instances of not adhering to plant procedures require continuing management attention. As a result of a lack of a significant improvement in this area, and with the third unit approaching the operational phase, significant attention is necessary in order to develop and maintain a positive trend.

Board Recommendation

The licensee needs to improve their methods of providing timely assessments of corrective action adequacy and promptly adjust their corrective methods when inadequacies are identified. The licensee should maintain direct corporate and site management involvement in the surveillance testing area until performance has demonstrated that corrective actions are adequate to preclude future late or missed surveillances and incomplete surveillance reviews. The licensee needs to seriously evaluate implementation of a computer assisted, state-of-the-art surveillance scheduling and management system.

Management should assure sufficient staff is available for proper overview and control of the surveillance test program for all three units.

5. Fire Protection - Units 1 and 2

During the current SALP period fire protection activities were inspected by the resident inspectors on a continuing basis as part of their assessment of plant operations. The inspections at both Units 1 and 2 were conducted to verify implementation of the licensee's fire protection program, including compliance with the Technical Specifications. A total of approximately 80 hours of direct inspection effort was spent in this functional area at both Units 1 and 2.

Enhancement to the licensee's fire protection program was noteworthy, and indicated by the level of importance placed on fire prevention and fire-fighting capabilities by site management. A major restructuring within the licensee's Fire Protection department was accomplished during the assessment period. The licensee saw the long term advantages of training and using specialists from within the fire protection organization to do fire protection surveillance testing. Appropriate programs to develop the needed expertise were instituted. Fire brigade staffing and surveillance testing of fire protection equipment, which previously involved members of various departments including Operations and Maintenance, were made the responsibility of the Fire Protection department. Staffing within Fire Protection was increased from three individuals to 30, in order to accomodate the added responsibilities. Staff training included qualifications in the control of hazardous materials and waste, as well as certification as State Fire Fighters. The training was conducted onsite, utilizing independent contractors, and offsite by the Phoenix Fire Department. The staff appeared well trained and qualified. Additional fire fighting equipment, including a dedicated fire truck, was also purchased. Program changes designed to bring about improved effectiveness in this area were well supported by management.

Management's involvement in assuring quality was evident. Management was involved in the selection of the professional fire fighting staff, initiation of the training and certification programs, as well as the development of program policies and procedures. Management reviewed daily logs to identify problem areas and directed the development of a computer program for tracking fire protection commitments and problem resolutions.

Inspector reviews of operational events, including the few minor fires and situations that had the potential for fires (e.g. oil sprayed on hot steam lines), demonstrated a rapid, effective response by the fire brigade, which put out the fire or prevented the threat of a fire from developing. In each instance, the fire brigade's response was considered to be well executed. Events were promptly reported and evaluated.

The licensee's approach toward the resolution of technical issues was good, demonstrating the proper regard for safety significant matters. The reduction in the number of spurious fire protection equipment alarms by correcting many of the hardware problems which caused the alarm condition was one example. A number of fire detectors with improved environmental compatibility were also installed to reduce spurious alarms. The excessive number of alarms was addressed in the previous SALP period. Although corrective actions have been undertaken as noted above, continued effort is considered necessary to further minimize spurious alarm conditions which are periodically received.

Five LERs were reported during the assessment period; three of which dealt with missed or late fire watches. There was one Severity Level IV Violation issued, involving inadequate fire watch surveillance of the Unit 1 low pressure safety injection pump room when the room sprinkler system was inoperable. The corrective action instituted was prompt and effective. Overall, significant improvement was evident in the implementation of the fire watch program compared to the previous SALP period.

The licensee's response to NRC issues was positive. In one case the NRC inspector noted that record keeping associated with compensatory fire watches, intended to satisfy Technical Specification requirements, could be improved by adding greater detail regarding tour times and locations. The licensee was responsive to the comment, and initiated action to improve the level of detail documenting fire watch tours.

Conclusions

Performance Assessment - Category 1. No apparent trend was identified. The licensee effectively implemented its fire protection program. Enhancements through staffing increases, and the addition of fire fighting equipment, including a dedicated fire truck, increased the licensee's capabilities. Management involvement was clearly evident.

Board Recommendation

The licensee should continue to maintain performance at a high level and remain attentive to the development of potential problems. Compensatory fire watches should receive additional attention to minimize missed or late fire watches. Efforts should be continued to eliminate spurious fire-related alarms.

6. Emergency Preparedness

Region V utilized approximately 480 hours of direct inspection effort to assess the licensee's Emergency Preparedness (EP) program. Three hundred hours were used for the Unit 1 facility and 180 hours were used for Unit 2.

The licensee's performance during this appraisal period has demonstrated that, generally, management has been involved in directing priorities and resources to resolve EP problems. Management has also supported and actively participated in the EP exercises. The improvements in the emergency preparedness training program are the results of management's involvement in the EP program. Management could have been more involved in the problems associated with the dose calculations performed by the on-shift staff. This situation was identified during the preoperational inspection. Management did become involved in resolving the dose assessment problems, which included the onshift dose calculations, after identification in the emergency response facilities appraisal; however, this was about two years after the preoperational inspection.

The licensee's handling of technical issues has usually resulted in conservative resolutions as far as safety is concerned. The emergency response facilities appraisal did identify a possible problem resulting from having the majority of the communications systems wiring passing through a single room that was protected from fire by sprinkler heads. A fire or water from the sprinkler(s) could disable a major portion, or possibly all, of these communications systems with a single event. The appraisal also noted that the monitor in the TSC's (emergency) HVAC was removed from the flow train when the system was operating.

Experience during this SALP period has shown the licensee to be responsive to NRC initiatives. For the most part, the licensee has addressed improvement items identified by the inspectors in a timely manner. A notable example was the development of a systematic approach to resolving the dose assessment problems, identified during the emergency response facilities appraisal, before the inspection report was issued. The licensee made a special effort to keep Region V informed of completed and planned corrective actions related to dose assessment. The licensee has committed to resolving the dose assessment matter in an acceptable manner.

No significant deficiencies or violations of NRC requirements were identified during this appraisal period. The follow-up of a violation regarding EP training identified during the previous SALP period, showed that the licensee had taken effective corrective action.

No significant operational events have occurred during this SALP period that are relevant to this functional area.

The inspections, including observation of an EP exercise, have shown that the licensee's emergency response organization is qualified and able to carry out their responsibilities. A need for some improvement in the capability of on shift dose calculations and protective action recommendations was noted during the Unit 2 preoperational inspection. This improvement appears to be related more to procedural matters than an inadequacy in training. During this SALP period the EP organization lost four engineers. These

individuals have not been replaced; however, the positions will be retained.

Improvements in the EP training program have been observed. The EP and Training Departments have worked more closely with each other during this SALP period. The inspections have shown that EP training/retraining is being accomplished in a timely manner.

The licensee's QA department conducted their annual audit of the EP program. These audits have continued to be a valuable asset to the EP program. When problems have been identified, they have been tracked to resolution. The QA department has also monitored the progress of the resolution of the EP training problems identified during the previous SALP period.

Conclusion

Performance Assessment - Category 2

Board Recommendations

Management should continue its active support of the EP program to assure that problems and improvement items are addressed in a timely manner and appropriate corrective actions are taken. The vacancies in the EP organization should be filled in a timely manner, before problems arise due to understaffing.

7. Security and Safeguards

During this 12-month assessment period Region V conducted eight safeguards inspections at Palo Verde Nuclear Generating Station, spending 460 hours of on-site inspection effort. Six inspections were physical security, and the remaining two were material control and accounting inspections. The increased number of security inspections during this period supported the preoperational security inspection requirements at Unit 2. In addition, the resident inspectors provided continuing observations of security operations. As a result of these inspections, Region V identified nine violations. Several physical security violations (e.g., lack of positive access control to vital areas; failure to respond to alarms; inadequate vital area barriers and lighting; and failure to report safeguards incidents) were categorized as a severity level III problem, and resulted in a proposed base civil penalty of $50,000. The proposed base civil penalty was increased to $100,000 because NRC had given the licensee prior notice of similar problems identified in inspection reports as violations and deficiencies (pre-operational) during the past three years, and because several examples of this violation involved multiple examples. Additionally, five level IV and one level V physical security violations were identified during this period. There were also two level V violations noted in material control and accounting inspections.

During the first half of this SALP period there was little evidence of sound prior planning and assignments of priorities. This was evidenced by findings of inadequate vital area barriers in Unit 2 and then finding the same at Unit 1. Further, licensee identified deficiencies were found where no, or incomplete, corrective actions were taken. This was a major contributor to the assessment of the civil penalty described above. During the second half of the SALP period there has been a reduction in security violations.

Through daily meetings and inter-department actions, security management demonstrated a coordinated effort with other plant staff in preventing continuing security problems. The licensee has also amended and improved their security plan and updated the security procedures in support of this plan.

The licensee's corrective measures during the past few months have been adequate and sufficiently thorough to prevent recurrence. This indicates improvement in management attention.

As identified above, the licensee's approach to resolution of security issues was inadequate, issues were not thoroughly thought out and resolutions were not adequately pursued to preclude further noncompliance. The newly instituted meetings, described above, have resulted in improved communications aimed at early resolution of identified security problems. The licensee's method of identifying, analyzing and correcting safety/security issues was considered acceptable.

The security management staff was responsive to NRC initiatives. Appropriate reviews of NRC Information Notices have been made by the licensee. For example, the licensee has implemented changes to their 73.71(c) reporting requirements and access authorization based on NRC initiatives. The licensee's security management frequently communicates with both Region V and NRC headquarters to seek clarification and interpretation of new initiatives.

Upon receiving a repeat violation for failing to report security events, the licensee has made a coordinated and determined effort to report all security events in accordance with 10 CFR 73.71(c). During the past few months, the timeliness and accuracy of event reports have improved. The licensee has been experiencing few significant operational security events, especially during the second half of this appraisal period.

The licensee's key security positions in the guard force, supervisory officers and managers are identified and the position responsibilities are described. Some key positions were vacant early in the SALP period but are now filled. The security staffing is adequate and includes expertise in physical security law enforcement and investigations and a Compliance/QA section. Consultants are utilized when necessary.

The licensee's earlier problems with excessive overtime and inadequate numbers of security officers were alleviated with the employment of additional personnel during 1986.

Conclusion: Performance Assessment - Category 3. Late in the assessment period an improving trend was identified. The previous SALP rating was a Category 2. During the first half of the appraisal period, significant problems were identified in the areas of vital area barriers, and access control to these vital areas. The licensee's overall corrective actions to these problems appear to have been effective and indicate that program improvements can be expected.

Board Recommendations: The licensee should continue to emphasize the recently increased level of management and staff awareness to the requirements of the security program to improve their future performance level. The specific requirements within the security plan that warrant increased attention are: vital area barriers, and access control to vital areas.

As the licensee continues to develop the physical security program for Unit 3, it should devote considerable effort to evaluating the root cause of security deficiencies at Units 1 and 2 with the goal of precluding similar problems at Unit 3.

8. Outages/Initial Fuel Load - Units 1 and 2

During the assessment period Unit 1 underwent a 30 day unscheduled outage and a scheduled 76 day outage; and Unit 2 completed its initial fuel load. Approximately 20 hours of direct inspection effort by the resident inspectors were applied in the followup of outage activities at Unit 1, and 10 hours were expended during inspection of the Unit 2 fuel load.

In planning for the Unit 1 scheduled outage, the licensee held regularly scheduled meetings to ensure proper advance preparation. Plant management demonstrated a high level of participation in this planning effort. Through utilization of the Work Control Center (WCC) and the Outage Management Group (OMG), the licensee identified work scopes and established advanced planning schedules to effectively control work activities. Work priorities were established, and documents and materials were prestaged. During the outage, major work items were added to the existing schedule without disruption of ongoing work, demonstrating flexibility to respond to unforeseen events. The WCC/OMG demonstrated itself to be an effective approach toward providing management attention and coordination in the identification and resolution of technical issues associated with forced and scheduled outages.

During the 30 day Unit 1 unscheduled outage in November, 1985, the major work items included the repair of the 13.8KV S03 bus, which failed under load, and the modification to the reactor coolant pump seal injection lines. Corrective actions implemented to facilitate repairs and subsequent inspections of the electrical buses were well

planned. The modifications on the RCPs seal injection lines were well controlled and coordinated, requiring the removal of all four reactor coolant pump motors and seal packages.

Overall outage planning included an unscheduled outage plan (Short Notification Outage Work) which was updated weekly. This provided preplanning for forced outages. Elements of the plan included pre-staging of work packages, radiation work permits and clearances; verification of material availability; and a list of work items for a one-day outage, seven-day outage, and forced power reduction.

During the scheduled Spring 1986 shutdown, the major outage activities included the incorporating of various system modifications, performance of the containment integrated leak rate test, and the 18 month surveillance test of the emergency diesel generators. Based on the experience acquired during the previous outage, the OMG and WCC implemented program changes which resulted in improved outage efficiency. Management conducted daily morning meetings to evaluate problems and provide readjustments to the work schedule and work groups.

Unit 2 initial fuel load commenced on December 11, 1985, and was completed on December 17, 1985. The resident inspectors witnessed initial fuel loading activities and verified appropriate Technical Specifications were met. Observations included the operational events taking place in the Control Room, Containment Building and Fuel Building. Fuel loading was completed with very few problems encountered. The licensee's approach was considered conservative and cautious throughout the fuel loading process. Additionally, the licensee's approach toward technical issue resolution involved a proper understanding and evaluation of the problems.

Plant procedures were confirmed to have been properly adhered to, and communications between the refueling bridge, spent fuel machine and the Control Room were complete and accurate. The operators involved with the fuel loading were knowledgeable and well trained on the fuel handling equipment and requirements of the Technical Specifications. A sufficient number of trained engineering personnel were involved to oversee and monitor the fuel loading activities. Monitoring of count rate, statusing of fuel location changes, and other data acquisitions were noted to be in accordance with procedures. Management involvement was continuous and evident throughout the fuel loading evolution.

No violations or LERs associated with outages/initial fuel load were issued during this evaluation period. The staffing and training in the functional area of outages/initial fuel load was adequate as demonstrated by the licensee's timely, and thorough completion of outage activities. The licensee's management involvement in assuring quality in both activities is considered to have contributed to the success of the outage and fuel load programs. NRC initiatives and issues in this area were minor in nature.

Conclusions

Performance assessment - Category 1. The Unit 2 initial fuel loading was performed in a cautious, deliberate manner with no significant problems experienced. Outage planning and implementation was well supported and carried out in an organized, disciplined fashion.

Board Recommendations

Management should implement the necessary planning that will allow for well prepared and organized refueling/maintenance outages, as well as initial fuel loading at Unit 3.

9. Quality Programs and Administrative Controls Affecting Safety

Units 1, 2 and 3

During the assessment period approximately 2150 hours of direct NRC inspection effort was spent at the three units in this functional area by resident and region based inspectors.

A programmatic concern identified by the NRC during the period involved the need for improved post trip reviews and equipment malfunction root cause analyses. Other concerns in the area of operations quality assurance programs carried over from the previous assessment period were associated with a relatively high number of Technical Specification violations, instances of failure to follow procedures, and personnel errors. A considerable amount of NRC attention and interface with the licensee was required in these areas. The licensee's efforts appeared to be effective in improving performance in the above mentioned problem areas at the conclusion of the appraisal period. In the area of construction quality assurance programs, weaknesses in subcontractor administration and vendor surveillance were documented and discussed with the licensee in the previous SALP report. Additional evidence was found during this period which indicated that past weaknesses still remain in the licensee's program for monitoring subcontractor and vendor performance, indicating that the licensee's corrective action monitoring and verification system needs additional attention.

The current QA organization was staffed with 166 members and was considered adequate. The organization added four individuals who previously held operator licenses, thus strengthening their operations monitoring expertise. In monitoring and auditing areas where technical or regulatory issues were complicated, the monitoring organization requested needed assistance from the ANPP engineering organization and Independent Safety Engineering Group (ISEG). All QA technical audits routinely include a member of ISEG. Quality Assurance (QA) monitoring and auditing of construction, startup testing and operations were all found to be carried out in accordance with formal program procedures and plans. Monitoring and auditing personnel were observed on frequent occasions in the plant evaluating construction, test and operational activities.

The approach to the resolution of technical issues generally exhibited conservatism and was based on sound and thorough evaluation techniques. However, on a number of occasions resolution of technical issues lacked strong problem-solving techniques and root cause analyses. Examples included the licensee's evaluation performed following several instances of gas binding of the charging pumps. In another case, the licensee management's decision making process was based, in part, on bad information due to poor communication associated with the normal position of a containment isolation valve.

One area demonstrating adequate resolution of a technical issue involved the development of a program which trends various plant operating, administrative and regulatory performance statistics. Among the trends closely followed were the number and age of outstanding corrective action reports. This was an area of previous criticism. The licensee's trend showed a definite improvement in this area. Reports of plant performance were distributed to corporate management as well as responsible plant managers. These reports were intended to alert management to negative trends so that priority attention and resources could be focused where needed. One report, which was issued semiannually, documented information designed to appraise corporate management of the effectiveness of its quality programs. The reports were comprehensive and represented a significant staff effort.

QA management response to the NRC concerns in several areas was positive. In addition to increasing QA involvement in post trip review activities, increased emphasis was placed on monitoring preoperational testing of radiation monitoring systems and in ANPP interfaces with outside emergency preparedness organizations. These efforts were the result of comments provided by the NRC.

The licensee's QA department continued to include a separate organization which investigated concerns which were called into the "Hotline" system. In general, NRC followup of selected issues called into the "Hotline" system confirmed appropriate followup by the licensee. The QA reviews were found to be well organized and very thorough. In one instance, the licensee's initial approach and handling of a worker's concern was considered to have included questionable judgement regarding the manner in which worker interviews were conducted. This was subsequently resolved satisfactorily.

The onsite and offsite review functions appeared to be implemented in accordance with Technical Specification requirements. A total of 68 meetings by the onsite Plant Review Board (PRB) were held during the assessment period.

The licensee has several systems intended to bring problems to the attention of the proper operational disciplines. The reporting systems such as Engineered Evaluation Reports, Operating Department Event Reports, and Nonconformance Reports appeared effective in communicating concerns and operating experiences.

There were a total of five violations and one deviation issued in this functional area. Two Severity Level V Violations were issued at Unit 1 dealing with late submittals of Licensee Event Reports (LERs) to the NRC, and failure to include facility changes in the annual 10 CFR 50.59 report to the NRC. One deviation related to Bechtel supervisors performing design verification reviews without advance approval. One Severity Level V Violation at Unit 2 involved failure of the licensee to provide all of the required information in an LER submitted to the NRC. Two Severity Level IV Violations were issued in this area as a result of findings made during a Construction Assessment Team (CAT) inspection of Unit 3. These two violations involved the failure of the licensee to assure the quality of certain vendor supplied components and material and to assure the performance of adequate inspections of some field installations. Eleven LERs were issued by Units 1 and 2 during the assessment period in this functional area. Four were associated with personnel error.

Evidence of continued management involvement in assuring quality of plant operational matters was evident. Decision making was consistently at a sufficient level to ensure adequate management review. Corrective actions, although not always immediately effective, were consistently pursued in an aggressive manner by management. Exit meetings were, generally, attended by a member of corporate management. Members of corporate management were frequently at the site and routinely solicited NRC perceptions. The level of involvement by corporate management in plant activities was acceptable.

Conclusion

Conclusion - Category 2. No apparent trend was observed.

Board Recommendations

Management should take a critical approach towards root cause analyses and implementation of appropriate corrective actions prior to NRC involvement. Lessons learned at one unit should continue to be applied to the other units.

10. Licensing Activities

During the evaluation period, management involvement and control in assuring quality for licensing activities was evaluated in various areas. In some areas, management involvement and attention are readily apparent; e.g., during the readiness meeting and Commission meeting in support of full power licensing of Palo Verde Unit 2, and during a staff team visit to the Palo Verde site in October 1985 to review recent events at Palo Verde Unit 1.

In other areas, sufficient management involvement is less apparent. For example, several license amendment requests involving proposed technical specification changes have been lacking in their content and justification, as well as in the supporting determinations of no

significant hazards consideration. The areas requiring additional information have been identified to the licensee as the submittals were received.

Another example where management attention was considered less than adequate involves implementation of staff approved generic guidelines and acceptable licensee commitments into emergency operating procedures. A staff evaluation of operator actions during an event that took place at Palo Verde Unit 1 on July 12, 1986, identified a number of deficiencies. Since the operators did follow written procedures, the deficiencies imply improper implementation of approved guidelines and, therefore, insufficient management attention. These deficiencies have been identified to the licensee.

The licensee's approach to the resolution of technical problems is generally conservative and timely. In three areas, i.e., ECCS reanalysis, fire protection and Technical Specifications for Palo Verde Unit 2, the licensee demonstrated a clear understanding of the issues and provided timely resolutions in support of low power licensing.

In its evaluation of a failed pipe support found on a main feedwater line at Palo Verde Unit 1 in March 1986, the licensee's initial evaluation did not appropriately consider all the loads that led to the failure. As a result, the licensee did not initially identify all other supports that could also fail. Upon further questioning by the staff, the licensee performed additional evaluations which identified other supports that required reinforcement.

One issue that the licensee has spent considerable time on concerns the adequacy of the as-built condition of certain masonry walls at Palo Verde. This issue arose during a CAT inspection of Palo Verde Unit 3 and followup inspections of Units 1 and 2, in January and February 1986, when it was discovered that the walls were not constructed in accordance with design requirements. To date, the staff has found that the licensee's several analyses have not exhibited sufficient conservatism and, in fact, have not met minimum code requirements.

The licensee's responsiveness to NRC initiatives relating to licensing activities has been generally sound and thorough, and deadlines are generally met. For example, both licenses for Units 1 and 2 have a number of schedular license conditions which were met, except for operability of SPDS. An extension of six months was granted to resolve problems associated with establishing an operable SPDS with high reliability.

For the following two areas, the licensee's performance was not fully responsive. In October 1985, the staff issued a 50.54(f) letter regarding concerns with the design of the auxiliary pressurizer spray system and raised specific questions. The licensee's response did not fully address one question related to safety-grade design requirements nor did it fully address all of the staff's concerns in the letter (e.g., the role of the charging

system for satisfying certain General Design Criteria was not addressed). Nevertheless, the staff was able to use the information provided along with other available information to complete its review.

In January and February 1986, inspections of Palo Verde, Units 1, 2 and 3 revealed that certain masonry walls were not constructed in accordance with design requirements. As a result, the licensee performed several analyses of the walls to illustrate the adequacy of the as-built conditions. This issue has resulted in repeated submittals by the licensee and considerable NRC effort without reaching a resolution to the problem.

Events at Palo Verde were reported within the required time period following an event, although followup reports were often submitted several months after the initial report. On several occasions, the information provided in 50.72 reports was incomplete. Subsequent attempts to obtain more detailed information on these events from the licensee were delayed, which prevented timely assessment of the incidents.

For both units, a total of nine events were considered significant enough to be brought to NRR management's attention. Of these nine events, four involved reactor trips with complications. Of these latter events, one was particularly noteworthy; on July 12, 1986, Palo Verde, Unit 1 experienced a reactor trip from 100% power on a steam generator Lo-Flow signal. This event: (1) involved the recurrence of previous problems encountered during power ascension testing, (2) challenged safety systems, (3) involved complications, and (4) resulted in inappropriate actions on the part of operating personnel in violation of licensee commitments.

In summary, the evaluation period for both operating units at Palo VErde is characterized by a large number of reported events. While many of these events have minimal operational significance (e.g., security), there are a substantial number that involve ESF actuations and reactor trips. Palo Verde, Units 1 and 2, have experienced significant operating difficulties which have resulted in increased NRR staff attention to the facilities. While events are reported within the required time period, followup activities often take several months to complete.

The licensee's technical staff was involved when meetings were held with NRC. In a number of cases, the licensee did supplement its technical staff with consultants to discuss detailed technical issues, e.g., issues related to masonry walls, pipe supports and auxiliary pressurizer spray system.

CONCLUSION

The licensee's overall performance for licensing activities during the evaluation period is rated at the Category 2 level. Although this level is the same rating as for the previous evaluation period, a decreasing trend was noted as a result of Operational Events,

continued problems with regard to Management Involvement in Assuring Quality, Approach to Resolution of Technical Issues, and Operational Events.

Board Recommendation

It is recommended that licensee management increase its attention in those areas where decreasing trends were noted.

11. Training and Qualification Effectiveness - Units 1 and 2

The evaluation of the training and qualification of station personnel consisted of observations from resident and regional inspectors. A total of approximately 50 inspector hours were applied to each unit. The inspections involved program reviews of licensed personnel training which included control room operators, senior control room operators/shift supervisors, and shift technical advisors; and non-licensed personnel training, including auxiliary operators, maintenance technicians (instrumentation and control, electrical, and mechanical) radiation protection, and general employees.

The licensee's training program was effective in supporting plant operations. The program includes training on operational events through the use of classroom instruction as well as the simulator. Improvements in the simulator's modeling of the units' operating characteristics was observed; however, further enhancements should continue to be implemented. General employee training was considered to be well implemented, and provided a sufficient level of detail in the areas of site access, radiological controls, fire prevention, and quality assurance. Job task training had been developed for reactor operators and was being developed for auxiliary operators. An ambitious training effort was effectively implemented to support six shift operations in Units 1 and 2 and to provide six licensed shift operations crews for Unit 3 before the plant is licensed. The staffing level of licensed operations personnel and trained non-licensed personnel was considered adequate to meet the operational requirements of the two units.

The licensee's approach to the resolutions of technical issues appeared to be based on sound judgement. Improvements in training were implemented by separating the licensed operators from the nonlicensed operators during requalification training. Self-study for requalification training has been reduced to a minimal amount needed for the annual requalification test review. Both actions are in response to NRC initiatives discussed in the previous SALP report. Requalification training for the licensee staff met license requirements. The formalization of the auxiliary operator training is nearly complete and the accreditation of the auxiliary operator training is being developed. However, this item was identified in the previous SALP report and implementation of a formal auxiliary operator training program has been slow.

The 107 member training department, staffed with qualified, knowledgeable personnel, supplied the numerous specialty courses needed to train the diverse work groups. The instructor turnover in the licensed operator training group seemed to be higher than the other training groups. A major effort culminated in the installation of a permanent, dedicated facility to train instrumentation and control technicians. Instructor performance was routinely evaluated by management. Training records were well maintained through the use of a computer system and knowledgeable clerical staff. Training records could be readily inspected using the computer for data retrieval.

[illegible] of the training and qualification of station
There were no LERs or violations associated with training activities.

Management was aggressively involved in meeting commitments to provide a high quality training program. One of the actions supporting this involved a change in reporting responsibility of the Training department from the Plant Manager to the Assistant Vice President of Nuclear Production, giving the organization more visibility and direction from senior management.

During the period all 44 operator license candidates passed their NRC operator examinations.

Conclusion

Performance assessment Category 1. No apparent trend was observed. The overall performance in the training area was effective in supporting plant operations and maintenance.

Board Recommendation

Continued efforts to develop and certify the auxiliary operator training programs is encouraged. Management should continue to support the actions necessary to fulfill the requirements of the INPO accreditation program. Efforts should also continue to improve the simulator's modeling of the operating units' characteristics.

12. Containment, Safety-Related Structures, and Major Steel Supports - Unit 3

During this SALP period, a special Construction Appraisal Team (CAT) inspection was conducted by the Office of Inspection and Enforcement on January 13-24 and February 3-14, 1986, of activities associated with the construction of Unit 3. A total of approximately 2260 hours of direct inspection was spent by the CAT members during this inspection. The specific areas of civil and structural construction evaluated were: masonry construction; structural steel installation, including high strength bolting for structural steel connections; general concrete surface finish quality; and QC documentation of cadwelds, concrete placements, post-tensioned tendons, and soil compaction. Approximately 740 hours were expended in these areas. Regional and resident construction inspection effort

was expended primarily on close-out of previously identified inspection concerns, including those identified during the CAT inspection as well as the followup of any additional licensee identified problems.

During the previous SALP period, a need for the licensee management to increase their overview of contractor and subcontractor activities was identified as a result of problems identified with safety systems within this category. Improvements have been noted in work performed recently by contractors due to increased licensee control over these activities.

Few significant construction events attributable to causes under the licensee's control have occurred relevant to this functional area. During this SALP period, there were two reportable construction deficiencies and two deficiencies that are currently being considered as potentially reportable by the licensee in this functional area. The most recent problem concerns bolting materials which were found not to meet material specification requirements. Similar problems were previously identified by the licensee. The licensee's responsiveness to these deficiencies including adequacy of written reports, was generally timely, thorough and technically sound. Corrective actions taken were generally effective, although some problems such as those with bolt material continue to recur. One Severity Level IV Violation was identified in this functional area during this evaluation period. This violation related to the adequacy of the design and construction of masonry block walls and the failure on the part of the licensee to ensure that installation requirements were met by the subcontractor during the construction of the walls.

As a result of the findings related to the masonry block walls, the licensee provided NRR a commitment as a licensing condition for Unit 2 to provide an acceptable analysis, perform additional testing, or implement design modifications on the masonry walls by December 22, 1986. The licensee was fairly responsive to the NRC's request for additional information on this subject. Considerable effort was, however, expended by the NRC without obtaining a suitable resolution of the issues involved. Initial licensee submittals were found to lack adequate conservatism making a more timely resolution of this problem difficult to obtain.

During this SALP period, significant reductions in the construction work force took place as the project neared completion. These reductions were primarily within contractor organizations. These include reductions not only in the numbers of craft personnel but also reductions in the numbers of field and resident engineers. The licensee, however, continued to maintain 34 full-time engineers in their own nuclear construction management staff and 18 quality assurance engineers involved in the monitoring of construction activities and the review of turnover documentation.

The changes made by the licensee in the construction force were seen as being consistent with the overall shift from construction activities into preoperational testing and plant operations.

During this SALP period, management involvement in construction activities continued to be evident even though management had to increasingly turn their attention toward problems encountered in the areas of plant operations. Long standing construction work controls which had been refined over the years as well as the overall reduction in the amount of work being performed, resulted in few problems in the management of construction during this SALP period. Emphasis on adherence to procedures and the importance of quality were found to continue to exist despite a solid push for completion of construction. Management also appeared to remain sensitive to the need to consider the possible impact of significant construction deficiencies identified in Unit 3 on the two operating units.

Conclusion

Performance assessment - Category 2. This is the same performance rating as that applied in the last SALP evaluation period.

Board Recommendation

Due to the recurrence of problems with materials and services supplied by outside organizations, licensee management should continue to increase efforts in the area of subcontract administration and vendor surveillance to ensure that subcontractors and vendors are complying with their own, and the licensee's, requirements. This effort should concentrate on improving performance in this area during the preoperational testing phase at Unit 3 as well as through plant operations of all three units.

13. Piping Systems and Supports - Unit 3

During this SALP period, approximately 280 hours of direct inspection effort was expended in this functional area. Effort was expended by both regional inspection personnel and the resident staff as well as by the NRC CAT in inspections of this area.

During the previous SALP period, weaknesses were noted in the area of engineering evaluations. While evaluations were generally comprehensive, timely and effective, several evaluations were considered lacking sufficient detail and adequate corrective action for identified deficiencies. Some concern in this area still existed through this SALP period.

Few significant construction deficiencies have occurred in this functional area. During this SALP period, there were two reportable construction deficiencies in this functional area both of which involved failures on the part of the designer to take into proper account certain conditions effecting the design of either a piping system or its supports. The most significant of these related to the identification of a failed pipe support during a routine snubber

surveillance inspection by the licensee in Unit 1 in March, 1986. The response of the licensee to the pipe support failure was considered as not being sufficiently comprehensive. The licensee, subsequently, did identify additional supports which required rework, and ultimately the licensee's response was found to be adequate.

One Severity Level IV Violation was also issued during this evaluation period which involved weaknesses identified by the CAT in field inspections of piping flange connections and pipe supports. The licensee performed extensive reinspections in this area to assure the adequacy of the installations involved, and took appropriate corrective action, as necessary.

The licensee's resolution of technical issues and responsiveness to NRC initiatives in this functional area were found to be generally adequate as evidenced by the actions which were ultimately taken by the licensee in response to the pipe support design problem.

As previously indicated, during this SALP period, significant reductions in the licensee's prime contractor's organization occurred at all levels including design engineering. The licensee however, increased its own in-house engineering staff by approximately 25%, from less than 100 engineers a year ago to near 130 engineers presently. Key positions in the licensee's organization have been filled with experienced personnel. An increasing level of expertise within the licensee's staff is occurring. The licensee has also retained the services of two additional architectural/engineering firms for the performance of engineering analysis beyond the licensee's inhouse capabilities.

Management involvement in this area was evident, particularly with regard to ensuring a timely and comprehensive assessment of the deficiencies in plant design that were identified during this SALP period. Decision making generally occurs at a level that assures adequate management review. These reviews are generally adequate.

Conclusion

Performance Assessment - Category 2. No apparent trend was evident. This is the same performance rating as that applied in the last SALP evaluation period.

Board Recommendation

The licensee should continue to develop its own in-house engineering expertise. The licensee should also continue to work at ensuring that engineering evaluations, particularly those performed by contractors, are comprehensive, timely and effective.

14. Safety Related Components - Mechanical - Unit 3

During this report period, inspection in this functional area was performed primarily by the CAT. Approximately 440 hours were expended in direct inspection effort. The CAT inspected the installation of a number of pieces of mechanical equipment including pumps, valves, tanks, heat exchangers and HVAC mechanical components. During the previous SALP period, weaknesses in the licensee program for subcontractor administration was evidenced by deficiencies identified in this functional area.

Few significant construction events have occurred in this functional area. There were two reportable and two potentially reportable construction deficiencies in this functional area identified during the SALP period. These deficiencies were each attributed to vendor quality control problems. The CAT also identified a number of tanks and heat exchangers that had vendor welds which deviated from the requirements stated in applicable drawings and specifications. Some radiographs and NDE documentation supplied by vendors were also found to be deficient with respect to the required quality. The problem with the quality of radiographs was cited as one example in a Severity Level IV Violation issued in conjunction with the CAT inspection involving a failure on the part of the licensee to assure purchased material, equipment and services conformed to purchase documents.

The licensee resolution of technical issues and responsiveness to NRC initiatives in relation to the identified deficiencies in vendor supplied components, included in this functional area, were found to be acceptable. The licensee exhibited an apparent understanding of the issues and proposed generally sound and thorough resolutions.

During this SALP period, primary control of activities associated with procurement, receipt inspection, material control and warehousing shifted from the prime contractor to the licensee with corresponding increases in the licensee's own staff. Key positions have been identified and the associated responsibilities defined. Positions have been filled in a reasonable time with few positions remaining vacant. Experience levels for management personnel have been found to meet or exceed the licensee's commitments in this area.

As evidenced historically by the number of deficiencies in vendor supplied components, the level of management involvement was not considered commensurate with that necessary to effect significant improvement in this area. It appeared that with the organizational changes in the assignment of procurement responsibilities, licensee management would become more directly involved in this functional area.

Conclusion

Performance Assessment - Category 2. No apparent trend was evident. This is the same performance rating as that applied in the last SALP evaluation period.

Board Recommendation

The licensee should continue to increase efforts to ensure an acceptable level of quality is achieved in all vendor supplied components.

15. Auxiliary Systems - Unit 3

During this SALP period, approximately 130 hours of direct NRC inspection effort was spent in this functional area. These inspections included the evaluation of HVAC, radwaste, fire protection and new and spent fuel storage and handling equipment installations and construction.

During the previous SALP period, recurring problems with the HVAC contractor and subcontractor were central to the evaluation of the licensee's performance in this area. A deviation in the design of fire protection systems was also noted.

During this report period, significant improvement in work associated with the HVAC contractor and subcontractor was noted. These improvements were, however, tempered by additional problems that arose in the area of fire protection and detection system construction. One reportable deficiency regarding the installation of Bisco fire sealant material was identified during the SALP period. Problems involving work controls for the installation and modification of fire doors were also identified. In addition, an incident involving the miswiring of a fire detection panel drew additional attention to the problems associated with fire protection and detection systems construction.

The licensee's efforts to correct the problems in the area of fire protection and detection systems were seen to be acceptable. The licensee responded well to NRC requests for information in these areas. The licensee was seen as exhibiting a generally sound and thorough approach to the resolution of technical issues, in this functional area. No violations or deviations were identified in this functional area.

Management involvement in ensuring the proper accomplishment of work in this functional area was seen as needing greater attention as evidenced by the problems associated with the fire protection and detection system installations. Poorly stated or ill-understood procedures for the control of activities is seen as having been the primary cause for difficulties in this functional area. Corrective action has, however, been generally effective in resolving previously identified deficiencies.

Conclusion

Performance Assessment - Category 2. This is the same performance rating given during the previous SALP period. No trend was evident during the evaluation period.

Board Recommendations

The licensee should pursue improvement in work associated with systems considered important to safety in an effort to see that such work during the preoperational testing and operations phase is accomplished with the appropriate level of quality.

16. Electrical Equipment and Cables - Unit 3

A total of 620 inspection hours were applied to this functional area during this reporting period, which included routine resident and regional inspections as well as inspections performed by the NRC CAT.

During the previous SALP period, weaknesses in the licensee's inspections of quality related installations in this functional area were noted.

During this SALP period, a Severity Level IV Violation was again issued to the licensee for failure to perform adequate inspections of electrical hardware installations. As a result of this, the licensee performed extensive reinspections and engineering evaluations in these areas. The results of the licensee's reinspections and the associated engineering evaluations which were performed showed the identified discrepancies to be of minimal safety significance in that none were found to result in equipment being installed in a manner that would cause it to be unable to perform its intended function. The problems with electrical equipment installation revealed a lack of attention to detail in the performance of work and inspections in this functional area. In addition, during this SALP period, an allegation concerning the failure to perform and document work in strict accordance with procedures was also received, investigated and partially substantiated although no instances were found wherein the failure to follow procedures had ultimately resulted in unacceptable hardware installations.

During the SALP period, five reportable construction deficiencies were also identified. These deficiencies were all related to problems associated with vendor supplied components further highlighting the licensee's past problems with assuring quality in purchased materials and components. These events were all reported in a timely manner. Reports were found to be only occasionally lacking necessary information.

The licensee's approach to the resolution of technical issues and responsiveness to NRC initiatives were seen as generally sound and thorough. Acceptable resolutions were generally proposed by the licensee on a timely basis.

Although overall staffing in the construction areas declined significantly over this SALP period, the smallest reductions were associated with this functional area since work relating to the installation of electrical cabling terminations and assuring the required Class 1E separation was achieved remained active throughout this period. An adequate level of expertise was seen as having been maintained by the licensee to ensure this work was appropriately accomplished.

Management involvement has remained evident as exhibited by the timely and comprehensive response of the licensee to the concerns expressed regarding electrical equipment installations. Evidence, however, was found to exist which indicated past management efforts to achieve a high degree of attention to detail and strict adherence to procedures have not been fully successful.

Conclusion

Performance Assessment - Category 2. No apparent trend was evident. This is the same rating as given during the previous SALP period.

Board Recommendation

The licensee should continue to stress the importance of procedural adherence and the need for proper performance of work and inspection activities in order to avoid any additional problems in this area. As stated previously, the licensee should also continue to increase efforts to ensure an acceptable level of quality is achieved in all vendor supplied components.

17. Instrumentation - Unit 3

During this SALP period 390 hours were expended in this functional area. This included inspections by both resident and regional inspectors and the NRC CAT.

During the past SALP period, no significant problems were identified in this functional area.

Few significant deficiencies have been identified in this functional area. During the present SALP period, there were two reportable deficiencies identified which involved problems with vendor supplied components. One of these involved the installation of flexible conduit on Combustion Engineering supplied instrument racks while the other involved problems in the electronic programming of a number of radiation monitors.

Additional deficiencies associated with the welding on CE instrument racks were also identified during the CAT inspection and were included as an example in a Severity Level IV Violation which documented deficiencies regarding the control of vendor supplied components.

The licensee's corrective actions in response to the identified deficiencies were considered adequate.

A high level of personnel experience was found to be exhibited by the quality of construction in this functional area.

Management involvement in this area was consistently evident in that activities were conducted in accordance with well defined procedures, and policies concerning the control of work appeared to be well established and understood.

Conclusion

Performance Assessment - Category 1. This is the same performance rating as that applied in the last SALP evaluation period.

Board Recommendation

Continued aggressive management attention is encouraged in order that the level of past performance in this area is maintained during maintenance or modification of instrumentation in the preoperational testing and operational phases.

18. Preoperational Testing - Units 2 and 3

During this SALP period both the resident inspectors and the regional inspection staff conducted reviews and observed preoperational testing activities. Approximately 250 hours were expended during the final stages of preoperational testing in Unit 2 and approximately 880 hours have been expended in Unit 3 since the start of preoperational testing during this SALP period.

During the previous SALP period, steadily improving performance was observed to be taking place in this functional area. Programs established for the review and acceptance of test results were effective in confirming design and regulatory requirements were met. Competent technical as well as operations and maintenance support throughout the conduct of testing was instrumental in minimizing the number of problems encountered. The tracking of open items requiring completion prior to fuel load was considerably improved over the experiences of unit 1 and, overall, was well controlled and managed. Consistently good performance was observed to be continuing to occur in this area as evidenced by a relatively trouble free conclusion of testing in Unit 2 and start of testing in Unit 3. No violations or significant program deficiencies were identified.

The licensee remained responsive to NRC questions or concerns as they arose out of test activities. Test discrepancies continued to be well documented and evaluated in a timely and technically sound manner.

The licensee maintained staffing levels in the testing organizations fairly constant during the SALP period with many experienced

personnel moving from Unit 2 preoperational test activities into Unit 3. Key positions continued to be well defined. The experience levels for management personnel were found to meet or exceed commitments made by the licensee.

Management involvement was evidenced by the refinement of work controls associated with preoperational test activities and the application of lessons learned in Units 1 and 2 to Unit 3. Consistent evidence of prior planning and assignment of priorities was found to exist. Decision making was seen as consistently occurring at a level which ensured adequate management review.

Conclusion

Performance Assessment - Category 1. The licensee's performance remained consistent during the assessment period. This is the same performance rating as that applied in the last SALP evaluation period.

Board Recommendation

The licensee should maintain efforts to assure continued good performance in this area through the completion of testing in Unit 3.

19. Startup Testing - Unit 1 and 2

The resident and regional inspection staff reviewed the startup testing program at Units 1 and 2 as part of the routine inspection program. Additionally, a NRC Region V special team inspection during low power physics testing at Unit 2 was conducted.

Evaluation of low power physics test results at Unit 2 was also performed by a consultant to the NRC. Areas inspected included the entire startup test program from test preparation through test results evaluation. Approximately 200 hours of direct inspection effort was spent in this functional area in both Units 1 and 2.

There were no violations or deviations identified in this area during the evaluation period.

(a) Testing Experience - Unit 1

Power ascension testing continued during the first five months of the assessment period, with the unit placed in commercial operation in February, 1986. Several plant transients resulted from unexpected trips during the performance of certain scheduled tests. During load rejection testing, design problems were discovered with the "fast transfer" of non-class 1E loads from the auxiliary transformer to the startup transformer, the steam bypass control system, and the reactor power cutback system. During the power ascension testing phase, three unscheduled reactor trips occurred due to test related activities. Power ascension testing, except for the

fast transfer capability for non-class loads, was completed in December, 1985.

(b) Testing Experience - Unit 2

Low power physics and power ascension testing began in January, 1986. The satisfactory completion of the test program at Unit 2 in September, 1986, reflected the resolution of many of the equipment problems experienced at Unit 1, such as the availability of the auxiliary spray system and the loss of offsite power because of the multiplexer malfunction. Several problems unique to Unit 2 were encountered such as several main generator trips resulting from vendor supplied generator protective system component malfunctions, and excessive degradation of reactor coolant pump seals. Similar problems identified in Unit 1 with the steam bypass and "fast transfer" capabilities were also experienced. Several operations related transient control problems early on in the test program reflected newness of plant operations to the staff. Based on the experiences at Unit 1, the testing approach taken at Unit 2 reflected improved thoroughness in the evaluation of the root causes and the resultant resolution of problems.

Tests were conducted in a controlled and cautious manner in accordance with approved procedures. Pre-test briefings of plant operators by test personnel was prior to the performance of the individual tests and was noteworthy. Identified problems were corrected prior to proceeding to new power levels. Good correlation existed between predicted and calculated/measured values. A review of test results of systems performance indicated that the design and test requirements had been met.

The Operations organizations at both units maintained increased staffing levels during the performance of transient power ascension tests. Appropriate staffing levels of knowledgeable test personnel, were assigned to coordinate specific tests.

Personnel from Maintenance, Operations Engineering, Chemistry and Radiation Protection provided good support during the testing phase. Test support experience acquired at Unit 1 was noted to have been applied to Unit 2. It was also noted that the licensee's Reactor Engineering staff was less reliant on contractor personnel during the conduct of the test program at Unit 2 than was the case with Unit 1.

Daily planning meetings attended and directed by management were held to identify work items, responsibilities, test requirements and schedule, as well as establish priorities and hold points. Plant management was involved in problem resolution and final test acceptance and provided proper overview. Evidence of a team approach was apparent. Good cross-communication among organizational unit managers was also evident.

NRC initiatives in this area were limited to those arising from inspector observations. In those cases, licensee response was timely and appropriate.

Conclusions

Performance assessment - Category 2. An improving trend was observed during the assessemnt period. The licensee's startup testing program was well implemented. Pre-test preparation was evident, with adequate support available during test performance.

Board Recommendations

Management should assure that proper technical support is available to perform the Unit 3 startup test program. Lessons learned from the operating units should be applied to Unit 3. Problems encountered during testing should be thoroughly evaluated and corrected, including feedback of potentially generic issues to the other units.

V. SUPPORTING DATA AND SUMMARIES

1. Inspection Activities

Five NRC resident inspectors were onsite for most of the appraisal period. Total NRC activity during this period involved approximately 11,430 inspection hours (resident, regional, IE, and contractor). Tables 1, 2, and 3 summarize the inspection and enforcement activities during the SALP evaluation period.

Three special inspections were conducted during the evaluation period. These include:

1) A regional team inspection conducted during the period October 28 - November 8, 1985. This team inspection assessed the adequacy, effectiveness and implementation of the licensee's administrative controls as they applied to the operation and maintenance of Unit 1. Two violations were identified and one deviation.

2) A special Office of Inspection and Enforcement construction assessment team (CAT) inspection conducted during the period January 13-24 and February 3-14, 1986. The CAT inspection evaluated the adequacy of construction activities in Unit 3. Three violations were identified.

3) A regional enhanced operations team inspection conducted during the period April 21-27, 1986. This team inspection provided around the clock observation of operating crews and support organizations in Unit 2. No violations or deviations were identified.

2. Investigation and Allegation Activities

The following cases were investigated by the Office of Investigations during this SALP period:

Case No.	Status
Q5-84-001	Closed
Q5-84-034	Open
Q5-85-001	Closed
Q5-85-003	Closed
Q5-85-046	Closed
Q5-85-052	Closed
Q5-85-053	Closed
Q5-86-001	Closed
Q5-86-003	Open
Q5-86-005	Open
Q5-86-006	Closed
Q5-86-009	Open

During the assessment period, the followup and resolution of allegations involved in excess of 400 inspection hours by resident and regional based inspectors.

The following allegations were received and reviewed during this SALP period:

RV-85-A-059	Closed
RV-85-A-065	Closed
RV-85-A-067	Closed
RV-85-A-068	Open
RV-86-A-004	Closed
RV-86-A-009	Open
RV-86-A-012	Closed
RV-86-A-013	Closed
RV-86-A-014	Closed
RV-86-A-018	Open
RV-86-A-019	Open
RV-86-A-020	Closed
RV-86-A-021	Closed
RV-86-A-024	Closed
RV-86-A-030	Closed
RV-86-A-033	Closed
RV-86-A-040	Closed
RV-86-A-044	Open
RV-86-A-045	Open
RV-86-A-047	Open
RV-86-A-051	Open
RV-86-A-055	Closed
RV-86-A-059	Open
RV-86-A-072	Open
RV-86-A-073	Open
RV-86-A-074	Open

3. Escalated Enforcement Actions

a. Civil Penalties

Inspection Reports 50-528/86-07 and 50-529/86-06 identified several safeguards violations which resulted in an aggregate Severity Level III safeguards problem. A one hundred thousand dollar ($100,000) civil penalty was levied. The licensee has requested mitigation of the civil penalty, which has been denied.

b. Orders

None.

c. Confirmatory Action Letters

None.

4. LER Analysis

A total of 71 LERs were submitted by the licensee during the assessment period for events in Unit 1 and 47 LERs for events in Unit 2. A synopsis of these LERs is provided in Tables 7 and 8.

Two violations of reporting requirements were issued during the assessment period. One involved submittal of late LERs (Level V) and the other involved failure to provide all information required by 10 CFR 50.73 (Level V). However, these violations were identified earlier in the evaluation period, and a trend of improvement was noted both in timeliness and quality of LERs toward the end of the assessment period.

AEOD reviewed a sample of 30 LER's reported by the licensee during this assessment period. This evaluation consisted of a detailed review of each selected LER to determine how well the content of its text, abstract and coded fields met the requirements of 10 CFR 50.73(b), and the guidelines of NUREG 1022 and its supplements.

AEOD determined that the LER discussions concerning the root cause, the safety consequences, the corrective actions, personnel errors, and the failure mode, mechanism, and effect of failed components, were well written in most of the LERs involving these requirements. However, there are some areas in need of improvement. They are summarized as follows:

Areas	Comments
Manufacturer and model number	Component identification information should be included in the text whenever a component fails or is suspected of contributing to the event because of its design. The failure to do so prompts concern that possible generic problems may go unnoticed for too long a time by others in the industry.

Text presentation	The use of an outline format is suggested.
Abstracts	Cause and corrective action information should always be included.
Titles	Titles should be written such that they better describe the event. Specifically, include the root cause, and the link between the cause and the result.

The results of this evaluation indicate a significant improvement over the previous SALP period in the quality of LERs submitted.

5. Management Conferences Held

October, 1985 - Commissioner Zech visited Palo Verde to discuss licensing of Unit 2.

March, 1986 - A management meeting was held in Region V to discuss management of post trip reviews and portions of the previous SALP report related to QA.

March, 1986 - Commissioner Bernthal visited Palo Verde to discuss licensing of Unit 2.

March, 1986 - Management meeting held at Palo Verde with NRR and Region V to discuss Unit 2 readiness for licensing.

April, 1986 - An enforcement conference was held to discuss inspections 50-528/86-07 and 50-529/86-06. This resulted in a Severity III problem and a $100,000 civil penalty being levied.

6. Construction Deficiency Reports (10 CFR 50.55(e))

The licensee's reportable construction deficiencies are listed in Table 9. Discussions of these reports have been included in the functional area analyses of this SALP report where appropriate.

7. Part 21 Reports

The licensee includes a Part 21 evaluation with each 50.55(e) report (DER) that is submitted to Region V. The following is a list of deficiencies which the licensee found to be reportable under the criteria of 10 CFR 21.

DER 85-28 - CE Instrument Rack Conduit Installations
DER 85-32 - Building Interface Seismic Separation
DER 85-34 - Faulty Override Feature on Diesel Generator
DER 85-38 - Components Supplied by GE which are Unacceptable for Class 1E service
DER 85-41 - Burned Wire Insulation on Certain SG Valves
DER 85-42 - Slippage of Diesel Generator Fuel Rack Linkage
DER 86-04 - Lack of Supports for BISCO Seals

DER 86-06 - Inadequate Wire Lug Terminations
DER 86-14 - Weld Failure on Pipe Support Structure
DER 86-17 - Carbon Steel Guides in Stainless Steel Gate Valves
DER 86-18 - Unsealed Penetrations in the AFW Pump Rooms
DER 86-19 - Deficient Pin Connectors on BOP ESFAS Modules
DER 86-27 - Air Starting Valve Seat Insert Problem on Diesel Generators

8. Licensing Activities

A. The following is a summary of significant licensing activities for Palo Verde, Units 1, 2 and 3 during the evaluation period:

1. NRR/Licensee Meetings - 8 (4 meetings on masonry walls, a meeting on operating events, a management meeting on Unit 2 licensing, a meeting on SALEM ATWS and a meeting on reload submittal plans)

2. NRR Site Visits - 6 (evaluation of operating events at Unit 1, entrance meeting for CAT inspection of Unit 3, 2 general plant visits, management visit for Unit 2 licensing, and plant visit for masonry walls evaluation)

3. Commission Briefings - one (Full power license for Unit 2)

4. Schedule Extensions Granted - 2 (EQ of hydrogen recombiners for Units 1 and 2)

5. Reliefs Granted - 4 (Efficiency of charcoal filters for Units 1 and 2 and setpoints for RCS low flow trip for Units 1 and 2)

6. Exemptions Granted - 5 (Partial schedular exemption to GDC 4 for Units 1, 2 and 3 and schedular exemption for submittal of Updated FSAR for Units 1 and 2)

7. Licenses Issued - Two (Low Power and Full Power Licenses for Unit 2)

8. License Amendments Issued - 13 (8 for Unit 1 - 2 for sale and leaseback transactions, 2 for hydrogen recombiners, 1 for efficiency of charcoal filters, 1 for natural circulation cooldown test, 1 for AC Sources, and 1 for management organization)

(5 for Unit 2 - 3 for sale and leaseback transactions, 1 for efficiency of charcoal filters, and 1 for hydrogen recombiners)

9. Emergency Tech. Specs. Changes - 2 (one for Unit 1 and one for Unit 2 regarding efficiency of charcoal filters)

10. Orders Issued - none

B. The dates for specific licensing actions are presented below:

Unit 2 Low Power License NPF-46, December 9, 1985
Amendment No. 1 to NPF-46, January 27, 1986
Unit 2 Full Power License NPF-51, April 24, 1986

Amendments to NPF-51 (Unit 2 License)

No. 1, August 11, 1986
No. 2, August 12, 1986
No. 3, August 15, 1986
No. 4, August 15, 1986

Amendments to NPF-41 (Unit 1 License)

No. 2, October 31, 1985
No. 3, December 26, 1985
No. 4, January 29, 1986
No. 5, January 27, 1986
No. 6, June 2, 1986
No. 7, August 11, 1986
No. 8, September 3, 1986
No. 9, September 3, 1986

Schedular Exemptions to GDC 4

Unit 1, November 22, 1985
Units 2 and 3, November 29, 1985

Schedular Exemptions for Submittal of Updated FSAR

Units 1 and 2, September 12, 1986

In support of these actions, the staff issued safety evaluations including the following two supplements to the Palo Verde SER for Unit 2 licensing:

SSER 9 - Low Power Licensing Matters (December 1985)
SSER 10 - Full Power Licensing Matters (April 1986)

C. The specific areas of licensing activities covered by the evaluation period are listed below:

1. Fire Protection
2. ECCS Reanalysis
3. Unit 2 Technical Specifications
4. Structures and Components
5. Shift Staffing
6. Preservice Inspection
7. Equipment Qualification
8. PASS
9. Event Evaluation
10. License Amendments

11. Radiation Monitoring
12. Auxiliary Pressure Spray System
13. Response to 50.54(f) letter
14. Relief Requests

The above licensing activity areas vary with respect to their safety significance and the amount of staff and licensee effort associated with each activity during the evaluation period. These factors were taken into consideration when evaluating the licensee with respect to the performance criteria.

9. Licensee Activities

Unit 1

During the evaluation period, 186 reports were called in by the licensee, in accordance with 10 CFR 50.72, covering events at Units 1 and 2. Of these 96 were security related events, 14 were associated with LCOs, four advised of the loss of ENS capability, and one advised of a chemical spill. Of the remaining 71 events, 67 were associated with reactor trips and/or ESF actuations.

Unit 1 was conducting power ascension testing at the 80% power plateau at the start of the assessment period. Testing continued through the 100% plateau and during the month of December, 1985, and January, 1986, several 100 hours of continuous operation at 100% power were conducted to satisfy various requirements for the formal declaration of commercial operation on February 13, 1986. Following a 76 day scheduled annual maintenance outage in the Spring, 1986, power operation was resumed May 22, and continued through the end of the assessment period.

During the power ascension testing and operational phases, the plant experienced 16 trips. On October 3, 1985, the plant tripped from 52% power on a loss of power when the plant multiplexer (PMUX) failed and tripped the 13.8 KV buses. On October 24, during a load rejection test from 80%, the plant tripped and a malfunction in the steam bypass control system (SBCS) caused an overcooling of the reactor coolant system (RCS) and resulted in a safety injection (SIAS), containment isolation (CIAS) and a main steam isolation (MSIS). During the startup following this trip on October 29, an electrical fault on a 13.8 KV bus caused the non-class S03 bus to fail. A month long outage in November, was used to repair the 13.8 KV bus and install a modification on the reactor coolant pump seal injection lines to prevent flange leakage. On December 4, the reactor was tripped by the core protection calculator following an unscheduled drop of control rod group 12.

A low steam generator level trip from 2% power occurred on December 16 following a loss of the operating feedwater pump. A third trip in December occurred on the 20th when the turbine generator tripped from 40% and the steam bypass control system could not maintain RCS temperature and the plant tripped on high RCS pressure.

During a load rejection test from 100% on January 9, 1986, the fast transfer scheme did not function resulting in a plant trip on anticipating RCS low flow and the steam plant overcooled slightly activating a MSIS. A scheduled trip from 40% power occurred on January 24 and the reactor coolant pumps were tripped during the successful performance of the natural circulation test. During the shutdown for the scheduled Spring, 1986 outage, on March 7, the reactor tripped from 20% on low steam generator levels following a malfunction of the operating main feedwater pump.

During the outage, on May 14, power from three of the four offsite sources was lost due to apparent offsite sabotage of the power lines. No effect was felt at the site by the temporary loss of the three power lines. Following the outage, the plant experienced a load rejection from full power on June 6 when an electric hydraulic control oil line failed. A personnel error tripped the plant from 100% on June 17. On July 12, the plant tripped from 100% on steam generator low flow as a result of the Technical Specification trip setpoint having little margin from the actual RCS flow rate (delta pressure). Following this trip a secondary plant overcooling caused startup transformer tripped causing a loss of two RCPs in each plant: Unit 1 was operating at 100% at the time. On August 15, another load rejection test from 50% resulted in a reactor trip on high pressure as to sluggish SBCS operation. On August 30 and September 2, the plant again tripped from 100% on steam generator low flows. A subsequent Technical Specification change to the low flow trip setpoint was approved, increasing the margin between the setpoint and actual flow rate (delta pressure).

The plant tripped from 100% on low steam generator pressure on September 12 after a loss of steam flow signal activated the SBCS while the turbine was at full power. The plant returned to power and remained at 100% through the end of the reporting period.

Unit 2

During the initial months of the assessment period, Unit 2 was in the final stages of completing open work items and conducting surveillance tests in preparation for fuel loading. A low power license (NPF-46) was issued on December 9, 1985, and initial fuel loading which began on December 11, was completed December 17. Following the initial fuel load, the post core hot functional test (HFT) was conducted from March 10, 1986, to April 6. Initial criticality was achieved on April 18, and was followed by low power physic testing. The full power license (NPF-51) was issued on April 24. Mode 1 was entered for the first time on May 18, for power ascension testing, which was completed on September 17. The plant successfully completed 100 hours of continuous operation at 100% and commercial operation was declared on September 22, 1986.

On May 25, 1986, during power ascension testing, the reactor tripped from a low steam generator level. A mismatch between reactor and turbine power coupled with generator overfeeding resulted in a rapid cooldown causing a reactor trip and a SIAS, CIAS and MSIS. On

May 31, the reactor tripped from a high pressurizer pressure condition when the main generator tripped from a faulty protective relay. Fifty percent power was reached on June 2. At this time a series of condenser tube leaks occurred and required repair before power ascension testing could be resumed. A reactor trip occurred on June 10, again from a high pressurizer pressure condition resulting from a main generator trip which was caused by the loss of the power supply to the main generator protection system. A planned loss of offsite power test was conducted on June 25. As a result of the failure of supply power to transfer from the unit transformer to the offsite power source, the reactor tripped when the reactor coolant pump (RCP) power supply was lost.

On July 1 the reactor was shutdown to replace reactor RCP seals which were leaking excessively. Operation was resumed following a three week outage. A reactor trip on July 25 occurred when a core protection calculator channel tripped from an erroneous plant parameter input at the time the system was in a 1 out of 2 trip configuration. On August 6, the reactor tripped from the loss of two RCPs when a malfunctioning current transformer isolated the startup transformer supplying power to the RCPs. On August 25 the reactor again tripped from high pressurizer pressure resulting from a main generator trip caused by an improperly calibrated vendor supplied transducer in the generator protective circuit.

Another reactor trip on August 28, 1986, from high pressurizer pressure resulted from a main generator trip caused by an improperly wired vendor supplied current transformer in the main generator protective system.

Power level was increased to 100% for the first time on September 5. The final power ascension test, a load rejection from 100% power resulted in a reactor trip on September 11, due to the loss of the RCPs caused by a slight voltage perturbation in the RCP power supply. The second load rejection test was successful.

Following declaration of commercial operation, a trip from 40% power resulting from low steam generator level occurred on September 23, 1986. Following recovery from the trip, plant operation at 100% was resumed, and continued until the end of the assessment period.

Unit 3

During the assessment period the licensee's activities included the continuation of construction from 98.6% to 99.8% completion, and the start of preoperational testing of plant equipment and systems.

Project milestones successfully achieved included completion of the following: primary system hydrostatic test and secondary system hydrostatic test in August, 1986; and, the containment Integrated Leak Rate Test on September 15, 1986.

Approximately 52% of all plant systems and areas were transferred from the Construction and Startup organizations to the Operations

organization. At the conclusion of the assessment period the plant was engaged in preparations for Hot Functional Testing which was scheduled to begin October 22, 1986.

TABLE 1

INSPECTION ACTIVITIES AND ENFORCEMENT SUMMARY
(10/1/85 - 9/30/86)

PALO VERDE UNIT 1

		Inspections Conducted		Enforcement Items Severity Level **					
	Functional Area	Inspection* Hours	Percent of Effort	I	II	III	IV	V	Dev
1.	Plant Operations	1640	45.5				1		
2.	Radiological Controls	210	6				1		
3.	Maintenance	230	6.5				1	1	
4.	Surveillance	240	6.5						
5.	Fire Protection	50	1.0				1		
6.	Emergency Preparedness	300	8.5						
7.	Security and Safeguards	120	3			2	7	1	
8.	Outage	20	0.5						
9.	Quality Programs and Administrative Controls	670	18.5					2	1
10.	Licensing Activities	N/A	N/A						
11.	Training and Qualification Effectiveness	50	1.5						
19.	Startup Testing	90	2.5						
	TOTAL	3520	100			2	11	4	1

* Allocations of inspection hours to each functional area are approximations based upon NRC form 766 data.

** Severity levels are in accordance with NRC Enforcement Policy (10 CFR Part 2, Appendix C).

Data reflects Reports 85-31 through 86-30.

TABLE 2

INSPECTION ACTIVITIES AND ENFORCEMENT SUMMARY
(10/1/85 - 9/30/86)

PALO VERDE UNIT 2

	Functional Area	Inspections Conducted Inspection* Hours	Percent of Effort	Enforcement Items Severity Level ** I	II	III	IV	V	Dev
1.	Plant Operations	1200	35						
2.	Radiological Controls	160	4						
3.	Maintenance	80	2.0				1		
4.	Surveillance	90	2				1	1	
5.	Fire Protection	30	1						
6.	Emergency Preparedness	180	5						
7.	Security and Safeguards	340	10			1	1	2	
8.	Outage	10	0.5						
9.	Quality Programs and Administrative Controls	640	18.5					1	
10.	Licensing Activities	N/A	N/A						
11.	Training and Qualification Effectiveness	50	1.5						
12.	Containment and Other Safety Related Structures	30	1						
13.	Piping Systems and Supports	20	0.5						
14.	Safety-Related Components-Mechanical	20	1						
15.	Auxiliary Systems	0	0						
16.	Electrical Equipment and Cables	50	2						
17.	Instrumentation	140	4						
18.	Preoperational Testing	250	7						

	Functional Area	Inspections Conducted: Inspection* Hours	Inspections Conducted: Percent of Effort	Enforcement Items: Severity Level ** I	II	III	IV	V	Dev
19.	Startup Testing	210	5.0						
	TOTAL	3500	100			1		3	4

* Allocations of inspection hours to each functional area are approximations based upon NRC form 766 data.

** Severity levels are in accordance with NRC Enforcement Policy (10 CFR Part 2, Appendix C).

Data reflects Reports 85-27 through 86-29.

TABLE 3

INSPECTION ACTIVITIES AND ENFORCEMENT SUMMARY
(10/1/85 - 9/30/86)

PALO VERDE UNIT 3

	Functional Area	Inspections Conducted: Inspection* Hours	Inspections Conducted: Percent of Effort	Enforcement Items: Severity Level ** I	II	III	IV	V	Dev
1.	Plant Operations	0							
2.	Radiological Controls	70	2						
3.	Maintenance	0							
4.	Surveillance	0							
5.	Fire Protection	0							
6.	Emergency Preparedness	0							
7.	Security and Safeguards	0							
8.	Outage	0							
9.	Quality Programs and Administrative Controls	840	20.5				2		
10.	Licensing Activities	N/A	N/A						
11.	Training and Qualification Effectiveness	0							
12.	Containment and Other Safety Related Structures	710	18				1		
13.	Piping Systems and Supports	260	7						
14.	Safety-Related Components-Mechanical	420	11						
15.	Auxiliary Systems	130	3						
16.	Electrical Equipment and Cables	570	14.5						
17.	Instrumentation	250	6.5						
18.	Preoperational Testing	880	17.5						

	Functional Area	Inspections Conducted: Inspection* Hours	Inspections Conducted: Percent of Effort	Enforcement Items: Severity Level ** I	II	III	IV	V	Dev
19.	Startup Testing	0	0						
	TOTAL	4130	100				3		

* Allocations of inspection hours to each functional area are approximations based upon NRC form 766 data.

** Severity levels are in accordance with NRC Enforcement Policy (10 CFR Part 2, Appendix C).

Data reflects Reports 85-22 through 86-23.

TABLE 4

PALO VERDE ENFORCEMENT ITEMS
UNIT 1

INSPECTION REPORT NO.	SUBJECT	SEVERITY LEVEL	FUNCTIONAL AREA
50-528/85-31	TWO TEMPORARY MODIFICATIONS WERE NOT VERIFIED WITHIN EIGHT HOURS OF IMPLEMENTATION AS REQUIRED BY PROCEDURE	IV	3
	INDEPENDENT AIR RECEIVER TANKS WERE CROSS CONNECTED BY A TEMPORARY JUMPER HOSE WITHOUT A WRITTEN SAFETY EVALUATION	V	3
	BECHTEL SUPERVISORS PERFORMED DESIGN VERIFICATION REVIEWS WITHOUT ADVANCE APPROVAL	D	9
50-528/85-38	SCREENING RECORDS FOR CONTRACT EMPLOYEES	IV	7
	SCREENING RECORDS FOR CONTRACT EMPLOYEES	IV	7
	LICENSEE DESIGNATED VEHICLES	IV	7
	PROTECTED AREA DETECTION AIDS	IV	7
50-528/85-43	EIGHT INCH CONTAINMENT PURGE VALVES WERE NOT SEALED CLOSED TO THE MAXIMUM EXTENT POSSIBLE IN THAT THE VALVES REMAINED OPEN WITHOUT JUSTIFICATION FOLLOWING COMPLETION OF CONTAINMENT ENTRY	IV	1
	LER 85-70 AND 85-72 EXAMPLES OF LATE SUBMITTALS OF LERS TO NRC	V	9
50-528/86-07	FAILURE TO REPORT SECURITY EVENT TO NRC	IV	7
	FAILURE TO PROVIDE ADEQUATE VITAL AREA BARRIERS	III	7
50-528/86-07	FAILURE TO PROVIDE ADEQUATE VITAL AREA BARRIERS	IV	7
	FAILURE TO LIMIT VITAL AREA ACCESS TO AUTHORIZED INDIVIDUALS	III	7
50-528/86-17	FAILURE TO RECORD REQUIRED SECURITY EVENTS IN A SEPARATE LOG	V	7

INSPECTION REPORT NO.	SUBJECT	SEVERITY LEVEL	FUNCTIONAL AREA
	FAILURE TO PROVIDE ADEQUATE RECORDS FOR LOCING DEVICES ON VITAL AREA DOORS.	IV	7
50-528/86-20	HOURLY FIRE WATCH PATROLS OF LPSI ROOM WERE NOT ESTABLISHED WHEN EQUIPMENT WAS REQUIRED TO BE OPERABLE AND SPRINKLER WAS INOPERABLE	IV	5
50-528/86-24	CHANGES TO FACILITY AS DESCRIBED IN FSAR WERE NOT INCLUDED IN LICENSEE'S 1985 ANNUAL REPORT	V	9
50-528/86-28	FAILURE TO SHUTDOWN WHEN RU-1 WAS INOPERABLE FOR GREATER THAN 30 DAYS	IV	2

TABLE 5

PALO VERDE ENFORCEMENT ITEMS
UNIT 2

INSPECTION REPORT NO.	SUBJECT	SEVERITY LEVEL	FUNCTIONAL AREA
50-529/86-02	RU-37 TESTED WHILE CHANNEL WAS UNBYPASSED RESULTING IN INADVERTENT CPIAS	IV	4
50-529/86-06	FAILURE TO RESPOND TO SECURITY ALARMS	III	7
	FAILURE TO PROVIDE ADEQUATE ILLUMINATION IN PROTECTED AREA	IV	7
50-529/86-07	LER 005 SUBMITTED BY LICENSEE TO NRC DID NOT DISCUSS WHETHER THE ERROR WAS CONTRARY TO APPROVED PROCEDURE WAS AN ERRONEOUS PROCEDURE, ETC.	V	9
50-529/86-17	UNIT 2 140' LEVEL CONTAINMENT INNER DOOR FAILED SEAL LEAK TEST AND OUTER DOOR WAS OPENED PRIOR TO SATISFACTORILY REPAIRING AND RETESTING INNER DOOR	V	4
50-529/86-23	FOREIGN MATERIALS LOCATED IN AND ON CLASS 1E RELAYS IN AUX RELAY CABINET. A SIMILAR CONDITION HAD BEEN PREVIOUSLY IDENTIFIED, CORRECTED AND REPORTED TO NRC	IV	3
70-2984/85-02	FAILURE TO HAVE FORM 741 SIGNED BY CORRECT PERSON	V	7
	FAILURE TO HAVE FORM 741 COMPLETED AND DISPATCHED WITHIN TEN DAYS OF RECEIPT OF SNM.	V	7

TABLE 6

PALO VERDE ENFORCEMENT ITEMS
UNIT 3

INSPECTION REPORT NO.	SUBJECT	SEVERITY LEVEL	FUNCTIONAL AREA
50-530/86-03	MASONRY WALLS INCORRECTLY CLASSIFIED AS QUALITY CLASS S	IV	12
50-530/86-03	NUMEROUS DEFICIENCIES IN VENDOR SUPPLIED COMPONENTS AND MATERIALS	IV	9
50-530/86-03	AS-BUILTS NOT IN ACCORDANCE WITH DESIGN AND INSTALLATION REQUIREMENTS	IV	9

TABLE 7
PALO VERDE UNIT 1

SYNOPSIS OF LICENSEE EVENT REPORTS**

	Functional Area	SALP Cause Code* A	B	C	D	E	X	Totals
1.	Plant Operations	8	3	0	2	16	3	32
2.	Radiological Controls	8	1	0	0	0	1	10
3.	Maintenance	3	0	0	0	2	0	5
4.	Surveillance	10	2	0	4	0	0	16
5.	Fire Protection	2	1	0	0	0	0	3
6.	Emergency Preparedness	0	0	0	0	0	0	0
7.	Security and Safeguards	0	0	0	0	0	0	0
8.	Outages	0	0	0	0	0	0	0
9.	Quality Programs and Administrative Controls Affecting Safety	3	1	0	0	0	1	5
10.	Licensing Activities	0	0	0	0	0	0	0
11.	Training and Qualification Effectiveness	0	0	0	0	0	0	0
		34	8	0	6	18	5	71

*Cause Codes:

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

**Synopsis includes LER nos. 85-70 through 86-49.

TABLE 8
PALO VERDE UNIT 2

SYNOPSIS OF LICENSEE EVENT REPORTS**

	Functional Area	SALP Cause Code* A	B	C	D	E	X	Totals
1.	Plant Operations	6	4	0	2	5	1	18
2.	Radiological Controls	2	0	0	0	0	0	2
3.	Maintenance	3	0	0	0	1	0	4
4.	Surveillance	15	0	0	0	0	0	15
5.	Fire Protection	2	0	0	0	0	0	2
6.	Emergency Preparedness	0	0	0	0	0	0	0
7.	Security and Safeguards	0	0	0	0	0	0	0
8.	Outages	0	0	0	0	0	0	0
9.	Quality Programs and Administrative Controls Affecting Safety	1	1	0	1	2	1	6
10.	Licensing Activities	0	0	0	0	0	0	0
11.	Training and Qualification Effectiveness	0	0	0	0	0	0	0
		–	–	–	–	–	–	–
		29	5	0	3	8	2	47

*Cause Codes:

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

**Synopsis includes LER nos. 85-01 through 86-48.

TABLE 9

REPORTABLE 10 CFR 50.55(e) REPORTS

Verbal Notification Date	Written Report Date	Description	ANPP DER No.	Functional Area
8/21/85	10/28/85	CE Instrument rack flexible conduit installation	85-28	17
9/17/85	11/13/85	Minimum seismic separation between buildings	85-32	12
9/30/85	10/28/85	Failure of Unit 2 diesels to pick up loads in override	85-34	16
11/8/85	6/11/86	Deficiencies identified during audit of GE Company	85-38	16
12/9/85	1/9/86	Burned wire insulation on some SG valves	85-41	16
12/9/85	3/11/86	Diesel generator slipped fuel rack linkage	85-42	14
2/7/86	3/31/86	Lack of supports for Bisco fire seals	86-04	15
2/21/86	6/24/86	Inadequate wire lug terminations on DG control panels and battery chargers	86-06	16
3/26/86	4/23/86	Partial penetration welded nozzles	86-12	13
3/20/86	8/7/86	Weld failure on pipe support structure	86-14	13
4/29/86	6/10/86	Carbon steel gate guides in stainless steel gate valves	86-17	14
4/18/86	5/16/86	MSSS west wall seals not installed	86-18	12
4/24/86	6/27/86	Missing lockwashers in BOP ESFAS modules	86-19	16
6/3/86	Potentially Reportable	HVAC damper seals not meeting required specifications	86-20	14

Verbal Notification Date	Written Report Date	Description	ANPP DER No.	Functional Area
7/25/86	Potentially Reportable	Wrong conversion factors on Rad monitor RU-1	86-25	17
8/27/86	Potentially Reportable	Softer than required nuts with heat trace 6C	86-26	12
8/29/86	9/29/86	Copper plated cylinders on DGs	86-27	14