U. S. NUCLEAR REGULATORY COMMISSION

REGION I

INITIAL REPORT

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

PENNSYLVANIA POWER & LIGHT COMPANY

SUSQUEHANNA STEAM ELECTRIC STATION

50-387/88-99
50-388/88-99

ASSESSMENT PERIOD: February 1, 1988 - July 31, 1989

TABLE OF CONTENTS

I. INTRODUCTION

I.A. Purpose and Overview

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

The NRC SALP Board, composed of the staff members listed below, met on September 26, 1989 to review the collection of performance observations and data, and to assess licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided as Attachment 1 to this report.

This report is the SALP Board's assessment of the licensee's safety performance at the Susquehanna Steam Electric Station for the period from February 1, 1988 through July 31, 1989. It is noted that the assessment covers an 18-month period.

I.B. SALP Board Members

The SALP Board was comprised of the following:

Chairman

W. F. Kane, Director, Division of Reactor Projects (DRP)

Members

B. Boger, Acting Director, Division of Reactor Safety (DRS)
W. Butler, Director, Project Directorate I-2, Office of Nuclear Reactor Regulation (NRR)
J. Linville, Chief, Projects Branch No. 2, DRP
J. Joyner, Division Project Manager, Division of Radiation Safety and Safeguards (DRSS)
P. Swetland, Chief, Reactor Projects Section 2A, DRP
G. Barber, Senior Resident Inspector
M. Thadani, Project Manager, NRR

Others

R. Blough, Chief, Reactor Projects Section 3A, DRP
W. Pasciak, Chief, Facilities Radiation Protection Section, DRSS
C. Conklin, Senior Emergency Preparedness Specialist, DRSS
G. Smith, Safeguards Specialist, DRSS
J. Stair, Resident Inspector
F. Young, Senior Resident Inspector, TMI
W. Hodges, Director, Division of Reactor Safety (DRS)
J. Durr, Chief, Engineering Branch, DRS

II. SUMMARY OF RESULTS

II.A. Overall Summary

The licensee's predominant strength was an emphasis on a strong safety culture. Internal and external communications were noteworthy strengths. Performance in individual functional areas varied somewhat but generally remained very strong. Performance in Engineering Support improved, while, performance in Emergency Preparedness declined. An improving trend was noted in Radiological Controls and a declining trend was noted in Safety Assessment/Quality Verification. Continued strong performance was observed in the Security/Safeguards area.

Both units had excellent operating records. This performance was largely attributable to a great deal of retained operator experience.

The radiological controls performance was improved. Weaknesses from the last SALP were addressed. Continued management attention is necessary to resolve problems in control of contaminated material and to improve contractor training.

The new maintenance organization effectively controlled work during outages. The use of thermography, vibration monitoring and other predictive maintenance technologies was a noteworthy strength. Reduction of unwanted system actuations during surveillances is needed to strengthen surveillance programs.

Emergency Preparedness performance declined during the period. The lack of full development and implementation of the Emergency Plan (EP) Position Specific Procedures (PSPs) and slow protective action recommendation during the annual exercise contributed to the performance decline. Timely implementation of the PSPs is needed to strengthen EP performance.

A declining trend also was noted in Safety Assessment/Quality Verification. Formalization of the employee safety concern program, reduction in the number of outstanding fire watches and resolution of training issues are needed to strengthen an otherwise strong overall performance in this area.

Probablistic Risk Assessment (PRA) and Plant Reliability studies were viewed as engineering strengths. A sixth diesel generator was added to improve PRA results. High quality design change packages along with thorough resolution of engineering issues contributed to a performance improvement in this area.

II.B. Facility Performance Analysis Summary

Functional Area	Category Last Period 8/1/86-1/31/88	Category This Period 2/1/88-7/31/89	Trend
1. Plant Operations	1	1	---
2. Radiological Controls	2	2	Improving
*3. Maintenance/ Surveillance	1/1	1	---
4. Emergency Preparedness	1	2	---
5. Security and Safeguards	1	1	---
*6. Refueling and Outage Management	1	---	
*7. Safety Assessment/ Quality Verification	1	1	Declining
*8. Licensing Activities	1	---	
9. Engineering Support	2	1	---
*10. Training and Qualification	1	---	

* Maintenance and Surveillance were previously rated as separate functional areas. Refueling and Outage Management has been deleted. That function is now discussed in the Maintenance functional area. Safety Assessment/ Quality Verification is a new functional area that includes Assurance of Quality and Licensing Activities. Training and Qualification Effectiveness is no longer a separate functional area; however, those aspects of performance are evaluated in each of the functional areas.

II.C. Reactor Trips and Unplanned Shutdowns

UNIT 1

Date	Power Level	Root Cause	Functional Area

Event Description:

1.	03/04/88	100%	Design Deficiency	Engineering/ Technical Support

An operator bumped against the unprotected span protection auxiliary relay in the 230 KV switchyard, causing a generator load reject and a subsequent AUTOMATIC REACTOR TRIP.

2.	06/01/88	98%	Component Failure	NA

A ground fault which occurred on a 500 KV transmission line caused a turbine trip and an AUTOMATIC REACTOR TRIP.

3.	01/04/89	100%	Personnel Error	Operations

An operator erroneously closed an instrument air valve to the cooling tower basin level instrumentation which resulted in a turbine trip and an AUTOMATIC REACTOR TRIP. This error resulted from inadequate control/turnover of system status for the instrument air system lineup during maintenance to the Unit 1 instrument air system.

4.	01/12/89	22%	Personnel Error	Operations

An operator error in transferring from manual to automatic feedwater control created a feedwater transient which induced a cold water reactivity addition and caused reactor power to increase above the 24 percent RPS trip bypass for turbine control valve fast closure. This resulted in an AUTOMATIC REACTOR TRIP. Ineffective skills training and procedures for this evolution contributed to the operator error.

5.	02/03/89	100%	Design Deficiency	Engineering/ Technical Support

MANUAL SHUTDOWN due to an inability to test the operability of suppression chamber to drywell vacuum breakers. The failure of several non safety-related test solenoid valves due to adverse environmental conditions resulted in their replacement on all drywell vacuum breakers.

Reactor Trips and Unplanned Shutdowns (Cont.)

	Date	Power Level	Root Cause	Functional Area
Event Description:				
6.	02/07/89	10%	Component Failure	NA

The unit was MANUALLY TRIPPED when both reactor recirculation pumps tripped due to an electrical fault caused by arcing in the "A" condensate pump motor.

7.	03/29/89	97%	Component Failure	NA

MANUAL SHUTDOWN due to a leaking expansion joint in the circulating water system. The refueling outage scheduled for April 1, 1989 commenced early.

UNIT 2

	Date	Power Level	Root Cause	Functional Area
Event Description:				
1.	02/27/89	100%	Component Failure	NA

MANUAL SHUTDOWN due to a failure of a containment isolation valve to isolate when the "B" RPS bus deenergized due to a power supply failure. A bad solenoid for the Reactor Building Chilled Water Valve (HV28792B2) was replaced.

III. PERFORMANCE ANALYSIS

III.A. Plant Operations (2338 hours, 54%)

III.A.1. Analysis

Plant Operations performance was assessed as Category 1 during the previous SALP period. Plant Operations was characterized by strong management involvement and an aggressive approach toward resolution of plant problems. Operators' conservative approach to nuclear safety was a strength. Weaknesses were identified in the areas of valve misalignment problems, post maintenance/ modification testing controls, and corrective action programs.

During this period the licensee continued to emphasize high quality operations. Direct involvement by middle management and upper management was frequently observed. Corporate management visited the site frequently. The Senior Vice President visited the plant on a weekly basis, met with plant staff, toured the plant and talked to operators and workers in the field. The presence of various section heads was noted during backshifts.

The operations department is fully staffed with well trained and qualified individuals. There were six rotating shifts for both units. A majority of operators on shift had more than ten years experience and provided a large retained knowledge base for dealing with plant evolutions and problems. Each shift operated the plant in a safe and efficient manner. The licensee did not tolerate noise or other distractions in the control room. Career apparel was provided for each operator, which encouraged a professional control room atmosphere. Each operator and worker on the site exhibited pride and professionalism in doing the job right the first time. Significant management involvement ensured that activities were consistently performed properly and professionally.

There were four automatic scrams on Unit 1 and no automatic scrams on Unit 2 during the SALP period (see Table II.C). Two of the four Unit 1 scrams were attributed to operator error. The first was due to valving out instrument air to the cooling tower basin level instrumentation which tripped the running circulating water pumps, causing a main turbine trip and reactor scram from full power. The cause of this scram was attributed to a lack of system status control and turnover. Lack of knowledge of this system and inadequate written turnover of system status contributed to this event. The second automatic scram occurred during recovery from the first at approximately 22 percent power. A control room operator opened both main feedwater discharge valves simultaneously which caused a power spike and the resultant plant trip. Inadequate skills training and excessive procedural latitude for this evolution contributed to this operator error. These operator errors were considered to be isolated cases.

Immediate operator response following three of the scrams was excellent. In each of these cases, the emergency operating procedures were used to effectively stabilize the plant in hot shutdown. For the fourth scram, untimely completion of required actions caused localized overcooling of the vessel.

During the recovery from a January 1989 scram, an overcooling event occurred. The cooldown was localized to the bottom head and was caused by elevated control rod drive (CRD) flow after the scram. Operators focused on restoration of the recirculation pumps prior to reducing CRD flow. The resultant cooldown was excessive. Of particular significance was the licensee's failure to recognize and evaluate this condition until reaching 27 percent power during the subsequent startup. Prompt operator action to limit CRD flow could have controlled the cooldown rate. Additional management attention is needed to ensure that emergency procedure steps are completed promptly and that anomalous conditions are effectively investigated and dispositioned prior to startup.

There was another significant operational event which indicated an isolated weakness with procedural compliance. The licensee inadvertently backflushed the common and Unit 2 filter/demineralizers (F/Ds) while shutting down the Unit 2 fuel pool cooling system in March 1988. Resin fines and crud were flushed into a letdown line from the F/D's to the Condensate Storage Tank (CST). The event occurred because the fuel pool cooling system shutdown procedure was not followed. Also, a post event flush of the letdown line had to be aborted because the fuel pool cooling pumps tripped on low suction pressure due to an improper valve lineup. The licensee's response to this event from a radiological perspective was consistently good (see section IV.B.). Prompt licensee action limited radiation exposure even though general area radiation levels increased by a factor of ten or more. The licensee manned the Technical Support Center (TSC) for the duration of the event and effectively directed the response of field personnel investigating the event. Nuclear Plant Engineering developed and successfully implemented a four part flush plan to recover the resin, and licensee control of corrective actions was effective. Interdepartmental teamwork and control of corrective actions was excellent.

The licensee had an effective method for dealing with plant problems and other operating occurrences. Significant Operating Occurrence Reports (SOORs) documented the licensee's screening and review of unexpected events, plant problems and equipment failures. These reports were very effective in ensuring that the licensee identified and corrected deficient operational conditions.

Housekeeping of the plant was excellent. The licensee expended significant resources to maintain a clean and well kept plant. Operators, workers and contractors alike cleaned up after themselves and took pride in plant cleanliness. On every shift, two or three people cleaned the plant on a full time basis. In addition, the licensee implemented a vigorous painting program to upgrade the appearance of the plant. Colors used were human factors engineered to brighten the plant, and to make a visual statement to personnel entering the radiologically controlled area. Housekeeping was a noteworthy strength.

The licensee's training program was very good. Operator training ensured that operators were being taught the right information and were retrained as necessary to operate the plant safely and efficiently. The licensee took great pride in their training program. All ten of the licensee's training programs were reaccredited by INPO in April and May 1989. Training was administered with approved lesson plans which were accurate and complete. Changes to the plant were promptly reflected in the lesson plans. The training staff was found to be very knowledgeable and was current on plant systems, modifications and changes. Training personnel frequently rotated to operating shift duty for 18-month periods to improve their understanding of plant systems, procedures, and administrative controls. This rotation has been very effective. The licensee's high quality performance was illustrated by the high percentage of operator candidates receiving licenses.

The Licensed Operator Requalification Program was rated satisfactory following an NRC administered requalification examination in which only one of sixteen candidates failed the simulator portion of the examination. There was complete agreement between NRC and licensee staff grading and the failure was effectively remediated. No program weaknesses were identified and a notable strength was the ability of the facility instructors to identify crew and individual strengths and weaknesses during post scenario critiques. These results were reflective of a high quality requalification training program.

Simulator training was generally good except for some problems with simulator fidelity. The simulator which has been in service since 1979 was only able to model certain relatively straight forward scenarios which limited the ability of operators to exercise the Emergency Operating Procedures for more complex scenarios. The licensee acknowledged this weakness in the last SALP management meeting and is in the process of procuring a new state-of-the-art simulator.

In summary, the licensee has demonstrated continued good performance in the area of plant operations. Aggressive management at both the corporate office and the site continue to strive to operate the plant in a safe and efficient manner. The organization remains flexible and responsive to industry and NRC initiatives. Good training and staffing are in place. This is reflected by the fact that there have been very few operator-related events. When plant problems did occur, however, and the licensee dealt with them in a prompt and effective manner. Overall, plant operations was a significant licensee strength.

III.A.2. Performance Rating: Category 1

III.A.3. Board Recommendations:

Continue actions to procure a state-of-the-art simulator on a timely basis.

III.B. Radiological Controls (574 hours, 14%)

III.B.1. Analysis

Performance in this functional area was rated Category 2 for the last assessment period. NRC review during that period found that the Radiation Protection Program was well defined, the overall ALARA Program was strong, and the Environmental Monitoring and Radwaste Programs were effective. However, NRC review also identified a decline in the quality of supervisory and management oversight of the Radiation Protection Program. Weaknesses were also identified in the quality assurance/quality control (QA/QC) of the Effluent Monitoring and Control Program. These observations prompted a management meeting between the licensee and NRC during the last assessment period.

Radiation Protection

NRC inspections during the assessment period reviewed the licensee's radiological controls for feedwater sparger repairs at Unit 2 and the radiological controls for the Unit 1 outage. The inspections focused on reviewing the adequacy and effectiveness of the licensee's corrective actions for the previously identified NRC concerns.

NRC review found that the licensee established an Action Plan to address the concerns identified during the last period and that the corrective actions outlined in the plan were pursued to completion. This is evidence that the licensee was very responsive to NRC identified concerns. Management involvement and support in resolving the previously identified problems was apparent.

During the assessment period, the health physics (HP) staff responded to a significant event. High radiation levels were generated when a spent fuel cooling filter/demineralizer (F/D) was improperly backflushed (see section III A). An operator error while performing the backflush resulted in resin media discharge back down the letdown line. Prompt response by licensee HP technicians to post the area and to control access effectively limited personnel exposures. Good cooperation was noted between HP and operations.

The quality of audits of the radiation protection program was enhanced during the assessment period. The enhancements included performance of in-depth self-audits of the radiation protection program by the corporate radiation protection group, the use of experienced contractors to evaluate the radiation protection program, and the performance of backshift reviews of radiation protection program implementation.

In addition, the corporate radiation safety committee monitored the quality of audits and requested that the QA group audit special areas. The audits were performance-based and reflected good management involvement with the radiation protection program.

A well-defined radiation protection organization is in place. Previously, loss of key personnel and frequent rotation of supervisors in the organization in the last assessment period had caused a decline in the quality of oversight and a lack of consistency in program implementation. Review during this assessment period found that the licensee hired qualified personnel to fill key vacant positions. The onsite radiation protection group was also reorganized to improve inter- and intra-departmental communications. NRC concluded that a good level of oversight by supervisors and managers existed during the period. Staff morale was also good.

Weaknesses in the contractor radiation protection training and qualification program identified in the last assessment period were addressed in this period. The licensee's overall training program for radiation protection personnel and radiation workers was found to be generally sound. Further improvements in contractor training may be necessary based on a potential overexposure event subsequent to the period. Records were generally complete and up to date.

NRC observations in the last period identified problems with program maintenance (e.g. expiration of important procedures), lack of program upgrades to keep up with NRC and industry initiatives, and isolated problems with program implementation. Problems in these areas were attributed to the organization and staffing problems discussed earlier and weaknesses in program oversight. During this assessment period, NRC concluded that the problems were being corrected and that the licensee was monitoring the effectiveness of corrective actions. The external and internal exposure controls programs were of good quality.

The licensee also experienced problems in the last assessment period with the control of contaminated material. Improperly surveyed material, with residual contamination, was released from the radiological controlled area (RCA). The licensee expended significant resources during this assessment period to address the problems. For example, a high sensitivity dry waste monitor was purchased and placed in operation and new high sensitivity personnel portal and tool monitors were placed at the RCA exit points. The licensee also prohibited egress from the RCA except from the designated exit points and notified station personnel of material survey requirements. Despite these actions, the licensee experienced another problem during this period. Contaminated tools were released from the RCA. Continued management attention to this area is needed.

NRC review identified a generally high level of ALARA planning for scheduled work activities and management support for the ALARA program. Exposure goals were generated for individual departments and jobs. The goals were generally good except they did not differentiate the work to be performed outside radiation areas. Although the goals were slightly inaccurate, the program was acceptably well implemented. Station aggregate exposures compare favorably to similar facilities. Examples of good ALARA practices included performing a controlled shutdown for the Unit 1 outage in order to minimize crud bursts and

maximize clean-up system effectiveness. Also, Stellite bearing materials (e.g. control rod blades) are being changed-out in an accelerated manner in order to minimize long term Co-60 plateout in primary systems. Overall, an effective ALARA program was implemented.

Effluent Monitoring and Control

The licensee has in place an effective program for the control of radioactive liquid and gaseous effluents. The management organization in this area is clearly defined with key positions identified and responsibilities delineated. The licensee's QA audits were thorough and had excellent technical depth to identify programmatic problems in this area. The licensee demonstrated generally sound approaches to resolution of technical issues identified by the NRC as evidenced by the corrective action to resolve problems with the cooling tower blowdown discharge flow monitor. These actions included replacing the flow element, but also determining flow versus valve position so that the flow reading could be checked against the valve position to ensure an accurate measure of flow.

Late in the assessment period an independent measurements inspection was performed using the NRC Region I Mobile Laboratory. The licensee's measurement results generally agreed with the NRC results. In addition, the licensee responded to weaknesses related to laboratory QA/QC identified during the previous assessment period. The licensee's corrective actions were found to be acceptable.

Water Chemistry Controls

A non-radiological chemistry inspection was performed late in the assessment period. Licensee performance on the NRC standards was good. The licensee was responsive to NRC identified weaknesses noted during the previous assessment period. The responses were sound and generally thorough.

Environmental Monitoring

NRC review during this period found that the licensee effectively evaluated the performance of the Radiological Environmental Monitoring Program. Quality assurance audits, surveillances, and quality control programs continue to be utilized in an effective manner to strengthen this program. Data from the Environmental Protection Agency (EPA) Cross-Check program continued to show good agreement between the licensee's laboratory results and the EPA known values for environmental samples. The meteorological monitoring instrumentation calibration program is effective.

Transportation and Solid Radwaste

During the last quarter of the assessment period, an inspection of the licensee's transportation and solid radwaste program was conducted. The licensee has notable strengths in the areas of QA/QC, housekeeping, and volume reduction. QA/QC audits, surveillances and reviews are performed, and the results are utilized extensively

by the Operations, and Health Physics and Chemistry staffs to ensure proper waste form and transport documentation. Housekeeping, especially in the Dry Active Waste sorting, packaging, and shredding areas, was excelient. The volume of waste generated, especially spent filter and demineralizer media, has been reduced significantly from past SALP cycles indicating good licensee performance in this area.

Summary

Management involvement and control in assuring quality was apparent. The licensee aggressively pursued the resolution of technical issues. There was active management involvement and support in resolving previously identified problems. The enforcement history in this functional area has been acceptable. Except for problems with the inadvertent release of contaminated objects from the RCA, no significant operational events attributable to poor HP performance occurred this period. Staffing in all radiological controls areas was good. The licensee's overall training program for permanent and contractor radiation protection personnel was generally sound and was considered to be improved over the training programs in place during the previous SALP.

III.B.2 Performance Rating: Category 2, Improving

III.B.3 Board Recommendations: None

III.C. Maintenance/Surveillance (513 hours, 12%)

III.C.1. Analysis

The previous SALP rated licensee performance in the separate Maintenance and Surveillance functional areas as Category 1. Those separate areas are now one combined area. During the last SALP period, the preventive and corrective maintenance programs were successfully implemented on site. The maintenance organization was well staffed with skilled and well qualified individuals. Previously, a minor weakness was noted in the area of maintenance work controls. The surveillance program was effectively implemented during the last SALP period.

Maintenance

Management involvement in maintenance was visible during the period. Foremen and their assistants were observed supervising, tracking, prioritizing and resolving problems. Frequent first line supervisor interaction with operations resolved many maintenance issues on a timely basis. There were no automatic scrams attributable to maintenance activities.

The maintenance program was successful in identifying necessary preventive maintenance. Safety related components received more preventive maintenance than their balance of plant (BOP) counterparts. The maintenance department was well staffed with capable and knowledgeable personnel. Maintenance activities were frequently observed and found to be properly conducted in accordance with maintenance procedures.

During this period, the licensee experienced a number of Reactor Water Cleanup system (RWCU) isolations and leaking RWCU pump seals. A number of the RWCU isolations were caused when a later model of temperature module was installed to replace an earlier module. The new model was extremely sensitive to temperature spikes. The licensee reinstalled earlier version modules to reduce the frequency of inadvertent RWCU isolations. RWCU pump seal leaks were also particularly troublesome. The licensee is working with the vendor and other industry groups to correct the problem. The licensee's program to correct RWCU pump seals is aggressive and designed to implement more complex solutions as the problem evolves.

The licensee is continuing to improve the use of new technologies for their predictive maintenance program. In the past, thermography was used to identify a high resistance contact on a reactor protection system (RPS) power supply breaker and a deteriorating coupling on a reactor feed pump turbine. The thermography program is being expanded. The licensee has also expanded its vibration monitoring to include more balance of plant pumps. The overall use of trending programs is being improved to predict long term failures. Predictive maintenance has been effective in correcting some deficient conditions before failure. The predictive maintenance program is a major positive licensee initiative.

Maintenance personnel, including I&C technicians, were properly trained and qualified. They are well versed in the administrative and maintenance procedures, as well as the technical requirements. The training program, however, did not provide the means of coordinating and tracking an individual's progress through the training program. Maintenance management is working to correct this deficiency (see section III.G.).

During the Unit 2 refueling outage in April 1988, an event resulted from poor control of refueling activities. The event was caused when operations began a draindown of the refueling cavity without coordinating the evolution with the refueling supervisor. As cavity level was lowered, the steam separator assembly was to be lowered into the vessel to keep it covered with water. A required alignment check was missed during the lowering evolution and the separator impacted the feedwater spargers. The controlling procedures did not contain hold points to warn the crane operators to check for proper alignment as the separator assembly was lowered, and the refueling supervisor could not adequately control activities on the refueling floor since he was not aware of the draining evolution. Licensee control of this activity was weak, but it was considered to be an isolated occurrence.

The maintenance organization was restructured for the Unit 1 Refueling Outage in May 1989. The revised organization was developed to parallel the actual performance of work in the plant. The majority of work performed during the outage was performed based on existing programmatic requirements, such as, inservice inspection (ISI) or snubbers, or corrective maintenance needs, such as, damaged or degraded pumps and valves. Additionally, some activities were part of the routine for refueling, such as, vessel disassembly. The new organization recognized these needs by dividing the conventional mechanical and electrical groups into maintenance teams. The mechanical group was deployed into the nuclear steam supply (NSS), BOP, valve and testing teams. The electrical group remained intact with some members going to the aforementioned teams. Services, a new team, corrected doors, seals, and lighting deficiencies. The licensee was able to better coordinate outage activities with its new organization.

Surveillance

The surveillance program was strong. A computer-based system was used to schedule the necessary surveillances. Generally, the scheduling and completion of the surveillance program was very effective. In one case, a surveillance test was missed due to a procedure error. A surveillance time limit expired that required checking vessel level instrumentation when performing refueling activities. In light of the many surveillances performed on time, this missed surveillance should be considered an isolated case. Effective management involvement assured good implementation of the surveillance program.

No automatic scrams could be attributed to surveillance activities. However, there were some personnel errors while performing surveillances. Personnel did not pay sufficient attention to detail and their errors caused Engineered Safety Feature (ESF) actuations during outages. The licensee is addressing these problems with respect to human factors, plant modification, and procedures. Surveillance implementation was generally good.

In December 1988, the licensee identified that the Reactor Core Isolation Cooling (RCIC) system started due to a personnel error while performing a surveillance. An Instrument and Control (I&C) technician improperly valved out a differential pressure (DP) detector which caused three level switches to actuate, any two of which would result in automatic initiation of RCIC. The control room was not aware of the RCIC start since no new alarms annunciated because of the error. Operators finally became aware of the RCIC start while investigating the cause of a RCIC room area radiation monitor (ARM) alarm. It took them 23 minutes to discover the event. Licensee investigation of the event faulted the I&C technician for failing to notify the control room of the surveillance error. However, operator recognition of the RCIC pump start was untimely. Additional management attention is needed to ensure that the cause for control room alarms and changes in system status due to surveillance activities are adequately investigated. Additionally, further emphasis is needed to ensure thorough investigation and analysis when root causes could be attributed to more than one department.

Summary

Overall, the maintenance program was properly established, implemented, and staffed. Surveillance and Maintenance of safety-related components and systems were rigorous as evidenced by no automatic scrams from maintenance and surveillance activities. Management controls were generally effective in controlling maintenance activities. Organizational changes have improved management oversight of maintenance activities and improved the coordination of work activities during refueling outages. The surveillance program was also effectively implemented. Continued licensee efforts are needed to prevent unwanted ESF actuations. For the most part, surveillances are conducted on time and without error.

III.C.2. Performance Rating: Category 1

III.C.3. Board Recommendations: None

III.D. Emergency Preparedness (256 hours, 6%)

III.D.1. Analysis

During the previous assessment period the licensee's performance was rated Category 1 based upon the excellent performance of the emergency response organization (ERO) during the annual full-participation exercise, the work done to improve emergency response facilities (ERF) following an NRC appraisal, and the good relationship with offsite support groups. During the exercise, the licensee's execution and participation demonstrated thorough planning and a strong commitment to emergency preparedness (EP).

During this assessment period, a partial-participation exercise was conducted in February 1988, a full participation exercise, which included NRC Region I response, was conducted in February 1989, and a comprehensive safety inspection of routine program activities was performed in July 1989. In addition, changes to the Emergency Plan and implementing procedures were reviewed.

Good initiatives were noted during the exercises. Changes in plant conditions were promptly observed by shift personnel and were used to upgrade and properly classify emergency conditions. Positive interactions were demonstrated among response personnel and effective coordination with the NRC incident response team was observed. In response to NRC initiatives, the control room simulator was used for the 1989 exercise. This was a significant improvement over previous exercises in testing shift personnel emergency response to continuing challenges in a realistic atmosphere. Notifications to offsite agencies were timely and communications between onsite response facilities were also improved. At the end of the exercise, the licensee's critique was weak because it did not identify some weaknesses found by the NRC team as discussed below.

Although performance during both of the exercises was generally good, significant weaknesses were identified. In the 1989 exercise, the NRC team found the licensee's methodology for formulating protective action recommendations (PARs) to be inconsistent with NRC guidance and accepted industry practice. The procedure directs the use of dose assessment results as the primary consideration for PARs, but does not provide guidance for PARs based on plant conditions. This was not identified as a weakness in previous exercises because scenarios did not establish conditions requiring PARs based on degrading plant conditions. During this exercise while degraded plant conditions existed, the licensee considered that actual field measurements were needed prior to recommending protective measures to the Commonwealth of Pennsylvania and this resulted in an unnecessary delay of the PAR at the General Emergency classification. In response to NRC concerns, a revision to the PAR procedure was prepared which includes immediate consideration for an evacuation PAR based upon plant system status.

Another weakness observed during the exercise was the failure to refer to and consistently use the approved implementing procedures when performing emergency response functions. As a result, some specific response actions were not completed in some areas; however, the overall response was adequate despite the omission of certain discrete actions. This resulted from an initiative on the part of the licensee to change EP philosophy and upgrade procedures. The licensee indicated that a change in EP implementing philosophy related to structure and organization of EP procedures had been initiated and was covered in ERO training, but the procedures had not yet been revised to reflect these changes. The licensee is in the process of developing position specific implementing procedures to address this concern.

Licensee audits were effective in scope and a thorough understanding of EP program areas was exhibited by audit team members. Corrective actions on findings and recommendations identified during audits and self-assessments were generally prompt. However, a licensee review of the adequacy of the interface with offsite authorities was not performed in accordance with 10 CFR 50.54(t). Although no concerns were identified with performance in drills and exercises, recurrent minor programmatic findings were identified in licensee audits, an indication that response to self-identified initiatives was not effective in all cases.

Training of site personnel and offsite support groups in emergency response is effectively maintained. A critical area not specifically covered in 1988 as required by 10 CFR 50, Appendix E either in training or during meetings with state and local authorities was a discussion and review of emergency action levels.

Following the 1989 exercise, the licensee requested a management meeting with NRC to provide information on its commitment to an effective emergency preparedness program and to address NRC identified concerns. Various self-initiatives,

including a substantial effort to train and interact with state and local authorities were described. Emphasis was placed on instituting the position specific procedures to help individuals perform their response functions. The NRC staff emphasized the need for timely PARs at the General Emergency classification for the protection of public health and safety. NRC evaluation of the meeting indicated that the licensee was making progress in critical program areas and correction of weaknesses.

Plant management was routinely involved in programmatic site activities and provided effective leadership to the site EP staff. Corporate management attention to site activities also was generally supportive for program administration and response activities. Management attention to NRC identified concerns raised during the ERF appraisal, however, was not timely as evidenced by delays in completing installation of new meteorological sensors and approval of Technical Support Center emergency lighting.

The ERO is well staffed with at least three individuals qualified at each level within the organization, including Recovery Managers from the corporate office. Just prior to the assessment period, a new Supervisor of Nuclear Emergency Planning was appointed. This individual spent the early part of the period becoming familiar with both routine and complex EP activities. He has been observed to be more effective in directing the program in the latter portion of the assessment period. Additional EP staff are available to implement essential program areas, such as maintaining the Emergency Plan and implementing procedures, conduct of drills and exercises, maintaining response facilities and equipment, and coordination with offsite support organizations. Site management also places a strong emphasis on promoting good relations with the local community.

In summary, the licensee maintains an emergency response organization capable of implementing adequate protective measures in the event of an emergency as evidenced by good exercise performance. However, weaknesses were identified during the 1989 exercise, particularly with regard to formulation of protective action recommendations, failure to carefully use implementing procedures, and incomplete update of procedures corresponding to changes in philosophy. Site and corporate management involvement is evident in onsite and offsite program activities, but resolution of deficiencies identified by NRC and in independent audits have not always been timely. The effort to ensure a good working relationship with Pennsylvania and local county governments is considered a strength. Although weaknesses remain in existing implementing procedures and the licensee has shown improved responsiveness to NRC concerns and progress in these and other program areas was made toward the end of the period.

III.D.2. Performance Rating: Category 2

III.D.3. Board Recommendations:

The licensee should expeditiously review, approve and implement the new position specific procedures for Emergency Plan implementation.

III.E. Security and Safeguards (190 hours, 1%)

III.E.1. Analysis

During the previous assessment period the licensee's performance was rated as Category 1, as it has been for all the previous periods in this functional area based on a very effectively implemented security program.

During this assessment period there was one routine physical security inspection performed by region-based inspectors and the NRC resident inspectors reviewed the security program throughout the assessment period. Additionally, an NRC Regulatory Effectiveness Review was performed late in the period. During the current assessment period, two violations were cited that resulted from original plant design deficiencies identified during a previous assessment period. No violations were identified during this assessment period.

The licensee has continued to implement a highly effective program during this assessment period. This sustained high quality performance is attributed to strong management involvement and support, as evidenced by: (1) a well-planned and integrated security program, utilizing well-trained personnel; (2) an effective and well-supported testing and maintenance program for security equipment as evidenced by low turn-around time for maintenance, excellent on-line experience with equipment and the absence of equipment-related events requiring reports to the NRC; and (3) aggressive site and corporate security organizations, staffed with security professionals who have well-defined duties and responsibilities and who are held accountable for their actions.

Corporate security management continues to be actively involved in all site security program activities and conducts various surveillances and reviews of on-site security operational readiness. Site and corporate management personnel also remained active in the Region I Nuclear Security Association and other organizations engaged in nuclear plant security matters. This demonstrates program support from upper level management.

The licensee's training program is administered by four full-time instructors, with full-time administrative support. In addition to the NRC-required training, the program includes courses in plant systems, first aid, chemical spills and health physics. Several of the instructors also received tactical response training that will be incorporated into the training for all security personnel. Except for the fire brigade training weaknesses documentated in the SA/QV functional area, the training program is well-structured, maintained current and effective as evidenced by minimal personnel errors and an excellent enforcement history. The facilities for training are also excellent and well-maintained. The commitment of resources and support for the training program is further evidence of management's desire to implement an effective security program. However, training of security force members for the fire brigade, by participation in fire drills, appears to require more management attention to ensure an appropriate number of fully trained personnel are available in case of a fire.

Audits of the security program conducted by the licensee's Quality Assurance (QA) Group, and surveillances conducted by the Corporate Security Staff, were found to be comprehensive and thorough. Findings of the audits and surveillances tend to be directed toward refining and enhancing the program; no major deficiencies were noted. Corrective actions were prompt and effective with aggressive follow-up to insure implementation.

The licensee submitted one security event report pursuant to 10 CFR 73.71(c) during this assessment period. The event involved the discovery of a small amount of a controlled substance on the site. The investigation of the event disclosed that the controlled substance was old and may have been on site for years. The licensee's actions were prompt and appropriate for this event.

Staffing of the security force is consistent with program needs as evidenced by the minimal use of overtime. Members of the security force exhibited a very professional demeanor and excellent morale. The turnover rate remains very low.

During this assessment period, an NRC Regulatory Effectiveness Review (RER) was conducted. The RER team's findings were generally favorable. However, several potential weaknesses were identified. The weaknesses were largely due to older equipment that the licensee had already planned to replace. The licensee took immediate actions to correct some of the weaknesses, and expedited existing schedules for other planned equipment replacements. The licensee was very responsive to all the concerns raised during the RER and many were resolved prior to the completion of the RER. Strengths noted during the RER included: very good coordination and effective interface between the security department and other plant departments, and excellent local law enforcement interface. The approach to resolution of technical security issues is excellent and very prompt.

During this assessment period, the licensee submitted two changes to the security plan under the provisions of 10 CFR 50.54(p). These revisions were of high quality, technically sound and reflected well-developed policies and procedures. Security personnel involved in maintaining program plans current are knowledgeable of NRC requirements and objectives. Although the two violations mentioned previously were issued during this assessment period, they related to inadequate 10 CFR 50.54(p) reviews in an earlier period (1984-1985) and do not reflect on current performance.

In summary, the licensee continues to maintain a highly effective and performance-oriented security program. Management attention to and support of the program are clearly evident in all aspects of program implementation. The efforts expended to maintain an effective program are commendable and demonstrate the licensee's continued emphasis on a high quality program.

III.E.2. Performance Rating: Category 1

III.E.3. Board Recommendations: None

III.F. Engineering and Technical Support (185 hours, 4%)

III.F.1. Analysis

During the previous SALP assessment period the licensee's performance in the Engineering Support area was rated as a Category 2. The primary weakness identified in the previous SALP report was the lack of management involvement in the Environmental Qualification (EQ) program. Strengths identified during the previous assessment period were a strong technical staff, PRA initiatives, and the use of industry events to address plant specific concerns.

The following evaluation is based on assessments of the engineering support effectiveness from routine and special inspections performed during this assessment period. Several inspections emphasized the review and assessment of engineering performance, while others assessed engineering support effectiveness during routine inspections of other functional areas. Assessments attempted to relate to the licensee's activities in response to the comments made during the previous assessment period.

During the current SALP, excellent engineering support was visible at the site. The licensee's engineering organization was well informed of day to day activities at the plant. Corporate engineering involvement in difficult engineering problems was routinely discussed at the Monday morning plant status call. Nuclear Plant Engineering (NPE) continued to provide corporate engineering support for plant activities. The priorities of engineering activities reflected a strong safety attitude. The plant's technical section actively worked to resolve day to day problems to improve plant availability and reliability. On site nuclear plant engineering support of the Engineering Work Request (EWR) program and Installation Engineering Group (IEG) support of construction related activities was strong.

Management involvement in the modification process continues to be evident. Administrative procedures which control the modification process and plant configuration control are detailed and thorough. The NPE engineer responsible for a design change communicates throughout the course of the design process with the IEG representative responsible for implementation of the design change packages. This effective communication between the plant and corporate engineering staff is instrumental in the production of the high quality design packages issued and implemented during this assessment period.

The Engineering and Technical support groups have shown involvement in assuring quality in a number of areas. The approach to and resolution of technical issues from a safety standpoint was consistently good as demonstrated in the examples listed below:

IEG established a weld trend program to better inform welders of their individual performance and to reduce weld rejection rate. The use of a monthly welding report card improved individual welder performance. IEG's use of underwater welding on the steam dryer was an industry first. The licensee used welding techniques used on offshore welding platforms to repair the dryer inside the storage pool. Innovations used during this repair are typical of the licensee's approach to problem solving.

The installation of a portable sixth diesel generator for supplying 125VDC power to vital plant equipment during a station blackout is another example. This modification was self-initiated based on probabilistic risk assessment, and exceeds applicable regulatory requirements. This modification was typical of the conservatism being applied to safety significant concerns.

In July 1988, the licensee informed the NRC that all eight of their Main Steam (MS) Tunnel differential temperature (delta T) modules were miswired rendering their isolation function inoperable. This MS wiring left only the MS tunnel high temperature modules capable of isolating the MS lines on a small leak in the area. This condition appeared to have existed since initial construction. Licensee root cause analysis was thorough and corrective action was found to be prompt and comprehensive.

The licensee's management and technical staff were observed to be knowledgeable and aggressive during the follow-up of an unplanned isolation of the Reactor Water Cleanup System. Actions included timely analysis and resolution of the issue and prompt reporting to the NRC.

The licensee has enhanced their in-house technical ability in the areas of plant reliability and core design. For example, extensive reliability studies were conducted using PRA techniques on Balance of Plant systems in an attempt to reduce unnecessary challenges to the Reactor Protection System. The core design group also performed extensive quality technical activities during this assessment period. A topical report requesting approval of the core design methodology and the first core design was completed and submitted to the NRC during this assessment period.

The licensee has been responsive to NRC initiatives during this assessment period. For example, the licensee responses to NRC Bulletins 88-07, and 88-07 Supplement 1, Power Oscillations, were timely, thorough, and technically sound.

Program strengths identified in the previous assessment in the areas of PRA, development of inhouse technical ability, and modifications have continued to be strengths during the present SALP period.

In spite of the above good performance, two isolated instances of inadequate Engineering/Technical Support were noted.

Division I and II 125 VDC power supplies were inadvertently tied together during a design change of the Reactor Recirculation Pump ATWS Trip circuitry. This error was due to the failure of the Design Change Package to require removal of the existing wiring prior to installing the new modification.

The second was an inadequate technical justification when a residual heat removal service water pump failed to meet ASME Section XI test criteria. Here the licensee used less stringent system requirements instead of pump specific requirements to justify pump operability. However, the licensee did replace the failed pump in a relatively short period following the identification of the pump problem. In this instance, the NRC was concerned that the licensee was too willing to justify interim operation without thoroughly researching the cause for the degraded conditions.

Additionally, a Unit 1 automatic reactor trip and an unplanned shutdown, which occurred during the assessment period could be attributed to original design weaknesses. However, the engineering staff responded to these in a prompt and appropriate manner.

The licensee had an effective program for administering the Inservice Inspection (ISI) program which provides assurance that the required examinations were completed as scheduled. Personnel were able to demonstrate that the program was up to date and complied with existing requirements. The licensee's program for controlling nonconforming items and inspection findings provided confidence that findings were adequately resolved and dispositioned.

The licensee has developed a dedicated ISI group to oversee the ISI program. Data Correlation Statements are required for each examination to assure that results have been compared with the results of previous examinations. This procedure provided confidence that deteriorating conditions would be identified. In one instance the licensee's surveillance program identified that an ISI contractor's evaluation of ultrasonic indications was incorrect due to incorrect evaluation parameters in the contractor's computer data base. This situation was effectively documented and resolved.

In another instance, the licensee failed to provide adequate control of sub-contracted ISI work, which led to starting up Unit 1 without properly dispositioning potentially unacceptable reactor vessel indications. The licensee did not adequately oversee these activities to assure conformance with Code requirements. The indications were ultimately determined to be acceptable.

Once the problem was identified, the licensee took a conservative approach by conducting a fracture analysis of the indications even though the evidence strongly suggested that the indications were due to nonmetallic inclusions and were not significant. These instances of problemmatic performance were isolated. Overall, ISI performance was good.

The errosion/corrosion program initiated by the licensee was adequate for tracking the erosion of various piping systems. The acceptance criteria were conservative and designed to prevent failures during the next operating cycle.

The staffing level of the engineering and technical support group was found to be adequate. The NPE group generated modifications at the rate at which the construction group was capable of installing them. The licensee is presently recalling all the old Project Funding Requests to re-prioritize them according to current plant requirements.

The training program for the technical support and engineering staff was well defined. Management was found to be cognizant of the training status of its staff. During this assessment period, the mechanical engineering group had dedicated one of its members to develop training courses on a full time basis. The licensee also has an active program to have its engineering staff licensed as professional engineers. This dedication to training and qualification programs has made a positive contribution to the quality of engineering activities as indicated by the high quality of design change packages.

In summary, the licensee responded positively to concerns identified in the previous SALP report. The licensee's response to NRC initiatives has been timely and thorough. Design changes such as the installation of a sixth diesel generator exemplify the conservative approach generally taken by the licensee regarding safety issues. Design change packages were found to be technically sound and well controlled by administrative procedures. Management involvement in solving technical issues continued to be strong. Good staff training, excellent communications, and adequate staffing were instrumental in providing high quality engineering and technical support for the station.

III.F.2. Performance Rating: Category 1

III.F.3. Board Recommendations: None

III.G. Safety Assessment/Quality Verification (240 hours, 6%)

III.G.1. Analysis

This discussion is a synopsis of quality and safety evaluation philosophies reflected in other functional areas. In assessing this area, the SALP Board has considered attributes that are key contributors in ensuring safety and verifying quality. Implementation of management goals, planning of routine activities, worker enthusiasm, management involvement and training are examples.

During the previous SALP period, the licensee's performance was rated Category 1 in both licensing activities and assurance of quality. The licensee maintained a knowledgeable and cooperative staff who were sensitive to safety concerns, and there was a visible presence and involvement of management and the staff in all aspects of plant operations requiring assurance of quality. The licensee's strengths included aggressive Technical Specification improvements, resolution of licensee identified safety issues, and Individual Plant Evaluation (IPE) initiatives; and the overall effectiveness of the licensee's organization.

The licensee's management remains fully involved in the safe operation of Susquehanna Units 1 and 2. The Vice President - Nuclear visits the site on a weekly basis and actively participates in the site operations during these visits. The licensee's Managing For Excellence program consists of setting five year safety goals and reviewing the goals every year during strategy planning meetings. The corporate management has been aggressive and proactive, and has contributed to excellent team performance. There is a high degree of cooperation and mutual support between corporate and plant management. As a result of this cooperation at the management level, the individual workers have a clear understanding of the safety and quality perspectives of the organization, and are able to function effectively to assure the safety and quality of plant operation.

The Plant Operations Review Committee and Susquehanna Review Committee functioned well in probing station practices, procedures and problems; thus assuring clear definition and comprehensive resolution of issues. The Nuclear Safety Assessment Group (NSAG) continues to provide a good oversight and auditing function independent from the plant staff. Comprehensive NSAG audits of outage plans and schedules, including actual performance during outages and day-to-day activities were particularly effective and representative of the licensee's willingness to improve the organization. An up-to-date strike preparation plan was ready for use and appropriate training of backup personnel was completed.

Licensee Event Reports (LERs) were complete and accurate. Two LERs were issued late. The licensee enhanced the internal review process to allow more time for management questions. No subsequent LERs were late.

During the current rating period, the licensee continued to be very active in the areas of Technical Specification improvements, use of IPE to enhance operational safety, and implementation of a program of Managing For Excellence to assure quality of all operations. The licensee continues to effectively use realistic risk assessment as a tool for improving its normal and emergency

operating procedures, strengthening defense-in-depth by considering all existing hardware which may be used in accident situations, and incorporating new hardware to mitigate the progression of accident sequences. As a result, new EP procedures are being formulated and tested for use. However, the final approval process should take place in a timely manner to assure usage of approved procedures and approaches.

The licensee has demonstrated excellent understanding of a majority of the issues surrounding safety. The staff has had extensive contact with the licensee in understanding its use of IPE, and its insights on risk management in assuring defense-in-depth against a variety at accident sequences. The licensee has used the information developed through the IPE and follow-on work to systematically examine the possible challenges to plant equipment and systems during a spectrum of accident sequences. Based on its findings, the licensee has identified and implemented improvements in operating procedures and hardware, and innovated special uses of the available equipment to assure that all available equipment is used, and actions are taken, to prevent the progression of postulated sequences and mitigate their consequences. The licensee has reflected the results of these improvements in its IPE analyses.

Some isolated weaknesses in the assurance of quality were noted during this rating period. For example, one of the three Reactor Water Cleanup (RWCU) room high temperature detectors was installed in an improper location inside a ventilation duct passing through the room instead of the room itself. Since monitored temperature was not representative of the room temperature an isolation signal would not have been generated when required. The required channel check was not effective in identifying this discrepancy which has existed since construction. The temperature detector has since been repositioned. Four severity level 4 violations were assigned to safety assessment/quality verification during this period. Three of these involved isolated failures to identify pre-existing conditions while one involved control of plant equipment. Prompt and effective corrective actions have since been taken.

The licensee has been responsive in providing the NRC staff information and briefings on its activities - be they in the severe accident prevention/mitigation areas, or in the area of responses to the NRC staff's questions regarding licensing actions. The information provided by the licensee has been very useful in formulation of the NRC staff's approach to dealing with a wide variety of significant safety issues that the staff is presently considering. These issues include procedures for responding to such severe accidents as Anticipated Transients Without Scram, hardware additions such as incorporation of a portable diesel generator for keeping batteries indefinitely charged during station blackout sequences, and use of existing hardware such as the reactor water cleanup (RWCU) system to mitigate the loss of containment heat removal capability in certain accident sequences which otherwise could challenge the integrity of the primary containment.

In most of the licensing actions submitted by the licensee for NRC review, the licensee adequately addressed the issues involved without any need for the NRC questions or contact. The issues requiring licensee response were frequently

successfully resolved in a prompt and acceptable manner. However, there were instances when the licensee's procedures were not fully responsive to the NRC staff's requirements. The licensee's diesel generator fuel oil sample analysis did not fully conform to ASTM specifications. The licensee corrected this deficiency after the NRC staff identified the concern. All fire protection issues except Safe Shutdown Analysis - Evaluation of High Impedance Faults and Carbon Dioxide Full Discharge System Testing have been successfully resolved and a favorable safety evaluation has been issued. The licensee's response to outstanding issues related to fire protection sometimes was slow and lacked aggressive management oversight. As a result, there continues to be many fire watches posted to compensate for uncorrected fire protection deficiencies.

The licensee continues to maintain an excellent group of technical experts and managers who have been successful in maintaining safe operations and assuring a high quality of operations. The licensee's program of rotational assignments continues to boost the employee morale and provides the licensee with a good cross section of multidiscipline trained staff who can assume a variety of responsibilities and provide management flexibility in assignments.

The licensee had a generally sound training program. However, the licensee's training on allegations and safety concerns resolution was somewhat ineffective. Allegations were received by the NRC during the period because some of these individuals were unaware that the licensee had procedures in place to address their safety concerns. The allegers' unawareness of existing procedures indicated the need for the licensee to review its training program to assure that allegations and safety concerns are identified first to the licensee so that they can be dealt with promptly. The licensee should reassess and improve the scope and depth of their management system for handling allegations.

In addition, coordination and tracking of maintenance personnel through their training programs needs improvement. The progress of individual maintenance personnel through their training program was not well known by the licensee (see Section III.C.).

Attendance by designated security personnel at fire brigade drills was not mandatory even though security was required to provide two members to the fire brigade for all drills. Attendance records indicated that not all fire brigade members from the security section attended equivalent fire drill training to their operations counterparts. The lack of participation in fire brigade training by some designated security personnel indicates a lack of management attention to this program.

In summary, the licensee's aggressive management and capable/cooperative staff have made a significant contribution to assurance of safety and quality of plant operations during this rating period. Management efforts continue to foster a positive safety culture throughout the organization. The licensee's excellent approach to resolution of technical issues is demonstrated by its risk management studies and plant improvements utilizing its IPE. The licensee continues to be responsive to the NRC staff, and has maintained a well trained staff. Continued licensee attention is needed to reduce the number of outstanding fire watches, ensure equivalent training to all members of the fire brigade and reassess training for personnel on safety issue resolutions. These actions should continue to solidify strong licensee performance in this area.

III.G.2. Performance Rating: Category 1; declining

III.G.3. Board Recommendations:

1. Reevaluate procedures and enhance the training of personnel on safety issue resolution.

2. Improve coordination and tracking of maintenance personnel progress through their training program.

3. Reduce the number of fire watches by quickly resolving outstanding fire protection issues. Ensure equivalent training is given to all members of the fire brigade.

IV. Background

IV.A. Licensee Activities

During the assessment period, the Susquehanna units operated safely and effectively. Unit 1 experienced seven unplanned shutdowns, four of which began with automatic scrams. Unit 2 experienced one unplanned shutdown and no automatic scrams. (See Table II.C.- Reactor Trips and Unplanned Shutdowns). Both units underwent refueling outages. The Unit 2 second refueling outage took place from March 5, 1988 through June 19, 1988 for a total of 106 days. The Unit 1 third refueling outage took place from March 29, 1989 through June 4, 1989 for a total of 65 days. Major activities during these outages included refueling, surveillance testing, inservice inspections, replacement of all 3 low pressure turbine rotors on Unit 2, and several major project modifications to address the issues of Appendix R, ATWS and Loss of Offsite Power.

Significant events which occurred during the assessment period included: the inadvertent backflushing of fuel pool cooling system demineralizer resin into the condensate storage tank and damage to six feedwater sparger nozzles during the Unit 2 second refueling outage in the spring of 1988; the discovery in July 1988, that the main steam line tunnel differential temperature sensors were improperly located and inoperable; the December 15, 1988 initiation and injection of Reactor Core Isolation Cooling (RCIC) without operator knowledge for approximately 23 minutes; and, the failure of the operating crew to recognize prior to restart that the 100 degree per hour cooldown rate had been exceeded following the January 12, 1989 reactor scram.

IV.B. Direct Inspection and Review Activities

During this assessment period there were two NRC resident inspectors assigned to the site except for the period April 3, 1989 - May 12, 1989 when one inspector was assigned. Several programmatic inspections were performed by regional inspectors in the areas of Maintenance, Emergency Preparedness, Security, Engineering, Assurance of Quality, and Radiological Controls. There were a total of 4296 inspection hours, which represents 2865 hours on an annualized basis.

V. Supporting Data and Summaries

V.A. Inspection Hour Summary*

FUNCTIONAL AREA	HOURS	HOURS ANNUALIZED	PERCENT
PLANT OPERATIONS	2338	1559	54
RADIOLOGICAL CONTROLS	574	383	14
MAINTENANCE/SURVEILLANCE	513	342	12
EMERGENCY PREPAREDNESS	256	171	6
SECURITY/SAFEGUARDS	190	127	4
ENGINEERING SUPPORT	185	123	4
SAFETY ASSESSMENT/ QUALITY VERIFICATION	240	160	6
TOTALS:	4296	2865	100

* Does not include NRC licensing staff hours.

V.B. Enforcement Activity

	Number of Violations by Severity Level						
FUNCTIONAL AREA	I	II	III	IV	V	DEV	TOTAL
PLANT OPERATIONS				4	1		5
RADIOLOGICAL CONTROLS				1	1		2
MAINTENANCE/SURVEILLANCE				1			1
EMERGENCY PREPAREDNESS							
SECURITY/SAFEGUARDS				2			2
ENGINEERING SUPPORT							
SAFETY ASSESSMENT/ QUALITY VERIFICATION				4			4
TOTALS:				12			14

An enforcement conference was held with the Licensee on June 30, 1988 to discuss environmental qualification violations. A civil penalty resulted from the violations. In addition, enforcement conferences were held on September 9, 1988 to discuss a violation of Technical Specifications with regard to the Main Steam Line Tunnel Differential Temperature instruments; and on March 21, 1989, to discuss a violation of Technical Specifications with regard to excessive cooldown rates. No civil penalties resulted from these violations. The two Security/Safeguards violations listed related to inadequacies in a previous assessment period and do not reflect current performance.

V.C. Licensee Event Report Causal Analysis

Number by Cause Codes

FUNCTIONAL AREA	A	B	C	D	E	X	TOTAL
PLANT OPERATIONS	9			4	9		22
RADIOLOGICAL CONTROLS							
MAINTENANCE/SURVEILLANCE	5	4		5			15
EMERGENCY PREPAREDNESS							
SECURITY/SAFEGUARDS						1	1
ENGINEERING SUPPORT		10	2	2			14
SAFETY ASSESSMENT/	4	5		3			12
TOTAL:	19	19	2	14	9	1	64

This analysis includes LERs 88-002 through 89-020 for Unit 1 and 88-001 through 89-005 for Unit 2.

Cause Codes *

Type of Events		Unit 1	Unit 2
A.	Personnel Error.	13	6
B.	Design/Man.Constr./Install . .	12	7
C.	External Cause	2	0
D.	Defective Procedure	10	4
E.	Component Failure	5	4
X.	Other	1	0
	Total	43	21

* Root Causes assessed by the SALP Board may differ from those listed in the LERs.

Overall, the number of LERs declined from 71 last SALP period (549 days) to 64 during this assessment period (548 days); a reduction of about 9 percent.

The causal analysis shows that personnel errors, design, manufacturing, construction/installation deficiencies, and defective procedures comprised almost all of the reportable events. These causal factors involved plant operations, maintenance/surveillance, safety assessment/quality verification, and engineering support and led to 16 violations of technical specifications (all were licensee identified and 5 of these were cited). Common causes were not identified for design, manufacturing, construction/installation and defective procedure related events. Common causes for personnel error appear to be related to inattention to detail and poor communication between individuals or groups.

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. Special areas may be added to highlight significant observations.

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

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

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

3. Responsiveness to NRC initiatives;

4. Enforcement history;

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

6. Staffing (including management); and

7. Effectiveness of training and qualification program.

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

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

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

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

The SALP Board may assess a functional area and compare the licensee's performance during a portion of the assessment period (generally the latter part) 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. Other 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 near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period and the licensee had not successfully 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.

It should be also noted that the industry continues to be subject to rising performance expectations. NRC expects each licensee to actively use industry-wide and plant-specific operating experience in order to effect performance improvement. Thus, a licensee's safety performance would be expected to show improvement over the years in order to maintain consistent SALP ratings.