ENCLOSURE

INITIAL SALP REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

INITIAL SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

REPORT NOS. 50-387/90-99; 50-388/90-99

PENNSYLVANIA POWER & LIGHT COMPANY

SUSQUEHANNA STEAM ELECTRIC STATION

UNITS 1 AND 2

ASSESSMENT PERIOD: December 1, 1990 - April 18, 1992

BOARD MEETING DATE: June 3, 1992

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) is an integrated NRC staff effort to collect observations, data and to periodically evaluate licensee performance on the basis of this information. The SALP process 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 feedback to the licensee's management to improve the quality and safety of plant operations.

An NRC SALP Board, composed of the staff members listed below, met on June 3, 1992 to review the collection of performance observations and data, and to assess the licensee's performance at the Susquehanna Steam Electric Station. This assessment was conducted in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance".

The SALP Board for the Susquehanna Steam Electric Station assessment consisted of the following individuals:

Chairman

Charles W. Hehl, Director, Division of Reactor Projects (DRP)

Members

W. Hodges, Director, Division of Reactor Safety (DRS)
J. Durr, (Acting) Deputy Director, Division of Radiation Safety & Safeguards (DRSS)
C. Miller, Director, Projects Directorate I-2, NRR
J. White, Chief, Reactor Projects Section 2A
G. Barber, Senior Resident Inspector, Susquehanna
J. Raleigh, Licensing Project Manager, NRR

Other Attendees

E. Wenzinger, Chief, Projects Branch No. 2, DRP
D. Mannai, Resident Inspector, Susquehanna
P. Eapen, Chief, Special Test Programs Section, DRS
W. Pasciak, Chief, Facilities Radiation Protection Section, DRSS
R. Keimig, Chief, Safeguards Section, DRSS
J. Kottan, Laboratory Specialist, DRSS
J. Noggle, Radiation Specialist, DRSS
C. Gordon, Sr. Emer Prep Specialist, DRSS
R. Albert, Physical Security Inspector, DRSS

II. SUMMARY OF RESULTS

II.A Overview

Overall, both units were operated with a demonstrated high regard for nuclear safety. The licensee undertook many initiatives aimed at improving safety. The new programs were implemented with good initial results. Many internal and external assessments were executed in a thorough and complete manner. Both units operated well with high reliability.

Licensee managers, supervisors, and workers communicated well among themselves, and with the NRC, as issues arose. The licensee used press releases prudently to keep the media informed of plant events and public interest items. Frequent management meetings between the licensee and the NRC were viewed as a positive licensee initiative. Licensee communications were considered a significant strength.

Operations performance remained strong. Effective management involvement was evident in day-to-day operations. Operator staffing, morale, and professionalism were outstanding. There were few personnel errors and operators maximized the availability of safety system equipment. Procedure use was excellent. Some weaknesses were noted in operator skills in maintaining reactor level and pressure following the Unit 1 scram that resulted in main steam isolation valve closure. Similar performance weaknesses were also noted following a Unit 2 scram and during a requalification program review. The eventual corrective actions implemented for these weaknesses were comprehensive; however, the tardy response to this problem contributed to the assignment of a declining trend to this area.

The radiological controls program was effectively administered. While some deficiencies existed, the licensee continues to accrue low annual exposures. Radiological concerns were identified in ensuring adequate postings and instructions to workers in the drywell, and effective use of Radiation Work Permits and temporary shielding. Effluent and environmental monitoring, transportation and radwaste programs were very effective. Overall, performance in this area was good.

Strong performance continued in maintenance/surveillance, emergency preparedness, security, and engineering/technical support areas.

Excellent performance was noted in the Safety Assessment/Quality Verification area. All levels of management were conservatively focused on safe operations and outages. Deficiency management was exemplary. The licensee's extremely effective closeout of deficiencies resulted in establishing a low backlog of outstanding nonconformances, engineering discrepancies and event resolutions. Improvements were seen in the licensee's identification and reporting of these deficiencies. However, concern still exists regarding the licensee's ability to plan and implement timely corrective actions for some recurring problems. Overall, the licensee emphasized safety and quality in their conduct of nuclear activities.

II.B Facility Performance Analysis Summary

Functional Area	Rating, Trend Last Period	Rating, Trend This Period
Plant Operations	1	1, declining
Radiological Controls	2	2
Maintenance/Surveillance	1	1
Emergency Preparedness	1	1
Security and Safeguards	1	1
Engineering/Technical Support	2	1
Safety Assessment/ Quality Verification	1	1

Previous Assessment Period: August 1, 1989 to November 30, 1990

Present Assessment Period: December 1, 1990 to April 18, 1992

III. PERFORMANCE ANALYSIS

III.A Plant Operations

The previous SALP rated licensee performance in operations as Category 1. That assessment concluded that licensee management continued to emphasize safe and effective operations. Operator training programs were very good and operational problems were resolved in a prompt, effective manner. Operations was a significant licensee strength.

Overall, operations performance continued to be strong during the current period. Unit availability and capacity factors reached record setting levels. Operators were attentive to their duties and effectively controlled planned evolutions. Procedures were effectively used. Corporate management provided effective oversight and was heavily involved in operational decision making. Operator morale was excellent.

Twelve hour shift rotations continued during the current assessment period. This shift schedule has significantly reduced the need for unplanned overtime. As evidenced by minimal personnel errors, the switch to 12 hour shifts has not adversely affected operator performance. Shift turnover was conducted promptly and efficiently. Operators communicated well and system status was kept up-to-date. Operator staffing was excellent. All control room activities, including access control, were performed in a professional manner. The day-to-day performance of control room personnel was excellent.

Safety system availability received significant management attention. Operations and plant scheduling ensured that work planning efforts minimized emergency core cooling system (ECCS) out-of-service time during maintenance periods. The licensee successfully maximized safety system availability.

There was one scram on Unit 1 and two scrams on Unit 2 during the SALP period (see Section IV.D). None of the scrams was attributable to operator error. Operator performance during all three scrams was sufficient to maintain the safety of the plant. Emergency Operating Procedures were used in all cases to bring the plant to a safe, stable state. Some weaknesses were noted in operator skills needed to control reactor level and pressure during two of the three scrams.

On January 18, 1992, a worker was mildly burned and contaminated to low levels when he began grinding on an open-ended pipe that normally supplies the common unit offgas hydrogen recombiner. A leaky valve allowed the slow buildup of hydrogen which ignited when grinding began. The licensee's failure to recognize high off gas pressure alarms as a symptom of an earlier hydrogen ignition, and the premature closeout of a work authorization package which resulted in incomplete repair to a leaking maintenance boundary valve were causal factors to this event. The event also indicated that the licensee's implementation of corrective actions from their early industry experience review program was not effective, their response to the situation was extremely prompt and effective. A sixteen person team

was on-site within four hours of the initial event. This Event Review Team (ERT) promptly identified root causes, causal factors, and proposed comprehensive corrective actions. The actions were completed in a timely manner and effectively addressed the earlier deficiencies which contributed to this situation.

In general, operator performance on license examinations was very good. Two NRC requalification examinations and one initial examination involving 37 individuals were given in the assessment period. The pass rate on the initial examination and the first set of requalification examinations was 100%. The pass rate on the second set of requalification examinations was only 75%, and one of three crews did not demonstrate satisfactory performance. During these examinations, weaknesses were also observed in the operators' ability to manually control reactor pressure vessel (RPV) level and pressure. These weaknesses were similar to those observed during the first set of requalification examinations and during 2 of the 3 actual scrams. Although the licensee has scheduled additional simulator training in 1992 to improve this skills weakness, the slowness in addressing this issue was of concern to the NRC.

The licensed operator requalification program was determined to be satisfactory for both requalification program evaluations. However, a programmatic weakness was identified in the evaluation techniques used by the facility training staff during dynamic simulator evaluations for the second program evaluation. Once the licensee fully understood the weaknesses, a strong corrective action plan was developed and implemented.

The licensee did a thorough, comprehensive job during this period in resolving numerous discrepancies identified by the NRC in an inspection (in the previous period) of the Emergency Operating Procedures (EOPs). The EOP program controls are now effective for developing and maintaining procedures of high quality. The process for tracking EOP open items was well organized and has ensured that identified problems were resolved. In general, the EOPs were found to be technically adequate, though some deviations from the BWR Owners Group Emergency Procedure Guidelines and the licensee's methodology for determining area radiation action levels remain to be reviewed by the NRC.

The site fire protection program, including procedures and training, was maintained in accordance with industry standards. Fire protection equipment was in good operating condition and combustible materials were identified and stored properly. The licensee has made excellent progress resolving previous concerns with fire barrier penetration seals. The licensee's corrective actions have fully addressed these concerns and demonstrated a strong commitment to effective fire barrier penetration sealing. In fact, the average number of fire zones requiring hourly fire watches in 1990 has decreased from about 190 per month to about 40 per month. The average number of these fire zones remained low at about 42 per month in 1991 and has dropped to about 26 per month, thus far, in 1992. The reduction in affected fire zones reflected excellent progress toward recovering from previous weaknesses in the fire protection program.

Plant housekeeping was excellent. Plant spaces were well kept. Debris and unnecessary clutter were not allowed to accumulate. The licensee implemented a new administrative procedure to improve control of transient tools and equipment. The program described by the procedure was very thorough and detailed. Spot checks during initial implementation indicated some compliance problems. However, increased management attention has resulted in significantly better and more consistent implementation of the procedure, resulting in significantly better control of transient tools and equipment.

The plant painting and labeling program was a continuing success. The licensee has dedicated significant resources to both programs. Painting and labeling of both unit's turbine decks are complete and have improved the aesthetic appearance. Similarly, based on discussions with plant personnel, attitudes have been positively influenced by the upgraded appearance of the Unit 1 Radiological Control Access (RCA) point.

In summary, the licensee continues to operate both Susquehanna units with an outstanding regard for operational safety. Management involvement continued to be strongly evident in day to day operations. Operational problems were conservatively resolved. The operator requalification program was generally strong, though some weaknesses were noted. Operator control of reactor pressure and level during scrams reflected some inexperience with these types of events. Skills training is underway to improve operator responses. Operator staffing, morale and professionalism were outstanding. Overall, strong, conservative plant operations was a licensee strength.

Performance Rating:	1, Declining
Board Comment:	An early requalification program evaluation and 2 of 3 scrams showed weaknesses in operator skills for post scram reactor level and pressure control. This performance issue was the basis for the assignment of a declining trend in this area. The additional training to cope with this weakness while adequate, was not conducted in a timely manner.

III.B Radiological Controls

The radiological controls program was assessed as Category 2 during the previous SALP period. Strengths included the development of various inter-departmental interface positions, the separation of the chemistry function from the radiation protection group, and strong management response to radiological events. The internal and external exposure controls programs, including ALARA efforts, were of good quality and effectively implemented. The effluent monitoring and control program was effective. Weaknesses were noted in management control of contractors that led to an unplanned exposure and in the sampling methods used to classify radioactive waste.

Radiation Protection

In the current SALP period, a well-defined and staffed radiation protection (RP) organization was maintained. Management effectiveness of this organization was enhanced by transferring radioactive waste (radwaste) functions to a newly formed Effluents Management Section. The RP organization was effectively augmented during the outages with properly trained and qualified contracted personnel. The licensee maintained sufficient supervisory attention to contracted personnel during these periods. The radiation protection organization staffing level remained stable. Emergency radiological response to the victim of a hydrogen burn in a contaminated area was prompt and effective, and demonstrated effective contingency planning. The licensee continued to accrue low annual exposures through an effective ALARA program. The licensee's overall training and qualification program for radiation protection personnel and radiation workers was found to be of good quality.

Notwithstanding the above, in some cases, the application of radiological controls in the work place was deficient despite the existence of excellent procedures and a well defined program. For example, during the Unit 1 outage, several radiological postings in the drywell were found devoid of radiation information and several workers demonstrated insufficient knowledge of the actual radiological conditions in the area. Such lack of knowledge was largely attributable to lack of sufficient radiological information provided to workers. Also, although Radiation Work Permits (RWPs) were well written, they did not always adequately convey information to the worker. Further, the temporary shielding program, while well-established and supported with sufficient resources, lacked criteria and guidance to assure the effective use and optimization of temporary shielding. Consequently, shielding of many sources in the drywell was found to be insufficient to assure that personnel exposures were maintained As Low As Reasonably Achievable.

Additionally, management has not yet resolved a long-standing potential airborne contamination concern as a result of positive containment pressure causing air flow out of the drywell during maintenance periods.

Several strengths were identified in the radiological control program implementation in the workplace. For example, the licensee has implemented good external and internal exposure control programs. Personnel exposure data are tabulated, evaluated, and published at least daily, providing good controls over accumulation of personnel exposure. Overall monitoring of airborne radioactivity was good. Radiation protection personnel training, qualification, and ability to use radiation detection instruments appeared very good.

Audits of the radiation protection program continued to be of good quality. Various audit perspectives were obtained from such diverse groups as the corporate radiation protection group, the station quality control department, and outside industry experts. The audits were performance-based and reflected good management involvement with the radiation protection program.

A high degree of corporate and station management involvement in ALARA goals was evident. The ALARA group was involved early in station outage planning activities and had complete access to all scheduled work packages. Emergent work received appropriate ALARA reviews. Exposure goals were developed for individual departments and jobs, and were considered challenging and reasonable. The recurring repair of reactor water clean-up (RWCU) pump seals in both units has accounted for a large percentage of the maintenance personnel exposure for the last two years. Due to ALARA considerations, in part, the pumps are scheduled to be replaced with seal-less pumps in 1992. While some deficiencies existed, as previously discussed, the licensee continues to accrue low annual exposures.

Effluent Monitoring and Control and Environmental Monitoring

The licensee continues to implement a very effective radioactive liquid and gaseous effluent controls program. The air cleaning systems were tested and well maintained. Excellent calibration techniques were implemented for the gaseous and liquid effluent radiation monitors.

The radiological environmental monitoring program (REMP) was effectively implemented. The instrumentation and equipment of the meteorological monitoring program were operable, calibrated and well maintained. The licensee implemented an effective QA/QC program to assure the quality of the REMP sample analysis.

An NRC review of the licensee's Personnel Dosimetry Processing revealed a strong commitment to quality. The licensee demonstrated a good understanding of the technical issues regarding thermoluminescent dosimeter (TLD) quality assurance/quality control, TLD calibrations, and methods for dose assessment.

Quality Assurance (QA) audits were thorough and of good technical depth and assessed the programmatic performance of all three programs. Procedures were detailed and well written to effectively implement these programs. The licensee implemented an effective program for measuring radioactivity concentrations in process and effluent samples.

Transportation and Solid Radwaste

NRC review of QA audits and surveillances of the solid radioactive waste and transportation program found them to be of excellent scope and technical depth. The quality assurance program in the solid radwaste and transportation area was good with only isolated indications of weaknesses that were promptly resolved. For example, initial QA involvement with the spent fuel pool clean-out project was marginal. However, following NRC identification, QA participation improved to an acceptable level during the project. Another problem involved the station practice of releasing waste oil based on effluent Lower Limit of Detection (LLD) versus environmental LLD levels. The licensee promptly stopped this practice following NRC identification, and revised their procedures accordingly.

The staffing and training in the newly organized Effluents Management Section were considered excellent. Management response to industry issues was good. For example, as a result of a vendor communication, the licensee determined that a certain resin (Marlex CL200K) used to manufacture high integrity containers (HICs) was substandard. In response to this concern, a nonconformance report was generated, and the licensee successfully identified and dispositioned 10 HICs made from this resin. The licensee's review of this concern was complete, thorough, and comprehensive. Overall this functional area appeared to be managed very well.

Summary

Formal audits of the radiological controls area were of excellent quality. Radiological controls were strong relative to internal and external exposure tracking and control programs, and supervisory oversight and staffing. However, the implementation of the program in the drywell during outages exhibited weaknesses relative to radiological control postings, effectiveness of RWP's, and resolution of a problem involving positive containment pressure. The effluent monitoring and control, environmental monitoring, transportation and radwaste programs were well implemented and maintained. Response to an event involving a potentially contaminated burn victim was very effective. The licensee's overall training program for permanent and contractor radiation protection personnel was well done.

Performance Rating: 2

Board Comment: None

III.C Maintenance/Surveillance

During the previous SALP, the Maintenance/Surveillance functional area was rated Category 1. The maintenance and surveillance programs were scheduled, planned, and implemented in an effective manner. A strong management commitment to both programs was evident. Personnel errors and procedural deficiencies in the maintenance area were minor weaknesses. Surveillance activities were generally performed well.

During the current period, the maintenance program continued to be effectively implemented. Management involvement with plant maintenance activities was excellent throughout the period. Management was involved daily to schedule, coordinate and adjust work activities for planned and corrective maintenance. I&C Foremen provided increased supervisory oversight of field activities, spending approximately fifty percent of their time in the field. Electrical and mechanical maintenance foremen also spent increased time in the field. The licensee has corrected the majority of the previously identified weaknesses and deficiencies in

their maintenance program. However, some minor deficiencies still exist in the maintenance procedures, and the self-assessment processes for mechanical and electrical maintenance are not well established.

The maintenance staff was well trained and the turnover rate was low. The training program was effective and qualification elements were well defined. The level of experience of maintenance personnel was high. This strength contributed significantly to the maintenance program as evidenced by relatively few performance errors.

Maintenance program performance was very effective as evidenced by high capacity factors and excellent individual system availability being maintained throughout the period. However, some weaknesses were noted. Control of maintenance activities on the off-gas recombiner was weak. Premature closeout of a previous work authorization package to repair a leaking boundary valve and maintenance work documents not containing adequate instructions relative to purging and monitoring for hydrogen were primary contributors to the hydrogen recombiner event. Additionally, early in the period, an unplanned ESF actuation occurred during the performance of a maintenance activity due to personnel error. Specifically, a Loss of Shutdown Cooling occurred during replacement of a pressure switch in the Residual Heat Removal (RHR) pressure permissive circuitry. The cause of the event was due to an I&C work planner not referencing proper electrical drawings when developing the instructions for pressure switch replacement. Notwithstanding these isolated deficiencies, the overall performance of maintenance was excellent.

During the assessment period, a Unit 2 refueling outage was completed and a Unit 1 refueling outage was in progress at the end of the period. Station maintenance and outage organizations performed well in scheduling, coordinating, and accomplishing work. Overall, plant and system performance following the Unit 2 outage was good. The licensee aggressively pursued and resolved two unusual problems during the Unit 2 refueling outage. Unidentified material was found in the reactor vessel and excessive leakage from a control rod drive occurred during mechanism changeout. Both problems were handled in a planned and systematic manner and successfully resolved.

Several maintenance program initiatives matured during the assessment period. The licensee continued tracking equipment availability and performance history to trend and assess maintenance effectiveness. Maintenance was prioritized according to probabilistic risk assessment and reliability. The maintenance organization interacted well with operations in the planning, scheduling, authorization and performance of maintenance activities. The licensee increased efforts in the use of predictive maintenance. A supervisor, assistant foreman, and several mechanics were assigned full time to this area. The predictive maintenance program was effective as demonstrated by the identification of combustible gas in the Unit 2 "C" phase main transformer oil and bearing problems with two Unit 1 turbine building fans prior to component failure. The licensee's initiative in the use of predictive maintenance was considered a strength.

The surveillance program was effective and well-managed as evidenced by no inadvertent automatic scrams and few errors. Scheduling and coordination were strengths of the program. Effective interaction with operations during performance of surveillance activities was a significant contributor to program success.

During the assessment period, there were no automatic scrams attributable to surveillance activities. Surveillance program performance was highly effective. However, some personnel errors and procedural deficiencies were identified. For example, an unplanned reactor water cleanup isolation occurred due to personnel communication error when a thermocouple calibrator was connected to the wrong test block. Procedural deficiencies affecting both units included: (1) failure to include 18 manual containment isolation valves associated with each unit in the monthly containment integrity surveillance inspection procedures; and, (2) failure to include a required 10 millisecond (msec) trip sensor response time in the applicable surveillance inspection procedures relative to Turbine Stop Valve (TSV) and Main Steam Isolation Valve (MSIV) response time verification. These licensee identified deficiencies were promptly corrected. Notwithstanding isolated deficiencies, the overall conduct of the surveillance program was excellent.

The in-service inspection (ISI) program was effectively implemented. Personnel responsible for performing nondestructive examinations in the plant were properly qualified. In-service test (IST) results were well organized, trended, and thoroughly reviewed; however, the licensee did not include check valves in the containment instrument gas (CIG) system in the IST program as required. The program for testing and surveillance of motor-operated valves (MOVs) was thorough, well managed, and on schedule.

Summary

In summary, the Susquehanna maintenance and surveillance programs continued to be a licensee strength. Some isolated minor weaknesses were noted in both programs involving personnel errors and procedural deficiencies. Management was effectively involved and strongly committed to the maintenance and surveillance programs. Overall, performance was outstanding.

Performance Rating: 1

Board Comment: None

III.D Emergency Preparedness

Analysis

During the last SALP period, this area improved to a Category 1 rating. Strengths included effective response to an Alert caused by a loss of shutdown cooling, development of Position Specific Procedures (PSPs), effective use of PSPs during the annual exercise, excellent Emergency Response Facility (ERF) readiness, ample and stable staffing, and effective training. Slow Media Operations Center (MOC) information dissemination was noted as a weakness.

During the current SALP period, one Unusual Event occurred. It involved a localized hydrogen ignition in the offgas hydrogen recombiner system and the consequent transport of a contaminated, injured individual off-site. Timely and effective licensee response was evident in prompt evaluation and declaration of the Unusual Event. MOC activation was notably prompt. Accurate and complete information was provided to the state, local officials, and the public.

During the October 16, 1991, annual emergency exercise, the licensee demonstrated excellent on-site analysis and response capability, provided timely classifications and notifications, appropriately prioritized tasks, exhibited a strong emphasis on personnel safety, established effective communications between ERFs, provided excellent and frequent media briefings, effectively tracked the progress of in-plant repair teams, developed Protective Action Recommendations (PARs), and effectively interfaced with the Commonwealth of Pennsylvania, and Luzerne and Columbia counties.

The February 19, 1992 annual emergency exercise was characterized by excellent on-site event analysis and response, timely notifications, and appropriately determined PARs. Overall, the licensee demonstrated effective performance. However, for much of the exercise, interim Emergency Operations Facility (EOF) management was in charge of the off-site response. Because of the consequent additional workload, the Interim Recovery Manager was overloaded. It was not until the corporate based Recovery Manager assumed his position (about three hours into the exercise) that sufficient staffing was available to effectively manage the activities in the EOF. The licensee has undertaken a study to determine the best long-term means of resolving this staffing issue. Subsequent to the end of this SALP period, the licensee developed an interim corrective action plan of training site managers as Recovery Managers. That plan was temporarily interrupted in order to pursue other possible interim and long-term corrective actions. However, training of TSC Emergency Directors on EOF related response activities was completed. The interim action plan will be implemented upon additional training and procedural revisions and is scheduled for completion in September, 1992.

NRC review noted that the October 1991 exercise scenario was challenging and provided a good environment for self-assessment. NRC review also noted that the February 1992 exercise scenario was carefully tailored by the licensee to challenge the Emergency Response Organization (ERO) in aspects not clearly demonstrated during previous exercises and program reviews, and that this self-challenging aspect was instrumental in revealing whether suspect areas were problems. Such critical self-examination by the licensee was considered a major strength.

Administration of the drill and exercise program was excellent. Six station drills were conducted in 1991 in addition to other, smaller scale drills required by the emergency plan. Rotation of players for drills and exercises was notable. Though ERO members were required to participate in drills and exercises at least once every four years to maintain certification, the licensee established a goal of ERO member participation once every two years. During this period, that goal was met by key ERO members.

Station and corporate management effectively maintained emergency response qualifications, reviewed and approved the emergency plan and procedure changes, participated in drills and exercises, and interfaced with state and local agencies.

EP training quality was excellent. All ERO positions had sufficient numbers (3 to 5) of trained and qualified personnel. Classroom training was conducted throughout the year and was well-defined. Lesson plans were properly controlled, accurate and well detailed. An initiative to change from classroom-based to performance-based training was in progress.

Performance during the emergency exercises demonstrated that emergency response facilities, equipment, and supplies were very well maintained. Emergency response procedures were generally well-maintained, but there were weaknesses in PSP provisions for turn-over of functions from the Technical Support Center (TSC) to the EOF. Administrative procedures were well-stated.

The licensee's 1991 audit was appropriate in scope and content, and combined the Technical Specification audit with the 10 CFR 50.54 (t) review. Off-site interface results were provided to state and county officials. Audit reports received wide management distribution. To provide better visibility and tracking of EP items, Nuclear Emergency Planning (NEP) was in the process of transitioning to the station commitment tracking system. NRC review concluded that this transition was a good initiative.

EP program administration was effective. The EP program was effectively administered by the Supervisor, Nuclear Emergency Planning. EP staffing was stable and had a good discipline mix. The licensee met regularly with state and local officials to assure coordination of emergency preparedness activities.

Summary

In summary, the licensee has implemented an effective EP program. Management was effectively involved. Response to actual events was appropriate and timely. The quality of the drill and exercise program, the audits and reviews, and the depth of the ERO were considered strengths. A need for more timely full staffing of the EOF was evident, as was a need for more specific provisions for turn-over of functions from the TSC to the EOF.

Performance Rating: 1

Board Comment: None

III.E Security and Safeguards

During the previous assessment period the licensee's performance was rated as Category 1. That rating was based on implementation of a highly effective and performance-oriented security program. Management attention and support were evident in all aspects of the program. Resources were allocated to ensure necessary program upgrades and staffing, an aggressive audit program, and an effective training program.

During this period, the licensee continued to sustain a superior level of performance. Upgrades and enhancements to security systems and equipment were continued and included the installation of state-of-the-art intrusion detection equipment on portions of the protected area perimeter and new security computer software to provide more rapid and varied data processing, diagnostics and programming ease. The upgrade of the perimeter intrusion detection system is an ongoing project and is scheduled to be completed during the next assessment period. The expenditure of resources for these capital improvements was indicative of management's continuing commitment to maintain an effective security program.

The security staff maintained effective communications with other station departments and met daily with maintenance to review security maintenance requirements and to discuss potential interface problems. The licensee continued effective implementation of the Fitness for Duty (FFD) Program. The station-supplied corrective and preventive maintenance support for security equipment was very aggressive and resulted in excellent on-line availability for security equipment, thus reducing the need for compensatory measures and attendant overtime. This support further reflected management's commitment to an effective program.

Security supervisors were well trained. These qualified security professionals closely monitored the program and ensured that it was carried out effectively and in compliance with NRC regulations, as evidenced by an excellent enforcement history. The supervisory staff was actively supported by a very knowledgeable and effective corporate staff in making program plan changes, self-assessment, upgrades, and enhancements. Corporate and station

security personnel continued to actively participate in groups engaged in nuclear plant security matters and also maintained excellent rapport and liaison with Commonwealth and local law enforcement agencies. Security force staffing was consistent with program needs as evidenced by the minimal use of overtime. The security officers demonstrated a very professional demeanor and a thorough and comprehensive knowledge of their duties, the station and its systems. This resulted in a very positive attitude toward the program by other station staff. The turnover rate in the security force remained very low. The continuing strong demonstration of these attributes reflected the licensee's resolve to implement an effective and high quality program.

The training and requalification program was well developed and administered by full time, highly qualified instructors. Lesson plans were kept current and accurately reflected the commitments in the licensee's program plans. Facilities were provided within the owner-controlled area for personnel training and firearms requalification. They were well-equipped, well-maintained, and made good use of instructional aids. The training program was very effective as evidenced by a minimum number of personnel errors. Excellent technical training continued, as well as training in non-security related areas such as supervisory skills and station systems. The training program contributed very positively to the overall success of the security program.

Audits of the security program conducted by the licensee's Quality Assurance Group were found to be comprehensive and thorough. Findings from audits and surveillances were directed toward improving the effectiveness of the program as opposed to being compliance-oriented. Corrective actions were prompt and thorough with aggressive follow-up to ensure implementation. The aggressive audit and surveillance program further enhanced the quality of the security program.

The licensee's event reporting procedures were clear, consistent with the NRC's reporting requirements, and well understood by the supervisory staff. There was one event requiring a prompt report during the period. It involved a computer failure. Corrective actions were prompt and appropriate. Loggable events were appropriately tracked and, where required, corrective action was initiated to preclude adverse trends.

The licensee submitted four security program plan changes during this period. The revisions were technically sound and demonstrated a thorough knowledge and understanding of NRC requirements and security objectives, not only by station staff but also by corporate staff who are responsible for this activity.

Summary

In summary, the licensee continued to maintain a very effective, high quality and performance-oriented program. Management attention and support were clearly evident in all aspects of the program implementation and resources were appropriately allocated to continue system and equipment upgrades. In addition, a well-trained, professional staff was retained and performance-based audits and self-assessments were conducted to monitor program implementation. These efforts reflected the licensee's commitment to a high quality and effective security program.

Performance Rating: 1

Board Comments: None

III.F Engineering/Technical Support

In the previous SALP report, Engineering and Technical Support was rated as Category 2. Sound technical resolution of safety significant issues, plant support, an aggressive self assessment program in the electrical distribution area, an effective modification process, and a highly qualified staff were noted as positive attributes. However, the SALP noted weaknesses in addressing causal factors and the implementation of timely corrective actions for recurring electrical bus trips due to poor design of electrical insulators, emergency diesel generator crankcase overpressurizations, and reactor water cleanup system pump seal failures. The timeliness of dispositioning of engineering discrepancies was also cited as a weakness. During the period, the engineering and technical support organizations were reorganized to address these weaknesses and to provide better support to the plant. At the end of the period, the licensee was making good progress in resolving outstanding engineering discrepancies.

During the current SALP period, the engineering organization underwent an additional organizational change. As a consequence of the Organizational Effectiveness Review (OER), the licensee re-aligned the classical engineering disciplines into Modifications, Technology, Fuels, and Systems Engineering to provide increased focus and a unified approach for engineering support. Systems Engineering now reports to the engineering manager instead of the plant superintendent. The Modifications and Nuclear Technology organizations were formed to recognize the diversity of roles that each performs. Modifications focuses on the development of design changes, while Nuclear Technology works to resolve long-term plant and system problems. The new organization was implemented in November 1991 and was viewed as a positive licensee initiative. However, because of long lead times of many engineering issues, the effectiveness of the new organization has yet to be fully demonstrated.

During this period, the licensee's efforts to provide timely closeout of plant deficiencies continued to be a high priority for the engineering organization. The licensee's deficiency management strategy effectively lowered the thresholds for operability and reportability reviews. As a result, licensee event reports were developed for two previously identified design weaknesses. The first involved reactor building ventilation system performance during an accident, and the second involved the capabilities of the 250v DC batteries to meet the four-hour rating. The licensee's evaluation and recent reporting of these, and other conditions that were reevaluated and determined to be outside the design basis, were excellent.

Corporate engineering support to the site has been very good. Nuclear Technology performed thorough and comprehensive evaluations of such issues as the potential pressure locking of residual heat removal (RHR) and core spray (CS) injection valves, electrical design deficiencies, and elevated drywell (DW) temperatures that resulted from a loss of drywell cooling. The final evaluations of these issues were found to be complete, comprehensive, and of excellent quality. One weakness was noted in the otherwise strong performance in this area. This involved an incomplete initial evaluation of a drywell (DW) temperature excursion following the loss of drywell cooling. The licensee's initial evaluation did not consider all the potential effects of elevated temperatures on system, structures, and components in the drywell. This appeared to be primarily due to a lack of effective guidance for the initiation of detailed engineering evaluations.

The Nuclear Engineering Department design change packages continue to be thorough and technically sound. The high quality of the modification packages is evident by the small number of changes made to the modification packages during installation. The design and installation kickoff meetings are useful efforts to enhance cooperation between the Nuclear Plant Engineering and the responsible station groups. The system engineers are involved in the design and installation kickoff meetings, and provide effective overview for the installation and closeout of plant modifications.

The motor-operated valve (MOV) program was thorough, well managed, and on schedule. Personnel responsible for the development and implementation of the motor-operated valve program were knowledgeable of the applicable technical and regulatory aspects of MOV reliability determination. Design basis reviews and motor-operated valve switch settings calculations were thorough and technically sound. A significant effort has been made in conjunction with industry groups regarding motor-operated valve diagnostic test equipment, and testing of grease for motor-operated valves under the NRC Generic Letter 89-10 MOV program.

The engineering organization has demonstrated an excellent safety perspective by continually reassessing the basis of the original design for adequacy. The licensee has been proactive in implementing their design basis reconstitution and has aggressively resolved discrepancies identified by the process. This design basis reconstitution initiative is a significant licensee strength.

Systems Engineering provided effective and visible support in resolving day-to-day engineering problems. The licensee increased the number of system engineers by combining the plant technical staff and the resident engineering staff. The resultant organization reduced the maximum number of systems assigned to an engineer from six to two. This allowed the system engineers to develop the necessary system expertise to effectively address day-to-day issues.

System Engineering resolution of certain recurring deficiencies has been occasionally ineffective or untimely. For example, spurious Electrical Protection Assembly (EPA) breaker tripping has been a problem since 1982, but little progress has been made in establishing a permanent solution. Past reliability problems included inadvertent tripping of EPA breakers due to large motor starts, poor breaker design, and high ambient temperature surrounding the EPA logic cards. Although the licensee has been historically slow to resolve this problem, management has initiated action to improve or replace the affected equipment.

In summary, the licensee has made excellent progress in reducing the number of outstanding engineering deficiencies. Actions in response to the OER provide increased efficiency and focus in the engineering organization. The new organization is effectively involved with the understanding and assessment of the design basis. Systems Engineering was strengthened significantly by the OER, and continues to resolve day-to-day problems in an effective manner. However, certain long-standing and recurrent problems, such as EPA breakers, continue to require management attention to assure an effective and timely resolution. The engineering organization has changed significantly during this assessment period. These changes have resulted in improved focus in many areas, while in other areas, the new organization remains untested.

Performance Rating: 1

Board Comment: None

III.G Safety Assessment/Quality Verification

During the previous assessment period, this area was rated Category 1. Licensee staff was of high caliber and capable of resolving complex technical issues. Licensee management emphasized thorough self-assessment and organizational effectiveness. The licensee's use of PRA in evaluating the relative risk of various engineering and operational deficiencies was a noteworthy strength. Weaknesses were noted in resolving certain safety significant concerns, especially postulated conditions outside the plants design basis. In addition, in the early part of the last SALP, the licensee allowed the backlog of open Significant Operating Occurrence Reports (SOORs), Non Conformance Reports (NCRs) and Engineering Discrepancy Reports (EDRs) to grow significantly. However, later in the period a backlog reduction program was

begun. Good progress was made throughout the period in reducing the backlog. The licensee instituted a policy that required the closeout of all backlog items by the end of each refueling outage.

During the current SALP period, licensee performance in this area continued to be strong. Corporate management continued to show a strong on-site presence and remained actively involved with decision-making. The integrated planning effort to ensure that all operational and outage activities were scheduled to minimize safety impact continued as a licensee strength. Operational and outage safety were top priority when planning and conducting operational evolutions, maintenance and surveillance activities. The plant scheduling group played an important role in ensuring that planned activities were conducted to result in a net safety benefit. The licensee's planning activities were conducted in a safety conscious manner.

The licensee continues to incorporate Probabilistic Risk Assessment (PRA) findings and insights when planning these various types of activities. Improvements made to the operating procedures and training, accident management strategies, and the prioritization of preventive and corrective maintenance activities are frequently the result of the individual plant evaluation (IPE) methodologies being applied to the respective programs. Furthermore, the licensee has continued to be an industry leader in assessing and planning for the risks nuclear facilities are subjected to while in shutdown conditions.

The licensee completed and fully implemented their Organizational Effectiveness Review (OER) during this assessment period. The goal of the OER was to solicit and implement grass roots level comments on how to make the organization more effective. The new organization increases the Nuclear Department's span of control, while reducing the layers of management between the workers and senior management. The OER dissolved certain historical alignments and shifted the organization to be more responsive to plant needs. The OER was viewed as a positive licensee initiative.

The licensee continued to use the nuclear safety assessment group (NSAG) effectively. During the assessment period, NSAG conducted thorough evaluations of plant operations, maintenance and outage safety, and remained involved with performing self-assessments of previous plant performance to ensure safety significant issues were being properly addressed. These NSAG activities have provided a significant contribution to the assurance of safety at Susquehanna.

The licensee's staff was generally well-prepared and technically correct when discussing emerging safety issues and open licensing actions with NRC staff. In general, the licensee is proactive and plans its licensing activity to ensure that delays in processing licensing actions are minimized, and that timely NRC reviews are facilitated. There have been isolated instances where responses to licensing submittal commitments and requests for additional information (RAIs) have been less than timely.

The licensee did not recognize the extent and significance of the operator performance weaknesses related to reactor level and pressure control identified during the first requalification program evaluation and in a previous reactor scram event. Therefore, they did not correct the weaknesses prior to the second requalification program evaluation. Following the second licensed operator requalification program evaluation, the licensee took prompt and comprehensive actions to address the operator performance and programmatic weaknesses. They performed a thorough root cause analysis. Their proposed corrective actions appropriately addressed the identified root causes.

The reduction of the backlog of identified deficiencies remained a licensee priority. The licensee made significant progress in reducing the overall number of deficiencies. When the licensee began their deficiency reduction in August 1990, there were 277 NCRs and 378 SOORs in the backlog. Of these, 23 NCRs and 13 SOORs remain as of April 1992. In addition, the licensee had identified the remaining deficiencies to be closed out in the Unit 1 Cycle 6 refueling outage. They have made excellent progress and their goal continues to be zero deficiencies at the end of the outage. The control and management of deficiencies is a significant licensee strength.

The Susquehanna Review Committee (SRC) and the Plant Operations Review Committee (PORC) continue to perform their respective off-site and on-site safety reviews responsibilities in an effective manner. The SRC utilizes outside contract and utility personnel that bring a diverse and unique safety perspective to the committee. The licensee also utilized Event Review Teams (ERTs) to perform in-depth reviews of safety-related events. The results of their reviews were broad, comprehensive, and demonstrated the licensee's strong commitment to formal root cause analysis techniques. These investigations were found to be extremely thorough at the plant and system level, but showed some weakness in two specific areas.

The first weakness involved component level root cause investigation, specifically for high temperature effects on electronic components. Accelerated aging was seen in capacitors used for the main steam line radiation monitors and for logic cards used for the reactor protection system (RPS) EPA breakers. The licensee's root cause analysis did not fully investigate these component level degradations. The second root cause investigation weakness involved the identification of past similar industry events for the January 18, 1992 hydrogen recombiner event. The event review team's (ERT) initial review did not consider past industry events as contributing to the root cause or identify other applicable similar events. However, this review did identify weakness in the industry experience review program (IERP). The IERP's primary focus was on the review process and did not ensure that long-lasting corrective actions were generated. The licensee is reevaluating their approach to these two identified weaknesses. Except for these two minor weaknesses, the licensee's safety review activities were found to be strong and comprehensive, with a balanced safety perspective evident.

Licensee event reports (LERs) and 10 CFR 50.72 Event Notifications (ENs) were well written with clear descriptions of the subject events. The root cause analyses presented in the LERs was adequate, and recommended corrective actions were technically correct. When in-depth engineering analysis and evaluation were required, the problem was referred to corporate engineering for solution. These solutions were generally very good.

The licensee has continued their efforts to determine the root cause of the past emergency diesel generator crankcase explosions at Susquehanna. The quality and detail of the reports produced on this issue were considered to be outstanding. In general, the documented information and the presentations given by the licensee were very informative and well prepared. Even though no single root cause for the crankcase explosions was identified, the licensee performed corrective actions which addressed all four major causal factors. Overall, the actions taken to assure the safe and reliable operation of the emergency diesel generators are considered a commendable effort on the part of the licensee.

The licensee was successful at resolving problems that arose on an individual occurrence basis once they were clearly recognized. However, there were some observations that indicated weakness relative to the licensee's ability to recognize potentially significant problems and effect timely corrective actions. Examples include: (1) operator skill weakness, observed early in the period in an operator requalification program review and, later, in actual performance involving two plant transients, was not effectively resolved until again observed during another operator requalification program review in January 1992; (2) operators' failure to recognize and fully evaluate an offgas high pressure alarm as a symptom of a probable hydrogen ignition, two days prior to the January 18,1992 event; (3) and failure to effectively correct a long-standing and recurring problem involving reactor protective system (RPS) electrical protective assembly (EPA) breaker tripping events. With these exceptions, the licensee has been effective in establishing and implementing good corrective measures to resolve problems.

In summary, licensee management demonstrated a conservative safety perspective with a high level of involvement with day-to-day activities and continues to emphasize thorough self-assessment and organizational effectiveness. The OER has lead to increased departmental effectiveness by emphasizing customer service. Outstanding deficiencies received an extraordinary amount of attention, and as a result, are at historically low levels. Safety review activities were conducted in an effective manner with few weaknesses noted. The licensee continued to emphasize safety and quality during the conduct of nuclear activities.

Performance Rating: 1

Board Comment: None

IV. SUPPORTING DATA AND SUMMARY

IV.A Licensee Activities

During the assessment period, both Susquehanna units operated safely and effectively. Plant availability and capacity factors reached record levels. Unit 1 experienced one unplanned shutdown, which was an automatic scram. Unit 2 experienced three unplanned shutdowns; an automatic scram, a manual scram and a manual shutdown. (See Section IV.D - Reactor Trips and Unplanned Shutdowns).

A refueling outage was completed on Unit 2 and a Unit 1 refueling outage was in progress at the end of the period. The Unit 2 fourth refueling outage took place from March 9, 1991 through May 9, 1991 for a total of 61 days. The Unit 1 sixth refueling outage began on March 9, 1992 and was in progress at the end of the assessment period. Major activities during both outages included core refueling, main generator rotor disassembly and inspection, emergency core cooling system (ECCS) valve work and testing, surveillance testing and inservice inspections.

IV.B NRC Inspection and Review Activities

During this assessment period, there were two full-time NRC resident inspectors assigned to the site. They performed on-going safety inspections throughout the SALP period.

Several periodic inspections were performed by regional inspectors in the areas of Maintenance, Emergency Preparedness, Security, Engineering, and Radiological Controls.

The NRC conducted one inspection during the period involving Motor Operated Valve Dynamic Performance (GL 89-10).

IV.C Reactor Scrams and Unplanned Shutdowns

	Date	Power Level	Root Cause	Functional Area
Event Description:				
			UNIT 1	
1.	07/31/91	100%	Component Failure	N/A

AUTOMATIC SCRAM due to a loss of one offsite power source with an existing half scram condition. The loss of power to Startup Transformer 10 (T-10) was due to a loss of the Montour Mountain Line. The resultant undervoltage and underfrequency tripped the "A" RPS Motor Generator Set. This sequence completed a full scram logic signal since a half scram signal had been previously inserted due to a failed power supply to the "B" Main Steam Line Radiation Monitor.

UNIT 2

1. 08/06/91 100% Component Failure N/A

AUTOMATIC SCRAM due to turbine stop valve closure. A fault in the electro-hydraulic control system caused the #1, #3, and #4 turbine stop valves to close.

2. 08/21/91 100% Component Failure N/A

MANUAL SHUTDOWN to replace a defective main transformer. The shutdown was based upon high combustible gases found during analysis of transformer cooling oil.

3. 03/18/92 100% Component Failure N/A

MANUAL SCRAM due to degraded plant conditions following 2C engineered safeguards system (ESS) bus lockout. Operators manually scrammed the unit in anticipation of Main Steam Isolation Valve Closure.

ATTACHMENT 1

SALP CRITERIA

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

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

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

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

3. Enforcement history;

4. Operational and construction events (including response to, analyses of, reporting of, and corrective actions for);

5. Staffing (including management);

6. Effectiveness of training and qualification program.

On the basis of the SALP Board assessment, each functional area evaluated is rated according to three performance categories. The definitions of these performance categories are given below:

Category 1: Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a superior level of performance. NRC will consider reduced levels of inspection effort.

Category 2: Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a good level of performance. NRC will consider maintaining normal levels of inspection effort.

Category 3: Licensee management attention and involvement in nuclear safety or safeguards activities resulted in an acceptable level of performance; however, because of the NRC's concern that a decrease in performance may approach or reach an unacceptable level, NRC will consider increased levels of inspection effort.

Category N: Insufficient information exists to support an assessment of licensee performance. These cases would include instances in which a rating could not be developed because of insufficient licensee activity or insufficient NRC inspection.

The SALP Board may assess a functional area to compare the licensee's performance during a portion of the assessment period to that during an entire period in order to determine a performance trend. Generally, performance in the latter part of a SALP period is compared to the performance of the entire period. Trends in performance from one period to the next may also be noted. The trend categories used by the SALP Board are as follows:

Improving: Licensee performance was determined to be improving

Declining: Licensee performance was determined to be declining and the licensee had not satisfactorily addressed this pattern.

A trend is assigned only when, in the opinion of the SALP Board, the trend is significant enough to be considered indicative of a likely change in the performance category in the near future. For example, a classification of "Category 2, Improving" indicates the clear potential for "Category 1" performance in the next SALP period.

It should be noted that Category 3 performance, the lowest category, represents acceptable, although minimally adequate, safety performance. If at any time the NRC concluded that a licensee was not achieving an adequate level of safety performance, it would then be incumbent upon NRC to take prompt appropriate action in the interest of public health and safety. Such matters would be dealt with independently from, and on a more urgent schedule than, the SALP process.