PDR

POLICY ISSUE
(Commission Meeting)

April 10, 1989 SECY-89-114

For: The Commissioners

From: Victor Stello, Jr.
Executive Director for Operations

Subject: REQUEST FOR COMMISSION APPROVAL FOR THE RESTART OF THE PEACH BOTTOM ATOMIC POWER STATION

Background: In March 1987, the Nuclear Regulatory Commission (NRC) received information that control room operators at Peach Bottom had been observed sleeping while on duty in the control room, reading materials not directly job related, and being otherwise inattentive to their licensed duties. The NRC confirmed this information during the initial phase of an investigation and determined that all levels of plant management at that time either knew or should have known of these facts and took either no action or inadequate action to correct this situation. As a result, the NRC staff no longer had reasonable assurance that the facility would be operated in a manner to ensure that the health and safety of the public would be protected and issued an Order to the Philadelphia Electric Company (PECo) on March 31, 1987, suspending operations of Peach Bottom.

Subsequently, the NRC determined that the inattentiveness described in the Order had occurred over an extended period of time and was pervasive and that the failure by site and corporate management to identify, investigate, and correct these conditions and report them to the NRC demonstrated a significant lack of management attention to, and control of, operations at Peach Bottom.

The Order issued to the licensee required, among other things, that before the licensee proposed to again operate either unit above the cold shutdown condition, the licensee would provide for NRC approval a detailed and comprehensive plan to ensure that the facility would be operated safely and would comply with all requirements.

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In response to the Order the licensee acknowledged the shutdown issues and identified four principal root causes for the conditions that led to the shutdown in a series of corrective action plans which culminated in the Plan for Restart, Revision 1, April 1988. The NRC staff published the results of its review of this programmatic plan for restart in its safety evaluation report (SER) in October 1988. The NRC staff published the results of its review of the licensee's performance and implementation of the corrective action plan in numerous inspection reports during the 2-year period of the shutdown, but most notably in the SALP report of October 19, 1988, and the Integrated Assessment Team Inspection (IATI) Report of March 6, 1989.

The NRC staff's review of the licensee's corrective actions and plans for restart has been managed and coordinated by a Restart Assessment Panel comprised of Region I and NRR managers. Summaries of the major documents produced under the guidance of this panel are provided in Appendices A through E.

The licensee's plan and accomplishments and the staff's review activities have been considered by the Advisory Committee on Reactor Safeguards. The Committee's letter of March 14, 1989 stated that the Committee found no reason to disagree with the staff's position. The Committee also concluded that the Mark I containment and intergranular stress corrosion cracking concerns of Councilwoman Barbara A. Risacher of Harford County, Maryland, had been dealt with appropriately by the licensee and the staff. The ACRS letter is included as Appendix F.

Discussion:

The licensee last briefed the Commission on the status of Peach Bottom on February 6, 1989. The licensee's senior management described their revised organizational structure and the associated personnel, the status of licensed operator resources, the plant security program, the physical state of the plant, and the plans for a transition to the operations phase. The Commission also was briefed by the licensee and the NRC staff on October 5, 1988, and September 14, 1987, regarding the major issues of the shutdown order and the status of corrective actions.

The staff has considered the comments of members of the public in three sets of public meetings held in the fall of 1987, May 1988, and on February 28 - March 1, 1989. The staff's disposition of the comments from the first two sets of meetings is discussed in Appendix C of the SER. A summary of the comments from the most recent meetings is provided in Appendix G. The State of Maryland and the Commonwealth

of Pennsylvania have provided comments on the licensee's restart plan and their representatives observed the IATI. Their comments have been factored into the staff's review and have been considered as part of its deliberations regarding restart. No new issues have been identified in the most recent public meetings nor in comments from either the State of Maryland or the Commonwealth of Pennsylvania which would alter the staff's overall conclusions regarding restart of the Peach Bottom facility.

It should also be noted that the Commonwealth of Pennsylvania is participating in certain matters that are before an Atomic Safety and Licensing Board (ASLB). These matters concern whether or not an amendment to the licensee's organizational structure chart in the Technical Specifications constitutes a significant hazard. The Commonwealth and the licensee have entered into a proposed agreement, dated February 27, 1989, which the Commonwealth indicates would meet the concerns of the issue before the ASLB. The NRC staff has reviewed the proposed agreement and has indicated, in a letter dated March 29, 1989 that certain aspects must be modified before NRC could fully agree with it. The staff is continuing to work with the two parties to the agreement, the Commonwealth and the licensee, to resolve the concerns.

The staff has concluded, based on its review of programmatic information and on its observation of the licensee's implementation of these plans, that the four principal root causes of the issues that led to the shutdown have been appropriately addressed to allow the restart of the Peach Bottom station. Specifically:

(1) With respect to the corporate-management-based root cause, the licensee has restructured the organization to focus management involvement on nuclear operation, has put into place new key senior managers with demonstrated success in managing similar organizations and has strengthened its self-assessment and independent assessment capabilities.

(2) With respect to the site-management-based root cause, the licensee has established a new site management team from inside and outside the licensee's organization that has strong leadership and management skills and the licensee has restructured the site organization to provide effective supervision and to ensure accountability for all functions.

(3) With respect to the licensed-operator-resource-availability root cause, the licensee has raised the entry level standards and starting salary and has hired a number of additional personnel to ensure a sufficient number of qualified applicants for licenses. The licensee is developing rotational and developmental positions and educational opportunity plans for licensed operators. These initiatives await additional increases in numbers of licensed operators so that shift staffing as well as these initiatives can be realized. More operators have been licensed since the order was issued than the number with licenses that expired. These additional resources as well as additional controls on the use of overtime are intended to ensure that excessive overtime usage during power operations is not necessary. The staff concludes that the licensee's resources for the restart of Unit 2 are acceptable and that, when training activities are completed for a sufficient number of the operators currently holding conditional licenses, the licensee will have a sufficient number of operators to operate the second unit.

(4) With respect to the cultural root cause, the licensee has identified and communicated new cultural values; has provided licensed operator and management training and fostered team building to support these values; and has developed management policies, programs, and control systems to support these values. On the basis of its observations of the licensee's present attitude toward safety, quality, professionalism, cohesiveness of shift crews, and other factors, the staff concludes that there have been significant positive changes in the Peach Bottom culture.

Significant safety improvements have taken place in the physical state of the plant, including design modifications and hardware changes implemented during the shutdown. Substantial progress in the cleanup of contaminated areas in the plant, in reducing radwaste stored onsite, and in eliminating overdue preventive maintenance has been made since the shutdown. There also is an enhanced focus on control of occupational exposure, reducing the number of personnel contaminations and on identifying and correcting the root causes of reportable events. As of April 10, 1989 there are several open items which must be resolved prior to startup of Unit 2. These items are identified in Appendix H and will be updated at the time of the Commission meeting on restart.

The licensee has provided a power ascension testing program that was reviewed and found acceptable by the staff. The program is a deliberate and controlled process that includes four NRC approval points: restart, 35 percent, 70 percent and continued operations after completion of the test program. This program is projected to require about four months to complete, depending on whether problems are encountered during power ascension testing. The NRC staff proposes to implement a phased release from the requirements of the Order to allow the licensee to proceed from one NRC approval point to the next NRC approval point. Upon successful completion of the last NRC approval point for Unit 2 the staff proposes a complete release from the requirements of the Order for Peach Bottom Units 2 and 3. Further NRC actions to monitor operation of Unit 3 are proposed to be part of the staff's augmented inspection program for the facility.

The staff's oversight during the power testing program will be comprehensive and will include around-the-clock coverage of certain evolutions. The staff will prepare reports detailing the plant status and adequacy of the licensee's activities during each phase of the program.

These reports will provide the basis for the Regional Administrator to authorize release from each of the NRC approval points.

The staff concluded that the issues addressed by the Order and the licensee's responses to the root causes, as discussed herein, have been resolved to the staff's satisfaction and that the licensee is ready and capable of operating Peach Bottom Unit 2 up to 35% of full power. Consistent with the requirements of the Shutdown Order the proposed letter that would permit this action is included as Appendix I.

Recommendations: That the Commission authorize the restart of the Peach Bottom Power Station and allow the staff to proceed with its oversight of the power ascension testing program by approval of the proposed letter included as Appendix I.

Scheduling: This paper is scheduled for consideration at the open Commission meeting on April 17, 1989.

Victor Stello, Jr.
Executive Director
for Operations

Attachments:

Appendix A.	Summary of Safety Evaluation Report
Appendix B.	Summary of Integrated Assessment Team Inspection Report
Appendix C.	Major Non-Routine Inspection Activities
Appendix D.	Peach Bottom SALP History
Appendix E.	Summary of Enforcement Actions
Appendix F.	Letter of Advisory Committee on Reactor Safeguards Dated March 14, 1989
Appendix G.	Summary of Comments from Public Meetings on February 28 and March 1, 1989
Appendix H.	List of Items Requiring Resolution Before Restart
Appendix I.	Letter to Corbin A. McNeill from William T. Russell on Modification of Requirements of Order.
Appendix J.	Safety Evaluation Report, dated October 19, 1988
Appendix K.	Integrated Assessment Team Inspection Report No. 50-277/89-81; 50-278/89-81, dated March 6, 1989

This paper is scheduled for discussion at an Open Meeting on Monday, April 17, 1989.

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APPENDIX A

SUMMARY OF SAFETY EVALUATION REPORT

1. INTRODUCTION

The Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, operated by the Philadelphia Electric Company (PECo, the licensee), is a 1098-megawatt electric boiling-water reactor designed by the General Electric Company and located about 19 miles south of Lancaster in York County, Pennsylvania. Units 2 and 3 were licensed to operate in 1973 and 1974, respectively.

In March 1987, the Nuclear Regulatory Commission (NRC) received information that control room operators at Peach Bottom had been observed sleeping while on duty in the control room, reading materials not directly job related, and being otherwise inattentive to licensed duties. The NRC confirmed this information during the initial phase of an investigation and determined that all levels of plant management at that time either knew or should have known of these facts and took either no action or inadequate action to correct this situation. As a result, the NRC staff no longer had reasonable assurance that the facility would be operated in a manner to ensure that the health and safety of the public would be protected and issued an Order to PECo on March 31, 1987, suspending operations at Peach Bottom.

The Order issued to the licensee required, among other things, that before the licensee proposed to again operate either unit above the cold shutdown condition, the licensee would provide for NRC approval a detailed and comprehensive plan to ensure that the facility would be operated safely and would comply with all requirements.

In response to the order the licensee submitted the Commitment to Excellence Action Plan in August 1987. Following several exchanges of correspondence the staff suspended its review of that plan in October 1987 because the licensee had inadequately responded to a principle root cause of the shutdown issues. A subsequent Plan for Restart was submitted in two parts in November 1987 and February 1988 and was revised in April 1988.

The safety evaluation report (SER) evaluates the adequacy of the licensee's programmatic Plan for Restart in response to the requirements of the shutdown Order.

The staff's overall approach to the review of the shutdown issues involves several major programmatic elements. These elements include (1) the enforcement actions as set forth in correspondence to individually licensed operators on August 9, 1988, and to the facility licensee on August 10, 1988; (2) the review

of the programmatic Plan for Restart as addressed in the SER; (3) the NRC's inspection program as enumerated in Appendix C to this paper; (4) consideration of comments made by the State of Maryland and the Commonwealth of Pennsylvania and public comments as discussed below.

Public comments have been solicited in two series of three meetings in the fall of 1987 and in May 1988. These comments are discussed in Appendix C to the SER. An additional series of three public meetings was held on February 28 and March 1, 1989, in Harford County, Maryland and in Fawn Grove and Quarryville, Pennsylvania. These comments were consistent with those received earlier and included comments on the Mark I containment design, strength and aging, radioactive waste storage, effluent releases, the need for power, Price Anderson protection, skepticism over whether improvements will be long-lasting, and comments favorable to restart.

The staff's criteria for considering the proposed recovery actions for a plant that has been shut down for safety reasons require that the licensee acknowledge the shutdown issues, appropriately identify the root causes of the issues at hand, and then identify and implement sufficient corrective actions. The shutdown issues for Peach Bottom were identified in the shutdown Order and the licensee identified them in its Plan for Restart. They are also discussed in Section 2.2 of the SER. The four root causes identified in the licensee's Plan for Restart are identified below.

Licensee-Identified Root Causes of Declining Performance

- Corporate management failed to recognize the developing severity of the problems at PBAPS and thus, did not take sufficient corrective actions.
- There was a lack of adequate personal leadership and management skills on the part of senior management at the plant.
- The Company failed to initiate timely licensed operator replacement training programs.
- The station culture, which had its roots in fossil and pre-TMI operations, had not adapted to changing nuclear requirements.

The licensee developed corrective action objectives to be attained to resolve each of the four root causes and also developed specific corrective actions to meet each of the objectives. The relationship between the shutdown issues, the root causes, the corrective action objectives, and the corrective actions is provided in appendices to the licensee's restart plan.

2. Review of Plan for Restart

The SER followed the format of the Plan for Restart as it addressed each of the root causes beginning with the corporate management based root cause.

In response to the corporate-management-based root cause the licensee (1) changed its organizational structure, (2) strengthened its nuclear group's self-assessment capabilities and (3) strengthened its independent assessment process to increase upper management involvement.

The organizational changes involve providing a vertically integrated structure responsible only for nuclear-power-related activities reporting directly to the Chief Executive Officer (CEO); a shortening of the chain of communications to upper management; specifications of the functions of organizational elements, programs and individual positions and management actions to communicate and implement these changes. A corporate management position of Vice President-PBAPS has been established to have full authority for all onsite organizations and regular employees except those involved in independent assessment and oversight activities.

Self-assessment and problem resolution have been strengthened by establishment and implementation of a philosophy for assurance of quality, by enhancing quality assurance and quality control activities, by strengthening reporting and tracking programs such as the Operating Experience Assessment Program (OEAP) and the Commitment Tracking Program (CTP) and by developing the Nuclear Performance Management Program (NPMP). Specifically, quality assurance and quality control activities have been strengthened by integrating previously separate activities into the Nuclear Quality Assurance (NQA) Department and by elevating the reporting relationship of NQA to the Executive Vice President-Nuclear (EVP-N). OEAP and CTP provide improved feedback of operating experience and retention and tracking of commitments. NPMP provides updated information for management review on the process towards meeting technical and operational performance standards.

Company management oversight has been strengthened by strengthening the corporate Nuclear Review Board and by establishing a Nuclear Committee of the PECo Board of Directors. The functions of each group are enhanced by specification of their responsibilities and by the addition of advisors from outside the PECo organization.

The staff developed separate findings for the matters discussed above; in summary, the staff concluded that the licensee's program was responsive to the root cause and was acceptable.

The licensee responded to the plant-management-based root cause by developing objectives to (1) establish a PBAPS management team with strong leadership and management skills and (2) to increase the number of site management positions to ensure effective supervision and accountability for each function.

The licensee has reorganized the onsite staff so that, in addition to the onsite Vice President for PBAPS, separate positions are provided for the Plant Manager, Project Manager, Support Manager and Training Superintendent. Additional managers are provided for the areas of Projects, Support and Training. This allows the Plant Manager to focus more on day-to-day plant operations and enables more focus to be provided to the other areas as well.

This revised site organization now has 54 management positions at the senior engineer level or above as compared with 23 such positions before the reorganization. The licensee's restart plan describes the structure and accountability of the organizations under all four site managers. The staff's emphasis was directed toward the Plant Manager's organization--particularly the operations staff under the Superintendent-Operations. The Plant Manager's management staff has been increased in size from 12 to 22 positions.

The Operations organization consists of the Superintendent-Operations, Assistant Superintendent-Operations, Operations Support Engineer, Shift Managers and the shift crew. The Shift Managers (one for each of the six operating shifts) provide a higher level of management authority on each shift. They have the authority to control shift operations and they coordinate and direct the activities of health physics, chemistry, maintenance, instrumentation and control, security, construction, and vendor personnel as these activities relate to operating the plant.

The staff also reviewed the qualifications and training of the Peach Bottom station personnel. The Vice President-PBAPS is a former senior U.S. Naval Officer with extensive nuclear power experience. The Plant Manager has 25 years of experience in management positions, including Plant Manager at the Limerick Station and previously at Peach Bottom on Units 2 and 3 as well as Unit 1. The other managers reporting to the VP-PBAPS and to the Plant Manager have extensive experience and reflect diverse backgrounds both from within and outside the PECo organization. The six Shift Managers are licensed senior reactor operators who each hold a degree in engineering and have had 6 to 14 years experience with PECo. They have completed intensive management training designed to enhance managerial skills for this position. They have demonstrated their leadership ability by building shift teams that have a high degree of cohesion and proficiency.

The staff concluded that the licensee had assembled a sufficiently strong leadership team to provide new direction at the Peach Bottom Station. All five senior site managers (the Vice President-PBAPS, Plant Manager, Project Manager, Support Manager and Training Superintendent) have demonstrated records of successful leadership and achievement across a broad spectrum of relevant backgrounds. The Operations organization has been similarly infused with management talent, as have other management positions in the expanded site organization. The staff also concluded that the licensee has sufficiently increased the number of site management positions to provide for effective supervision and accountability.

The licensee responded to the licensed operator resource based root cause by developing objectives to ensure an adequate reserve of licensed operators and to provide opportunities for alternate career paths and relief from shift work during their career progression.

In addition to the Shift Manager on shift, the licensee has one more Shift Supervisor than required by Technical Specifications and one more Reactor Operator (RO) than required by Technical Specifications. This brings the currently staffed shift positions up to seven for each of six shifts for a total of 42. Of the 24 ROs, 11 are restricted to operate during the shutdown and refueling modes only until they complete sufficient hot operating experience

to gain an unrestricted license. The staff concluded that the licensee satisfies the requirements for startup of one unit and that it will meet the requirements for two-unit operation when training requirements are completed to allow removal of license restrictions on the 11 ROs.

The licensee has taken actions involving its personnel policies, entry level screening standards, recruitment activities and training programs to further increase the number of licensed operators.

The licensee's Plan for Restart outlines plans for opportunities for additional career paths, offshift rotational assignments, and further educational opportunities. However, at this time the total number of licensed personnel is not adequate to permit significant exercising of these options.

To address the cultural root cause the licensee sought to identify and communicate the desired cultural values; to provide training, team building support and communication processes for management and employees to attain these values; and to ensure that management policies, programs and control systems support these cultural values.

The staff concluded that the cultural value themes of individual accountability and responsibility, team work, open and candid communications and a striving for excellence were being communicated through mission statements, objectives and goals, and a philosophy for assurance of quality as articulated in company newspapers, meetings, training, and other means.

A broad range of management training and team building activities has been implemented including the Managing for Excellence (MFE) course, consulting by organizational development personnel, training in human resource policies and in managing meetings, management modeling, visits to well managed plants, and simulator team training.

The corporate Organization and Management Development group has been prominent in assisting in these activities so as to enable managers to specify the change desired and to assess progress toward achieving the desired organizational values, performance and culture.

Employee training for cultural change has included a 6-week attitude assessment and training program for licensed operators, "People - The Foundation of Excellence;" a 2-week attitude training program, "Personal Effectiveness," for non-licensed operators; an employee-management communication program, "Tell It To The Vice President;" an organizational survey; an emphasis on management by walking around (MBWA); and is to include a followup training program, "Interaction;" and augmented progression training for operators. The staff found that these programs are intended to ensure that the requisite cultural changes will occur and noted that the staff will monitor activities to determine that they have produced positive results.

The NRC staff conducted shift team evaluations to evaluate how effectively the shift manager and the operating crews performed as a team. Several assessments were conducted in January, August, and September 1988, as discussed in the SER. The staff's most recent assessments in January 1989, which found the operating shift crews satisfactory for performance of power operations, were documented in Inspection Report No. 50-277/89-05 and 50-278/89-05.

The staff reviewed several of the licensee's proposed human resource practices and found the licensee's activities to strengthen its performance appraisal system and its planned training on revised disciplinary and grievance policies to be acceptable.

The shift rotation schedule has been switched from a reverse or backward rotation to a forward rotation. Operators interviewed stated that they were generally satisfied with the change and felt less fatigued. This response is consistent with the results of extensive research by specialists in circadian rhythm technology.

The licensee plans to control overtime by increasing shift staffing to seven operators per shift, which represents one more RO and one more SRO than required by Technical Specifications; by further increasing the number of licensed operators on a long-term basis; by establishing staffing and work assignments so that an 8-hour day, 40-hour week during operations is the norm; and by implementing further administrative controls on overtime consistent with revisions to the Technical Specifications. The staff found these methods acceptable for reducing unnecessary and extensive overtime.

3. CONCLUSION

On the basis of its review and evaluation, the staff concluded that the revised Plan for Restart submitted on April 8, 1988; meets Requirement V. C of the March 31, 1987 Order Suspending Power Operations and Order to Show Cause that the licensee submit a detailed and comprehensive plan and schedule to ensure that the facility will be operated safely and comply with all requirements including station procedures.

APPENDIX B

SUMMARY OF INTEGRATED ASSESSMENT TEAM REPORT

This is a summary of the Integrated Assessment Team Inspection (IATI), conducted February 3-19, 1989, from Inspection Report No. 50-277/89-81; 50-278/89-81.

1. Background

Peach Bottom had experienced a deteriorating performance history in the years prior to the shutdown as documented through inspections, Systematic Assessment of Licensee Performance (SALP) reports, and enforcement actions. There was a complacent attitude toward procedural compliance in plant operations and management involvement and effectiveness toward improving operations activities was not evident.

In March 1987, the Nuclear Regulatory Commission (NRC) received information that control room operators at Peach Bottom had been inattentive to licensed duties. This led the NRC to issue an Order to the Philadelphia Electric Company (PECo) on March 31, 1987, suspending power operations of the Peach Bottom units.

The Order addressed concerns including failure of both the line organization and the quality assurance program to identify conditions adverse to safety. Additionally, prior to further proposing operation of the station, the licensee was required to provide for NRC approval, a detailed and comprehensive plan to ensure that the facility would be operated safely and comply with all requirements. In response, the licensee identified four principal root causes of the issues that led to the shutdown of Peach Bottom and proposed a Plan for Restart that included discrete tasks to correct these root causes.

2. Inspection

On October 19, 1988, the NRC approved the licensee's restart plan. On February 2, 1989, the licensee reported that subject to resolution of certain identified issues, PBAPS was ready for startup and safe operation. In order to assess the status and results of PECo's corrective actions, the NRC performed an independent review of the effectiveness of the licensee's management control, programs and personnel during the Integrated Assessment Team Inspection conducted February 3-17, 1989.

The purpose of this team inspection was to perform an independent, in-depth assessment of the readiness of management controls, programs, and personnel to support safe restart and operation of the facility. The inspection team performed an integrated evaluation of various functional areas including site management/operations, licensed operator resource development, station cultural changes, corporate oversight, radiation protection, maintenance/surveillance, engineering/technical support, and security. Within these areas, the

inspection consisted of interviews with personnel, observations of plant activities, and examinations of procedures, records, and documents by the inspectors. The team consisted of an SES-level manager, a team leader and members of the NRC Region I and Nuclear Reactor Regulation staff. The inspection team also included an observer representing the Commonwealth of Pennsylvania and one representing the State of Maryland. These observers had access and input to all aspects of the inspection as provided by established protocol.

During the extended shutdown, PECo has initiated numerous management and organizational changes, conducted extensive training, implemented complex plant modifications, and made various program improvements. During this same period, the NRC has performed numerous inspections to determine the status and adequacy of the improvements. The objective of the IATI was to review the adequacy of issues that required followup inspection, determine if improvements made are effective and appear long-lasting, and determine if PECo is prepared to support the restart and safe operation of Peach Bottom. The inspection team performed an integrated evaluation of the various functional areas as follows:

Shutdown Order Root Causes

- Corporate Oversight/Safety Assessment/Quality Verification
- Site Management/Operations
- Licensed Operator Resource Development/Training
- Station Culture

Other Functional Areas

- Radiological Controls
- Maintenance/Surveillance
- Engineering/Technical Support
- Security

3. Summary of Conclusions

The inspection generally confirmed the results of the SALP report for June 1, 1987 through July 31, 1988, as well as validated the general SALP conclusion that performance was improving at the end of the SALP period. Further, licensee performance appeared to be consistent or improving in all functional areas examined during the IATI, with the current level of achievement for overall safety performance equal to or better than that described in the SALP. For security and safeguards, the performance is noticeably improved.

The inspection generally confirmed the effectiveness of the Restart Plan and other various licensee self-improvement programs, including the licensee's self-assessment process. Specifically, the team found that the corrective actions implemented, as stated in the Plan for Restart of Peach Bottom, were generally effective in addressing the four root causes.

On the basis of its review of the management structure, staffing, goals, policies, and administrative controls, the team concluded that the licensee has an acceptable organization and administrative process, with adequate management and technical resources to ensure that the plant can be operated in a safe and

reliable manner during normal and abnormal conditions. Further, this performance-based inspection provided an integrated look at overall management effectiveness in ensuring high standards of nuclear safety. The overall conclusions of this inspection confirm facility management effectiveness, especially its ability to perform self-assessment functions, to improve performance, and to raise nuclear safety awareness and attitudes throughout the organization.

The team concluded, with high confidence, that licensee management controls, programs, and personnel are generally ready and performing at a level to support safe startup and operation of the facility. Technical items requiring resolution or completion before restart are being addressed and tracked by the licensee. The team identified a relatively small number of additional items for which licensee actions or evaluations appear appropriate. During the inspection, the licensee made acceptable commitments in these areas. There are currently no fundamental flaws in the licensee's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

4. Summary of Results by Functional Areas

Within each functional area, conclusions were reached including the identification of various strengths and weaknesses. These strengths and weaknesses are summarized below. The basis for these items, as well as the many significant observations made by the team, are explained in Section 3 of the IATI report.

Site Management/Operations

Strengths:

- Shift Manager leadership
- MBWA program success by noted improvements in plant material condition
- Shift communications within the shift and between shifts
- Operational event and problem follow-up by shift and operations management
- Quality of the new system operating procedures
- Control of overtime

Weaknesses:

- Some key new system operating procedures initially scheduled for completion after restart.

Licensed Operator Resource Development

Strengths:

- None

Weaknesses:

- Alternate career paths and educational plans not formalized or promulgated.

Cultural Change

Strengths:

- Effective shift crew teamwork, communications, and interaction within the shift crew and with other personnel.
- Management guidance to operations personnel provided as expectations in the Operations Management Manual/Operations Manual.
- Support by management of Organization Development/Human Resource activities.
- Regularly scheduled operations meetings designed to enhance communications, specifically Shift Management Meetings and Shift Team Meetings.
- Accessibility and openness of all levels of management.
- Willingness of shift crew to question suitability of direction provided by shift crew supervision, and the openness of shift crew supervision to such questioning.

Weaknesses:

- Lack of trust in site and operations management as a result of:
  - Perception that management may not meet its commitments with respect to career paths and rotational and permanent off-shift assignments.
  - Lack of timely response to shift crew recommendations on various operations concerns and personnel issues.
  - Quality and timeliness of communications and feedback loops.
  - Inconsistency among shift crews in the implementation of some policies such as vacation schedules and performance evaluations.
  - Need for effective direct organizational link between shift crews and Superintendent for Operations to provide for clearer guidance and more effective and responsive feedback.
  - Timeliness of follow-up Interaction Training for licensed and non-licensed operators.
  - Incorporation of parts of "People - The Foundation of Excellence" and "Personal Effectiveness" (PFE/PE) training into operator progression training.

Corporate Oversight

Strengths:

- Onsite involvement and presence of senior management including the Executive Vice President-Nuclear in virtually all major activities.
- Positive attitude that has been fostered by corporate management in station personnel as seen in personal interaction skills, generally being in control of situations and open mindedness toward sharing information and in critiques.

- Enhanced tools to support management self-assessment of issues
- Comprehensive scope of Nuclear Quality Assurance audits providing feedback to management regarding identified problems.
- Technical monitoring provides real-time assessment of ongoing activities.
- Effectiveness of Independant Safety Engineering Group (ISEG) root cause analysis.

Weaknesses:

- QC installation/inspection procedures need improvement.
- More focus needed by some auditors on quality and safety as indicated by the inservice testing (IST) audit.
- No electrical or Instrument and Control (I&C) expertise on ISEG.
- Failure of QC to identify deficiencies in tubing installation and support.
- 1989 NQA master audit plan and schedule not yet approved.

Radiological Controls

Strengths:

- Reduction of contaminated areas and good housekeeping including aggressive goals. Improved use of engineering controls such as tents and containment to reduce contamination spread.
- Operational health physics (HP) interface with other groups continues to improve.
- Corporate and plant management support of ALARA including goal setting and planning.
- New aggressive HP technician management chain from first line supervisory personnel to superintendent.
- High radiation area controls.
- Improvement in timeliness of radiological occurrence report closeout

Weaknesses:

- HP technicians lack Peach Bottom operational power experience.
- Radiological occurrence reports continue to reflect poor radiation worker practices and contamination controls.

Maintenance/Surveillance

Strengths:

- Particularly effective surveillance scheduling and tracking system (STARS).
- Problems resolved by engineering (system/test) personnel indicate they are knowledgeable of their systems.
- Professionalism of technical personnel including system/technical engineers, I&C technicians and maintenance craft.

Weaknesses:

- Some weak surveillance test procedure acceptance criteria.

Engineering/Technical Support

Strengths:

- Modification team approach that includes the integration of plant personnel with design engineers during modification design and revision process.
- Timely revision of control room P&IDs on red line drawings to show completed modification works.
- Use of double verification/independent verification on modification acceptance tests (MATs) and system engineer understanding of the intent and expected practices.

Weaknesses:

- Lack of clearly defined acceptance criteria on MATs and, poor application of design basis to modification acceptance testing.

Security/Safeguards

Strengths:

- Security responsiveness to NRC questions.
- Oversight and knowledge of Nuclear Security Specialist.
- Improved attitudes of security force members.
- Good integration of security into the shift team.

Weaknesses:

- Security procedure concerning hand search of hand-carried items after alarming explosive detector.
- Security and HP interfaces.

5. Licensee Commitments

The licensee made certain commitments relating to corrective or enhancement actions in response to team findings or concerns. The status of these issues will be reviewed by the NRC prior to restart of the plant as appropriate.

- Prior to restart ensure new system operating (SO) procedures that are important to safe operation are implemented prior to startup or system operations.

- Prior to restart provide plans and schedule for improving the permit and blocking rules.

- Prior to restart complete response to LaSalle BWR Power Oscillations NRC Bulletin 88-07.

- By May 31, 1989 provide schedule for development and implementation of revision 4 of the Emergency Procedure Guidelines.

- Beginning in July 1989 and continuing for two years, provide semi-annual human resource status reports on progress towards meeting operator resource development and cultural related commitments.

- Prior to restart provide to the NRC a revised commitment regarding the schedule for implementation of follow-up Interaction Training for licensed operators and non-licensed personnel and for incorporation of parts of PFE/PE training into licensed operator progression training.

- Prior to restart provide to the appropriate HP technicians orientation and training in the area of Peach Bottom power operations experience and radiological expectations.

- Prior to restart review torque switch settings for Limitorque motor operated valves settings below the vendor recommended values.

- Prior to restart provide the results of a review of instrument air tubing and support installations and show that the root cause of analysis of modifications adequately encompasses the installation deficiency.

- Prior to restart demonstrate the operability and maintainability of the Emergency Cooling Water System.

APPENDIX C

MAJOR NON-ROUTINE INSPECTION ACTIVITIES DURING SHUTDOWN

Report No.	Inspection Date	Areas Inspected - Conclusion
50-277/88-10 50-278/88-10	Mar 12-April 22, 1988	Report on team evaluation of operator rehabilitation training program.
50-277/88-17 50-278/88-17	July 1988	Maintenance program generally effective
50-277/88-200 50-278/88-200	Aug 22 - Sept 1, 1988	Emergency operating procedures are acceptable, capable of being implemented and are understood by operators.
50-277/88-36 50-278/88-36	Sept 26-28, 1988	Annual emergency preparedness exercise demonstrated adequate provision of protective measures for public health and safety.
50-277/88-81 50-278/88-81	Nov 28 - Dec 2, 1988	PECo Self-Assessment Evaluation: 1) PECo adequately reviewed previously identified weaknesses, 2) self-assessment process not fully demonstrated.
50-277/89-80 50-278/89-80	Jan 1989	Security Program performance has improved under new contractor.
50-277/89-05 50-278/89-05	Jan 12, 1989	All six shift operating crew teams demonstrated satisfactory performance for power operation.
50-277/89-07 50-278/89-07	Jan - Feb 1989	Electrical team inspection - several technical issues to be addressed prior to restart.
50-277/89-81 50-278/89-81	Feb 3-17, 1989	Integrated Assessment Team Inspection - no fundamental flaws that would inhibit ability to ensure safety during operation.

APPENDIX D

PEACH BOTTOM SALP HISTORY

FUNCTIONAL AREA	4/85-1/86	2/86-5/87	6/87-7/88
PLANT OPERATIONS	2	Unacceptable	2
RADIOLOGICAL CONTROLS	2	2	2
MAINTENANCE/SURVEILLANCE	2	2	2 (IMPROVING)
EMERGENCY PREPAREDNESS	2	2	2
SECURITY AND SAFEGUARDS	3	2	3
ENGINEERING/TECHNICAL SUPPORT	-	2	1
SAFETY ASSESSMENT/QUALITY VERIFICATION (SA/QV)	-	-	2
LICENSING ACTIVITIES	2	2	Part of SA/QV
ASSURANCE OF QUALITY	3	Unacceptable	Part of SA/QV

APPENDIX E

SUMMARY OF ENFORCEMENT ACTIONS

Shutdown Order	-	MARCH 31, 1987
INDIVIDUAL OPERATOR ENFORCEMENT CONFERENCES	-	FEBRUARY 8, 1988 TO MAY 17, 1988
ISSUED GRADED ENFORCEMENT ACTIONS	-	AUGUST 10, 1988
PHILADELPHIA ELECTRIC COMPANY (PECO)	-	NOTICE OF VIOLATION (NOV) AND $1,250,000 CIVIL PENALTY
THREE PECO MANAGERS	-	ORDER EXCLUDING THEM FROM RESPONSIBLE OPERATIONAL POSITIONS
SHIFT SUPERINTENDENT (SRO)	-	NOV AND $1,000 CIVIL PENALTY
SHIFT SUPERVISORS (SRO)	-	NOV AND $800 CIVIL PENALTY
CONTROL OPERATORS (RO)	-	NOV AND $500 CIVIL PENALTY
RECENTLY LICENSED ROs	-	NOV

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

March 14, 1989

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: REVIEW OF THE PEACH BOTTOM ATOMIC POWER STATION RESTART

During the 347th meeting of the Advisory Committee on Reactor Safeguards, March 9-11, 1989, we reviewed the Philadelphia Electric Company's (licensee's) plans for restart of the Peach Bottom Atomic Power Station and the evaluation of these plans by the NRC staff. Our Subcommittee on General Electric Reactor Plants, which considered the Peach Bottom Restart, met with representatives of the licensee and the NRC staff on March 9, 1989 to discuss this matter. We also had the benefit of the documents referenced.

Since the transmittal of the shutdown order to the licensee on March 31, 1987, there have been major changes in corporate and plant management, in staffing, training, and procedures. There has also been a significant and largely successful effort to eliminate overdue preventive maintenance items.

The NRC staff is prepared to conclude that, subject to completion of certain well-defined commitments to modifications of equipment and revisions of procedures, the licensee can, with the organization now in place, operate the Peach Bottom Atomic Power Station without undue risk to the health and safety of the public. We find no reason to disagree with the staff's position.

Since the staff's evaluations have been made for a managerial and operational team that has not yet operated the plant at power, we endorse the staff's plans to continue a close monitoring and evaluation of this team for an appropriate period after operation at power has begun.

As requested, we have examined the questions raised by Councilwoman Barbara A. Risacher of Harford County, Maryland, in her letter of August 30, 1988 to you. We conclude that these issues have been dealt with appropriately by the licensee and by the staff.

Mr. J. C. Carroll did not participate in the Committee's deliberations regarding this matter.

Sincerely,

Forrest J. Remick
Chairman

References:

1. Letter dated October 19, 1988 from William T. Russell, Region I Administrator, Nuclear Regulatory Commission, to Philadelphia Electric Company, transmitting Safety Evaluation Report dated October 1988 of the Philadelphia Electric Company's Plan for Restart of the Peach Bottom Atomic Power Station.
2. Letter dated March 6, 1989 from William F. Kane, Region I, Nuclear Regulatory Commission, to Philadelphia Electric Company, transmitting Integrated Assessment Team Inspection Report 50-277/89-81; 50-278/89-81.
3. Letter dated October 19, 1988 from William T. Russell, Region I Administrator, Nuclear Regulatory Commission, to Philadelphia Electric Company, transmitting SALP Board Report No. 50-277/87-99; 278/87-99.
4. Letter dated March 1, 1989 from Joseph W. Gallagher, Philadelphia Electric Company, to William T. Russell, Region I, Nuclear Regulatory Commission, transmitting letter dated February 21, 1989 from Zack T. Pate, INPO, concerning Peach Bottom Atomic Power Station.
5. Letter dated August 30, 1988 from Councilwoman Barbara A. Risacher of Harford County, Maryland, to Chairman Lando W. Zech, Jr., Nuclear Regulatory Commission, regarding Peach Bottom Atomic Power Station.
6. Letter dated March 2, 1989 from Jean S. Ewing, Peach Bottom Alliance, to the Commissioners, Nuclear Regulatory Commission, regarding Peach Bottom Atomic Power Station.

APPENDIX G

SUMMARY OF COMMENTS RECEIVED AT FEBRUARY 28 -MARCH 1, 1989
PUBLIC MEETINGS ON PEACH BOTTOM

Opposing Restart

-- Concerns over the Mark I containment design, strength, and aging. Would like all outstanding Mark I issues, including Commission decision on staff and ACRS proposals, as well as any "fixes," to be resolved before restart. In addition, the Individual Plant Examinations and Station Blackout rule activities should also be completed before restart.

-- Concerns over the short- and long-term storage and transportation of low- and high-level radioactive products, particularly plutonium. Questioned wisdom of creating additional waste without long-term plans.

-- Concerns over environmental releases and the related impact - particularly as they relate to adverse health effects and the incidence of cancer.

-- Desire for an on-line radiation monitoring system similar to the one installed at Three Mile Island facilty.

-- Concern that power from Peach Bottom is not needed in view of its absence for almost two years without an impact on power supplies. Conservation would reduce reliance on a power supply whose risk, even if small, is considered unacceptable.

-- Concern that Price-Anderson is paid for by the taxpayer and would not cover the true costs of recovery.

-- Skepticism whether changes and improvements at PECo/Peach Bottom will be long lasting.

Favoring Restart

-- Feeling that significant changes had been made at Peach Bottom and that the plant can be operated safely.

Transcripts were taken at these meetings and provide all statements received and the staff's responses.

APPENDIX H

LIST OF ITEMS REQUIRING RESOLUTION

BEFORE RESTART

As of April 10, 1989, the NRC staff has identified the items listed below as requiring resolution before restart of Unit 2.

Item Description

AC/DC Electrical Issues (Batteries, Voltage Adequacy, Loss of Power Test)

Alternate Rod Insertion

ECCS Room Wall Seals/Barriers

QC Inspection/Installation Procedures

Appendix R Compliance (High Pressure/Low Pressure Interface) and Procedures

Control Room Enhancements, Ventilation, Habitability and Procedures

Safety Grade Air Supply, Check Valve Leakage

Bulletin 88-07 (LaSalle Event)

Motor Operator Valve Torque Switch Settings

Torus Water Level on LOCA

License amendment on degraded voltage protection.

APPENDIX I

Docket Nos. 50-277
50-278

Philadelphia Electric Company
ATTN: Mr. Corbin A. McNeill
Executive Vice President-Nuclear
Correspondence Control Desk
P. O. Box 7520
Philadelphia, Pennsylvania 19101

Gentlemen:

Subject: Modification of Requirements of Order

On March 31, 1987, the Executive Director for Operations issued an Order directing the Philadelphia Electric Company to shut down Peach Bottom Atomic Power Station and take certain corrective actions to address concerns including failure of both the line organization and the quality assurance program to identify conditions adverse to safety. Specifically, Sections V.A-V.C of the Order respectively required (a) that Unit 3 be shut down and both units be maintained in a cold shutdown condition pending further order; (b) a description of the actions planned to provide assurance that the facility will comply with all requirements while in a cold condition; and (c) that before proposing operation of either unit, a comprehensive plan be developed to ensure that the facility will be operated safely and comply with all requirements. The actions outlined in your letter of April 6, 1987, were evaluated as part of our inspection program and determined to fulfill the requirements of Sections V.A and V.B of the Order.

In my letter dated October 19, 1988, the NRC accepted your proposed "Plan for Restart of Peach Bottom Atomic Power Station" in response to the requirements set forth in Section V.C of the Order. We have conducted an assessment of your implementation of this plan during an Integrated Assessment Team Inspection in February 1989 and have concluded that your performance relative to the Peach Bottom facility is at a level sufficient to support safe startup and operation of the facility and that there are no fundamental flaws that would inhibit your ability to ensure reactor or public safety during plant operation. However, before final release from the requirements of the Order, you must demonstrate the effectiveness of your corrective actions in an operating environment in accordance with your approved restart power testing plan.

Therefore, in accordance with Section V.E of the Order, I hereby modify the requirements set forth in Section V.A of the Order to permit operation of Unit 2 not to exceed 35 percent of full power.

No reply to this letter is necessary. Thank you for your cooperation in this matter.

Sincerely,

W. T. Russell
Regional Administrator

cc:
John S. Kemper, Sr., Senior Vice President-Nuclear
J. W. Gallagher, Vice President, Nuclear Services
E. C. Kistner, Chairman, Nuclear Review Board
Dickinson M. Smith, Vice President, Peach Bottom Atomic Power Station
Jack Urban, General Manager, Fuels Department, Delmarva Power & Light Co.
John F. Franz, Plant Manager, Peach Bottom Atomic Power Station
Troy B. Conner, Jr., Esquire
W. H. Hirst, Director, Joint Generation Projects Department,
Atlantic Electric
Bryan W. Gorman, Manager, External Affairs
Eugene J. Bradley, Esquire, Assistant General Counsel (Without Report)
Raymond L. Hovis, Esquire
Thomas Magette, Power Plant Siting, Nuclear Evaluations
W. M. Alden, Director, Licensing Section
Doris Poulsen, Secretary of Harford County Council
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Pennsylvania

,blind 2 4
bcc:
Region I Docket Room (with concurrences)
Management Assistant, DRMA (w/o encl)
Section Chief, DRP
PAO (23) SALP and (2) Inspection Reports
Robert J. Bores, DRSS
R. Martin, NRR
B. Clayton, EDO

,blind 2 2

RI:DRP	RI:DRP	RI:DRP	RI:DRP	RI:DRA	RI:RA
Gadzala/rhl	Linville	Wenzinger	Kane	Allan	Russell
3/ /89	3/ /89	3/ /89	3/ /89	3/ /89	3/ /89

,end

APPENDIX J

Safety Evaluation Report

Dated October 19, 1988

B Boger

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

19 OCT 1988

Docket Nos. 50-277
50-278

Philadelphia Electric Company
ATTN: Mr. C. A. McNeill
Executive Vice President-Nuclear
Correspondence Control Desk
P. O. Box 7520
Philadelphia, Pennsylvania 19101

Gentlemen:

Subject: Peach Bottom Atomic Power Station Safety Evaluation Report

The enclosed Safety Evaluation Report (SER) documents our acceptance of your proposed "Plan for Restart of Peach Bottom Atomic Power Station" (PBAPS) received April 8, 1988 and the supplemental information listed in Appendix B of the SER.

Accordingly, we conclude that this plan meets Requirement V.C. of the March 31, 1987 Order Suspending Power Operations and Order to Show Cause that the licensee submit a detailed and comprehensive plan and schedule for completion of plan corrective action activities to ensure that the facility will be operated safely and comply with all requirements including station procedures.

We will continue to monitor the effectiveness of the implementation of this plan by conducting additional inspections including an integrated assessment team inspection at the PBAPS before making our recommendation to the Commission concerning authorization to restart the facility.

Sincerely,

W. Russell

W. T. Russell
Regional Administrator

Enclosure: Safety Evaluation

cc w/encl:
John S. Kemper, Sr., Senior Vice President-Nuclear
J. W. Gallagher, Vice President, Nuclear Services
E. C. Kistner, Chairman, Nuclear Review Board
Dickinson M. Smith, Vice President, Peach Bottom Atomic Power Station
Jack Urban, General Manager, Fuels Department, Delmarva Power & Light Co.
John F. Franz, Plant Manager, Peach Bottom Atomic Power Station
Troy B. Conner, Jr., Esquire
W. H. Hirst, Director, Joint Generation Projects Department,
Atlantic Electric
Bryan W. Gorman, Manager, External Affairs
Eugene J. Bradley, Esquire, Assistant General Counsel (Without Report)
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Thomas Magette, Power Plant Siting, Nuclear Evaluations
W. M. Alden, Director, Licensing Section
Doris Poulsen, Secretary of Harford County Council
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Pennsylvania

bcc w/encl:
Region I Docket Room (with concurrences)
Management Assistant, DRMA (w/o encl)
Section Chief, DRP
PAO
Robert J. Bores, DRSS
R. Martin, NRR
B. Clayton, EDO

SAFETY EVALUATION REPORT
ON THE PHILADELPHIA ELECTRIC COMPANY'S PLAN
FOR RESTART OF THE PEACH BOTTOM ATOMIC POWER STATION

U.S. Nuclear Regulatory Commission
October 1988

ABSTRACT

On March 31, 1987, the U.S. Nuclear Regulatory Commission issued an order to shut down the Peach Bottom Atomic Power Station, Units 2 and 3, operated by the Philadelphia Electric Company, because the NRC no longer had reasonable assurance that the facility would be operated in a manner to ensure that the health and safety of the public would be protected. The associated issues included inattentiveness of control room operators to their licensed duties and the failure of plant and corporate management to properly identify and correct the problem.

In response to requirements of the shutdown order, the licensee identified the root causes of these problems and proposed corrective actions in the "Plan for Restart of Peach Bottom Atomic Power Station," as revised on April 8, 1988. The NRC staff's evaluation of this plan and several supporting documents is presented in this safety evaluation report.

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1 INTRODUCTION AND PURPOSE

The Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3, operated by the Philadelphia Electric Company (PECo, the licensee), is a 1098-megawatt electric boiling-water reactor designed by the General Electric Company and located about 19 miles south of Lancaster in York County, Pennsylvania. Units 2 and 3 were licensed to operate in 1973 and 1974, respectively.

In March 1987, the Nuclear Regulatory Commission (NRC) received information that control room operators at Peach Bottom had been observed sleeping while on duty in the control room, reading materials not directly job related, and being otherwise inattentive to licensed duties. The NRC confirmed this information during the initial phase of an investigation and determined that all levels of plant management at that time either knew or should have known of these facts and took either no action or inadequate action to correct this situation. As a result, the NRC staff no longer had reasonable assurance that the facility would be operated in a manner to ensure that the health and safety of the public would be protected and issued an order to PECo on March 31, 1987, suspending operations of the Peach Bottom station.

Subsequently, the NRC determined that the inattentiveness described in the order had occurred over an extended period of time and was pervasive and that the failure by site and corporate management to identify, investigate, and correct these conditions and report them to the NRC demonstrated a significant lack of management attention to, and control of, operations at Peach Bottom.

The order issued to the licensee required, among other things, that before the licensee proposed to again operate either unit above the cold shutdown condition the licensee would provide for NRC approval a detailed and comprehensive plan to ensure that the facility would be operated safely and would comply with all requirements.

In response to the order, the licensee eventually identified four principal root causes of the issues that led to the shutdown of the Peach Bottom units and proposed a plan for restart that included discrete tasks to correct these root causes of the problem.

In this safety evaluation report (SER), the staff evaluates the adequacy of the licensee's response to the requirement of the shutdown order, as set forth in the plan for restart. The staff has based its findings on several sources of information including that provided in Sections I and II of Revision 1 of the plan for restart, submitted on April 8, 1988, and in responses to NRC requests for additional information, submitted by letters on July 22, August 15 (two), 22, and 23, and September 7 and 20, 1988. The staff gained more information from the numerous enforcement conferences that were conducted with previously and currently licensed personnel at Peach Bottom station and a number of onsite inspections and audits, which will be documented in respective inspection reports.

1.1 Approach to the Restart Plan Review

The NRC's approach to the review of issues associated with the Peach Bottom shutdown involves several major programmatic elements. These elements include enforcement actions, as discussed in Section 2.2 of this SER; the review of PECo's program plan for restart, as addressed throughout this report; the NRC inspection program, as discussed in Section 1.2 below; consideration of comments made by the State of Maryland and the Commonwealth of Pennsylvania; and the involvement of the public as discussed in Section 1.3 below.

When a nuclear facility is shut down for safety reasons, the NRC's criteria for consideration of restart require that specific corrective actions be satisfactorily implemented before the plant can be permitted to restart. In the case of Peach Bottom station, the shutdown issues were identified in the NRC's shutdown order of March 31, 1987, and in the accompanying notice in the Federal Register (52 FR 11386). These issues are itemized in PECo's restart plan and are listed in Section 2.2 of this report. The NRC required PECo to identify the root causes of the issues that led to the shutdown as well as the appropriate corrective actions to address the root causes. These corrective actions involved substantial changes in personnel, organizational interactions, and procedural implementation at all levels of the PECo organization. PECo's plan for restart defines the needed changes. Once the NRC has accepted this plan as satisfactory to bring about the needed changes, fulfillment of the requirements of this plan becomes the essential restart criteria. The staff's acceptance of PECo's plan for restart is conveyed by this report.

This SER gives the results of the staff's evaluation of the licensee's programmatic response to the shutdown order as set forth in the licensee's plan for restart. The staff will determine the effectiveness of the implementation of the plan and if it is having the desired effect in correcting the problems that have been identified at Peach Bottom. This is done primarily through the staff's inspection program, including the monitoring of future performance trends.

The licensee's plan for restart identified nine shutdown issues from the shutdown order. The licensee then identified four root causes for these issues. The licensee developed corrective action objectives to be attained to resolve each of the four root causes and also developed specific corrective actions to meet each of the objectives. The relationship between the shutdown issues, the root causes, the corrective action objectives, and the corrective actions is provided in appendices to the licensee's restart plan. The schedular status of implementation of the corrective actions is provided periodically. The staff's objectives in reviewing the licensee's restart plan are (1) to establish that the licensee's identification of the root causes is appropriate, (2) to establish whether or not the scope of the corrective action objectives and tasks is adequate to address the root causes, and (3) to establish whether the completion dates for the corrective actions and major activities are consistent with NRC staff requirements for restart.

The NRC established the Restart Assessment Panel to review the licensee's restart plan. The panel includes members from the NRC's staff in Region I and from the Office of Nuclear Reactor Regulation staff. The format of this report* is consistent with the format used by the licensee in its plan for restart. Therefore, Sections 3, 4, 5, and 6 of this SER deal respectively with the root causes attributed to the corporate organization, as described in Section I of the restart plan, and with the root causes attributed to station management, operator resources development, and cultural changes, as described in Section II of the restart plan.

1.2 Other Related Activities

In addition to the enforcement actions and the staff's review of the restart plan, the staff also has numerous other activities under way with regard to Peach Bottom station.

These activities include the preparation of a report on the results of the staff's systematic assessment of licensee performance (SALP) for the period of May 31, 1987, to July 31, 1988. In addition to pursuing the program of regular inspections, the staff is conducting inspections of licensee activities in several specific areas. These include inspection of the maintenance program, the emergency operating procedures, and plant security and safeguards. An integrated performance assessment of the licensee's response to shutdown-related issues also will be performed to determine the licensee's overall readiness for restart. The results of these inspection efforts will be reported in separate inspection reports.

The results of these other related activities also will be considered in the staff's basis for making a recommendation on restart of the plant.

1.3 Public Comments

The staff was concerned that members of the public had views or concerns on the issues to be addressed in any restart decision that had not otherwise been addressed in correspondence to the NRC. To ensure that all members of the public had an opportunity to comment on the licensee's restart plan, the staff held meetings to receive comments from members of the public in the vicinity of the Peach Bottom site.

Public comments and the staff's response to them as they relate to issues associated with the shutdown are discussed in Appendix C to this report.

*The staff has added Appendices A, B, and C, which provide the chronology of correspondence between the NRC and the licensee, the bibliography, and public comments and NRC response to the comments, respectively.

2 BACKGROUND

2.1 Performance Before the Shutdown

Enforcement history before March 1987 identified instances of inattention to duty or failure to adhere to procedures on the part of licensed operators in the control room at Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. These instances and the resulting shutdown order were published in the Federal Register (52 FR 11386) and are summarized below.

On June 10, 1985, an NRC inspector observed a reactor operator on duty apparently asleep or otherwise inattentive to his duties. An enforcement conference was held concerning this matter on June 21, 1985.

On June 6, 1986, the NRC issued its report of the systematic assessment of licensee performance (SALP) for Peach Bottom and concluded that management involvement and effectiveness in improving operations activities was not evident. The report stated that inadequate management involvement was indicated by poor dissemination of management goals and policies, poor communications between different departments and divisions, and management's focus on compliance rather than acknowledgement and correction of the root causes of problems. Further, the report concluded that a complacent attitude toward procedural compliance in plant operations was evident.

On June 9, 1986, the NRC issued a Notice of Violation and Proposed Civil Penalty for several violations that resulted from errors by licensed operators. These personnel errors indicated a pattern of inattention to detail, failure to adhere to procedural requirements, and a generally complacent attitude by operations personnel toward performance of their duties. This NRC assessment was emphasized in a letter dated June 12, 1986, from the NRC's Executive Director for Operations to the licensee's Chairman of the Board and Chief Executive Officer. In addition to this civil penalty, three previous civil penalties had been issued for violations to the Technical Specifications that involved personnel errors.

2.2 Shutdown Order and Subsequent Events

On March 24, 1987, the NRC's Region I office received further information that operators at Peach Bottom had been observed sleeping while on duty in the control room and were otherwise inattentive to their license obligations. The NRC determined that all levels of plant management at that time either knew or should have known of these facts and took either no action or inadequate action to correct this situation. As a result, the NRC no longer had reasonable assurance that the facility would be operated in a safe manner and ordered Peach Bottom Unit 3 to be shut down and both units to be maintained in the cold shutdown condition pending further order.

The order instructed the licensee to provide for NRC approval a detailed and comprehensive plan and schedule to ensure that the facility would be operated safely before the NRC would consider a proposal for restart.

The licensee provided its "Commitment to Excellence Action Plan" on August 7, 1987, in response to the NRC order. This commitment-to-excellence (CTE) plan identified four principal root causes of the problems and areas wherein changes were being made to address the concerns as well as a proposed list of tasks and associated schedules to resolve these concerns.

The CTE plan stated the root causes as

- poor leadership by plant management
- failure to initiate timely licensed operator replacement training programs
- a station culture, which had its roots in fossil and pre-Three Mile Island operations, that had not adapted to changing nuclear requirements
- slowness or the part of corporate management to recognize the developing severity of these problems and take sufficient corrective action

Areas identified by the licensee wherein changes were being made included

- plant management changes
- licensed operator attitudinal assessment and training
- additional licensed operator resources
- site-wide attitudinal change
- procedure upgrade and compliance
- quality assurance program improvements
- management involvement and communications

The staff subsequently requested additional information about the CTE plan in letters dated August 24 and September 11, 1987. The licensee responded to these in its submittal of September 28, 1987.

The staff reviewed the licensee's response of September 28, 1987, and identified several major concerns, which it expressed by letter dated October 8, 1987. The staff concluded that the licensee had not addressed a fundamental concern regarding the previous inability of the licensee to self-identify problems, and implement timely and effective corrective action. The staff also concluded that the CTE plan did not contain sufficient information to establish the relationship between the specific root causes and the actions proposed to address them. On the basis of these concerns, the staff deferred further review of the CTE plan pending receipt of a revised plan that addressed the expressed concerns.

In the fall of 1987, the licensee undertook a major reorganization of its site and corporate staff (shown in Figures 2.1 through 2.6 at the end of Section 2). The revised organizational structure associated with this reorganization was reflected in an application dated November 19, 1987, for amendment to the Technical Specifications with regard to administrative controls. The revised organizational structure was subsequently approved in amendments to the Technical Specifications as issued on June 22, 1988. Figure 2.5 shows the structure existing at the time of the shutdown and Figure 2.6 shows the revised structure.

The licensee, in a submittal dated November 25, 1987, stated that it had completed an indepth analysis of (1) its corporate organization and systems for

management and support of its nuclear operations and (2) its ability to identify its own problems and to take prompt corrective actions. This submittal included the first of two sections of a revised corrective action plan entitled "Plan for Restart of Peach Bottom Atomic Power Station," Section I, "Corporate Action" (restart plan). The revised plan reflected the new organization and responded to the concerns expressed in the staff's letter of October 8, 1987. Specifically, the root cause with regard to self-assessment was restated as follows: "Corporate management failed to recognize the developing severity of the problems at PBAPS and thus, did not take sufficient corrective actions."

The revised plan also responded to the staff's concern with regard to establishing a connection between the root causes and their corrective action tasks. Specifically, the licensee listed nine shutdown issues from the shutdown order and correlated these issues with the four root causes, the corrective action objectives to address the root causes, and the corrective actions and major activities required to implement these objectives. The shutdown issues are listed below with the appropriate designation of the restart plan given in parentheses. The shutdown issues and the previously discussed correlation are shown in Appendices C and A to Sections I and II, respectively, of the restart plan.

Shutdown Issues

- Operations control room staff periodically slept or have otherwise been inattentive to licensed duties. (SD-1)

- Pattern of inattention to detail, failure to adhere to procedural requirements, and a generally complacent attitude by the operations staff toward performance of their duties. (SD-2)

- Management at the shift supervisor and shift superintendent level have either known and condoned the facts (SD-1) or should have known of these facts. (SD-3)

- Plant management above the shift superintendent position either knew or should have known the facts (in SD-1) and either took no action or inadequate action to correct this situation. (SD-4)

- The licensee must have and implement procedures to ensure that activities affecting quality, including operations of the facility, are satisfactorily accomplished. The Peach Bottom quality assurance program has failed to identify this condition adverse to safety. (SD-5)

- The licensee, through its enforcement history and from what has been developed by the ongoing investigation, knew or should have known of the unwillingness or inability of its operations staff to comply with Commission requirements, and has been unable to implement effective corrective action. (SD-6)

- Lack of adequate management involvement: poor dissemination of management goals and policies. (SD-7)

- Lack of adequate management involvement: poor communications between different departments and divisions. (SD-8)

- Lack of adequate management involvement: focus on compliance rather than acknowledgement and correction of the root causes of problems. (SD-9)

The first section of the restart plan addresses the corporate-level actions and the related root cause. The licensee submitted the second section of the restart plan on February 12, 1988; it addresses the other three root causes.

On January 11, 1988, the president of the Institute of Nuclear Power Operations (INPO) provided a report on the Peach Bottom restart issues to the PECo Board of Directors. INPO requested that the letter and accompanying report be provided to the NRC as well as to others. By letter dated January 29, 1988, the president of the Philadelphia Electric Company provided the INPO report to the NRC. By letter dated March 4, 1988, the staff requested that it be provided with any information that the licensee would give to INPO concerning the restart issues. The staff also requested that the licensee inform the staff of the results of forthcoming INPO evaluations of station and corporate readiness for restart.

Changes in the licensee's senior management personnel took place in March 1988. The Chairman of the Board/Chief Executive Officer and the President/Chief Operating Officer retired from the company. The Senior Vice President-Nuclear moved over to take charge of the completion-of-construction effort at the licensee's Limerick Generating Station, Unit 2. These people were replaced by a new Chairman, President, and Chief Executive Officer, Mr. Joseph Paquette, and by a new Executive Vice President-Nuclear, Mr. Corbin McNeill. In joint response to these changes and to certain recommendations made in the INPO report, the licensee submitted Revision 1 to the plan for restart on April 8, 1988.

The staff issued requests for additional information on the revised restart plan on June 1, 1988. The licensee responded to these requests, as well as to issues raised by the State of Maryland, by letters dated July 22, August 15 (two letters), August 22, and August 23, 1988. The licensee indicated that it was continuing with its development of responses to issues raised by the Commonwealth of Pennsylvania.

On August 9 and 10, 1988, the NRC issued enforcement actions to individuals that comprised the shift operations staff at Peach Bottom at the time of the shutdown order and to PECo, respectively.

The decision to initiate enforcement action against PECo and its employees was based on the results of a report prepared by the NRC Office of Investigations in December 1987. This report included the findings of an extensive investigation conducted by the PECo Claims Security Division that was provided to NRC in August 1987. After considering the information from these investigations, a meeting was held with PECo on December 22, 1987, to obtain additional information to assist the staff in determining whether and, if so, what kind of enforcement action was appropriate. This meeting focused primarily on the basis for PECo's retaining certain of its operators in light of PECo's own investigation and on those corrective actions PECo was taking to address operator inattentiveness.

Thereafter, enforcement conferences were scheduled with each of the current and former licensed operators who was a member of the Peach Bottom operations staff

shift work complement at the time of the shutdown or shortly before. These conferences were held beginning in February 1988 after the operators had completed their retraining so that the staff could consider the effectiveness of each person's rehabilitation before the NRC made an enforcement decision. The staff gave serious consideration to the full range of enforcement actions for the operators, including revoking their licenses. In considering the question of enforcement actions against these people, the staff did not need to consider revocation of the licenses for the shift superintendents who were the senior licensed individuals and supervisors on shift because PECo had already removed them from licensed duties. Consequently, their licenses were terminated by action of the Commission's regulations. In addition, one of the operators resigned from the company and two others decided not to continue with licensed duties. These enforcement conferences were completed in May 1988.

The staff did not believe that the remaining operators should have their licenses suspended for the following reasons:

(1) These operators had undergone an extensive rehabilitation program designed to ensure that they had a better understanding of their individual responsibilities under their NRC licenses and to ensure that such conduct does not recur.

(2) During the enforcement conference, each of the operators was candid and forthcoming in his statements, admitting to some form of inattentiveness to the extent it violated his license and admitting for the most part, notwithstanding opportunities to blame facility management, that he was individually responsible.

(3) Although the operators were individually responsible, the PECo corporate, plant, and shift management certainly bears a large responsibility for the climate which permitted pervasive inattentiveness to exist.

(4) The technical knowledge and experience of the licensed operators is high, such that retaining some licensed operators, subject to successful rehabilitation, would be in the interest of reactor safety.

(5) The rehabilitation of selected operators appears to have been successful.

For these reasons, the staff recommended, and the Commission supported, the decision not to revoke the operators' licenses. Nevertheless, further enforcement action in the form of civil penalties was appropriate for all but the newest operators (1) to stress that improper actions and poor attitudes of the operators, with the potential for affecting safe operation of the facility, will not be tolerated and (2) to emphasize their individual responsibility to the NRC. Civil penalties were included for former operators because (1) the action occurred when they were licensed, (2) the purpose of the penalty is not only to address individual performance but to deter others, and (3) some of the individuals may be involved in nuclear activities in the future.

With regard to enforcement action against PECo, the staff considered the following:

(1) The plant was shut down by NRC order, has remained shut down despite various submittals of corrective actions, and will remain shut down until the NRC has reasonable assurance that appropriate measures have been taken to prevent recurrence.

(2) The shutdown order and its associated shutdown costs (reported by PECo in its last annual report to be $58 million for 1987) should have sent a clear message to PECo, as well as to all other licensees, that the NRC will not tolerate such conduct and will apply its enforcement authority, when warranted, to ensure that such conduct does not occur.

(3) There have been significant personnel and management changes at several levels within the company.

The civil penalty action was taken to highlight to PECo and other licensees the consequences of the failure of corporate management to be aware of conditions such as those at Peach Bottom and the failure to take appropriate corrective action, particularly in light of the pervasiveness of the conditions and PECo's prior enforcement history. These failures constitute a very significant regulatory concern and are considered the primary cause of the events that contributed to issuance of the shutdown order. In the staff's view, available sanctions such as civil penalties should be used so that this licensee, as well as other licensees, will recognize that in addition to the cost of corrective action for violations, civil penalties will be added to increase the cost associated with significant safety deterioration so as to increase the deterrent value.

2.3 Philadelphia Electric Company Organization

Since Peach Bottom station was shut down on March 31, 1987, the licensee has been developing and implementing management and technical programs to address the NRC concerns that led to the shutdown. The licensee responded to these concerns in its restart plan, which is described below.

The licensee has revised its corporate organizational structure to provide an organization dedicated only to nuclear power activities (the nuclear organization) with direct management authority and responsibility over all aspects of nuclear operations, engineering, maintenance, and construction. The new nuclear organization will be headed by an Executive Vice President-Nuclear with nuclear responsibilities only. This nuclear organization has been formed by separating nuclear engineering, maintenance, and other support activities for nuclear operations from corresponding support activities for fossil and hydro production and by reassigning the resources for these activities to the new nuclear organization. The former positions of Senior Vice President-Nuclear Power, Nuclear Production Manager, Superintendent-Nuclear Generation Division, Superintendent-Nuclear Services, and Manager-Nuclear Plant have been abolished and the functions under these positions have been reassigned within the new organization under the Executive Vice President-Nuclear. A comparison of the former organizational structure with the current structure can be made using Figures 2.5 and 2.6. Figures 2.1 through 2.4 show the current corporate and site organizational structure.

There are three staff organizations and five line organizations that report to the Executive Vice President-Nuclear, as shown in Figure 2.1. The five line organizations have responsibility for the Limerick Generating Station, Unit 2 construction, the corporate Nuclear Engineering and Nuclear Services groups, and the operating site groups at Peach Bottom and Limerick. The three licensee staff organizations have responsibility for the corporate Nuclear Review Board (NRB), Nuclear Quality Assurance (NQA), and Organization and Management Development.

2.3.1 Peach Bottom Site Group

The licensee has established a corporate office of Vice President-Peach Bottom Atomic Power Station (VP-PBAPS) at the site. This office has overall control of the conduct of activities of organizations at the Peach Bottom site. There are four line organizations that result from the reassignment of previous functions as well as the addition of new functions. These are plant, support, projects, and training as shown in Figure 2.3. The PBAPS site organization is discussed further in Section 4 of this SER.

2.3.2 Nuclear Services Group

The Vice President-Nuclear Services is responsible for nuclear service activities that support both the Peach Bottom and Limerick stations. The Vice President-Nuclear Services, as shown in Figure 2.4, is responsible for the support, maintenance, training, and administration groups.

The Manager-Nuclear Support is responsible for licensing, fuel management, radiation protection, radioactive waste management, nuclear plant chemistry, emergency preparedness, nuclear plant security, and the Operating Experience Assessment Program.

The Manager-Nuclear Maintenance is responsible for the supplemental craft maintenance support that serves the maintenance organization at the nuclear facilities. These activities include mobile mechanical maintenance, mobile electrical maintenance, and centralized maintenance services.

The Manager-Nuclear Training is responsible for two branches: the Nuclear Training Section, which is responsible for licensed, accredited, and general employee training, and the Barbados Training Center, which is responsible for craft training for maintenance and construction workers.

The Manager-Nuclear Administration is responsible for coordinating and monitoring activities that support the nuclear organization, including personnel administration, budget and cost control, computer applications, and nuclear records management.

2.3.3 Nuclear Engineering Group

The Vice President-Nuclear Engineering is responsible for the management of engineering activities that support the Peach Bottom and Limerick stations. Reporting to the Vice President-Nuclear Engineering through the Manager-Nuclear Engineering, as shown in Figure 2.4, are the Manager-Engineering, Manager-Project Management, Manager-Engineering Design, and the Construction Superintendent, Limerick Generating Station (LGS), Unit 2.

The Manager-Nuclear Engineering is responsible for engineering designs, analyses, studies, assistance, and expertise, as required, to support the safe and effective operations of PECo's nuclear units.

The Manager-Project Management is responsible for the management of engineering projects for each station to ensure that all engineering work is defined, planned, scheduled, budgeted, implemented, and technically supported and evaluated in a timely and cost-effective manner. The Manager-Projects Management works with each station's project manager to coordinate each station's implementation of engineering projects.

The Manager-Engineering Design is responsible for providing conceptual design support, engineering design, and drafting services to support the development and implementation of nuclear plant modifications.

The Construction Superintendent, LGS, Unit 2, is responsible for planning, scheduling, coordinating, directing, and controlling the safety, quality, timeliness and cost effectiveness of all work associated with LGS, Unit 2, until fuel loading.

2.3.4 Nuclear Quality Assurance

The General Manager-Nuclear Quality Assurance (NQA) is responsible for maintaining an effective Nuclear Quality Assurance Program. The Manager-Peach Bottom Atomic Power Station Quality, Manager-Limerick Quality, Manager-Quality Support, Manager-Performance Assessment, and Manager-Independent Safety Engineering Group (ISEG) report to the General Manager-Nuclear Quality Assurance. Three of the groups, PBAPS Quality, LGS Quality, and Quality Support, perform functions related to ensuring compliance with regulatory requirements including 10 CFR Part 50, Appendix B. The other two groups, ISEG and Performance Assessment, provide independent assessments and oversight of operations, respectively. The NQA organization, as discussed further in Section 3.2.2 of this SER, has thus been expanded beyond being concerned only with typical quality assurance activities.

2.3.5 Nuclear Review Board

The Nuclear Review Board (NRB) is responsible for reviewing and auditing technical and managerial areas. Its composition has been revised to include outside nuclear executives. The NRB is discussed further in Section 3.3 of this SER.

2.3.6 Organization and Management Development

The Organization and Management Development Division, reporting to the Executive Vice President-Nuclear has been established to assist managers in improving the effectiveness of their organizations and to develop management resources. This group is discussed further in Section 6 of this SER.

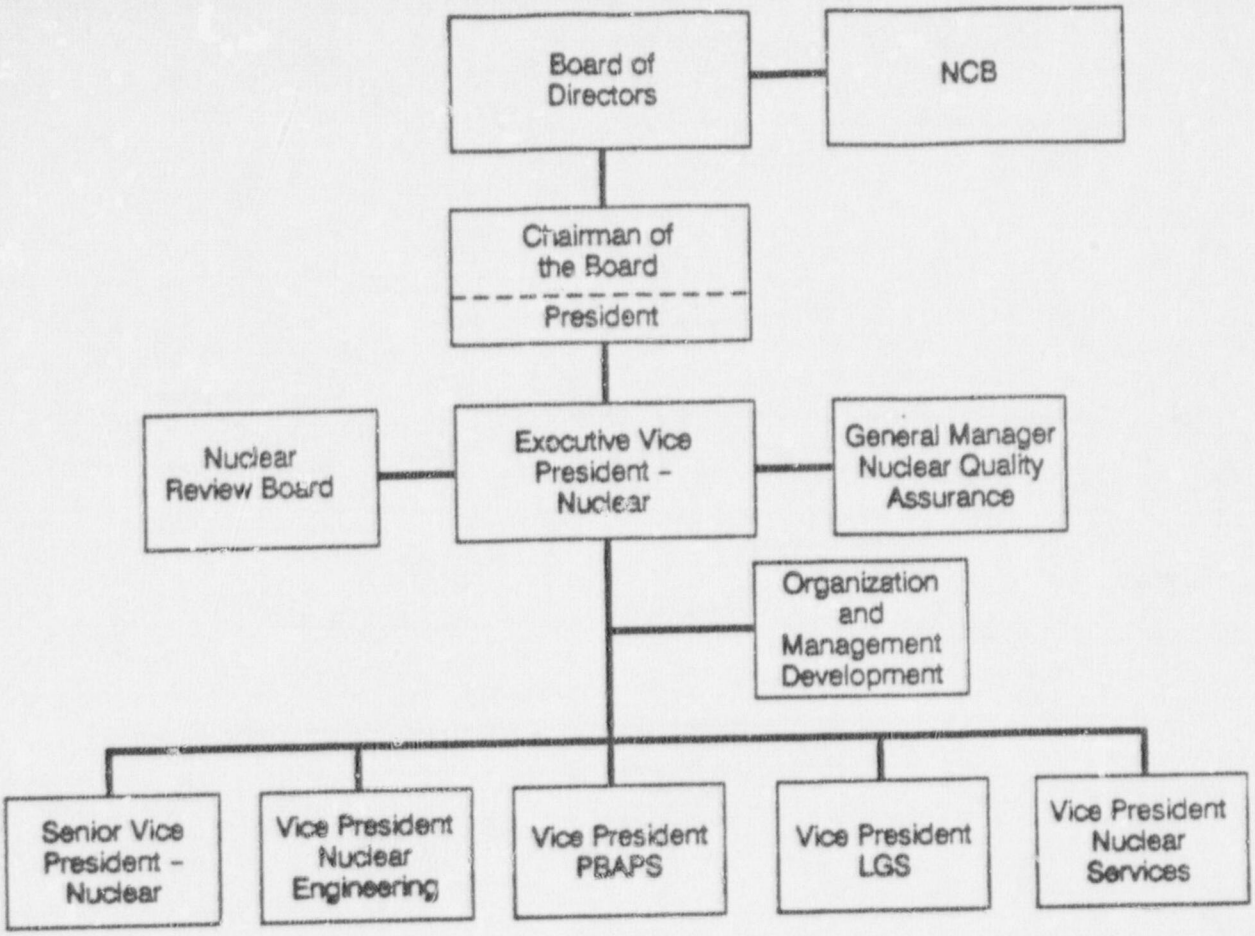


Figure 2.1 Corporate reporting structure for the nuclear organization

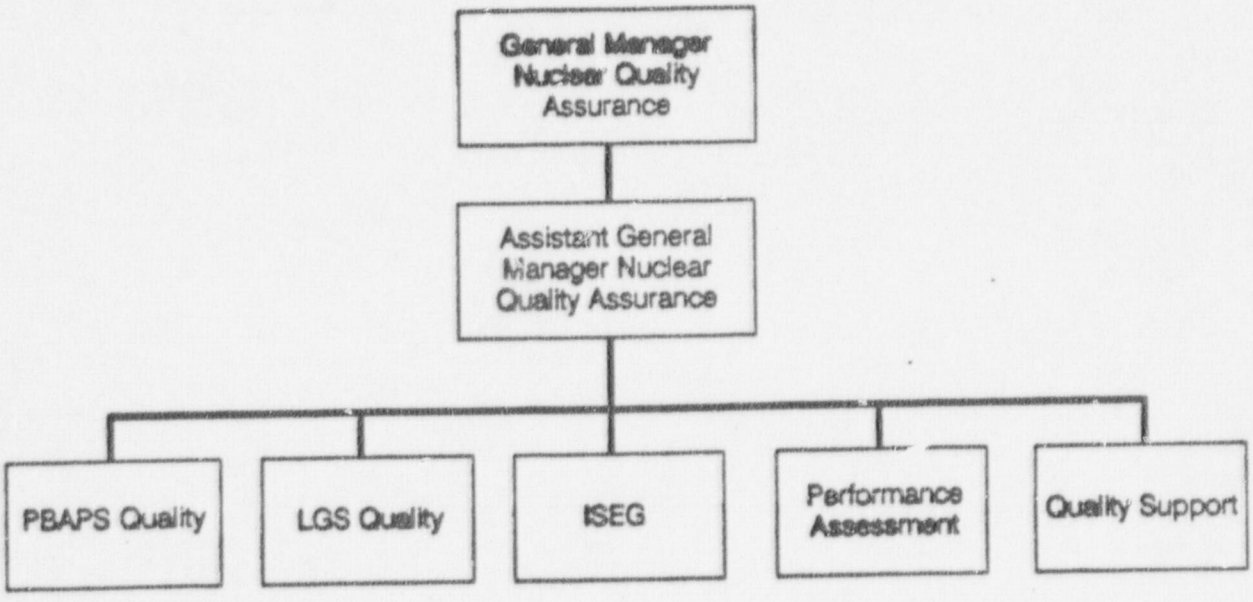


Figure 2.2 Nuclear quality assurance

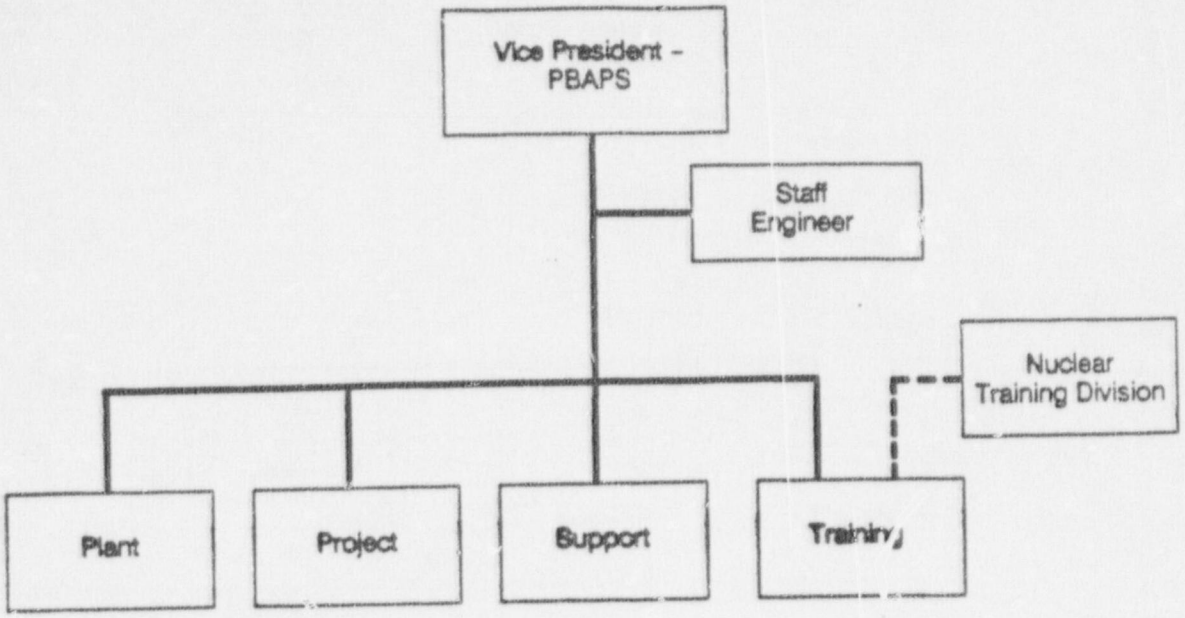
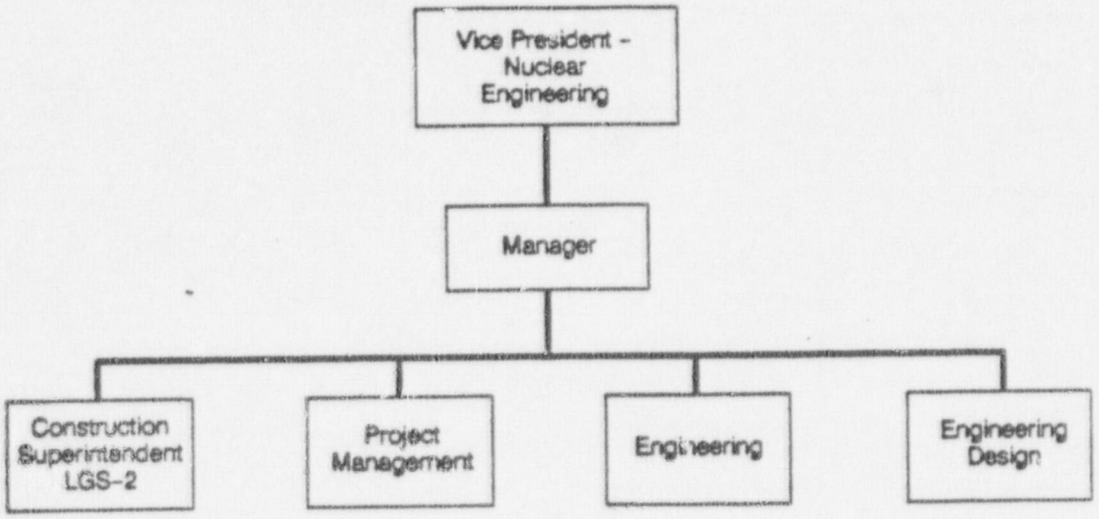


Figure 2.3 Site organization



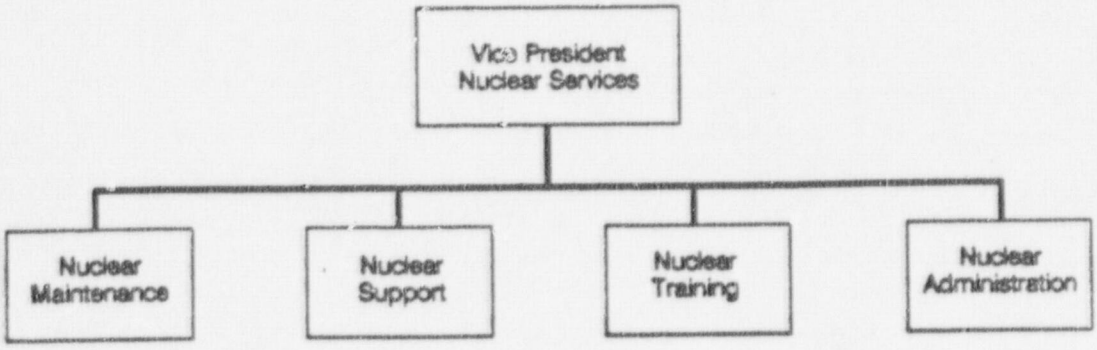


Figure 2.4 Nuclear engineering and nuclear services

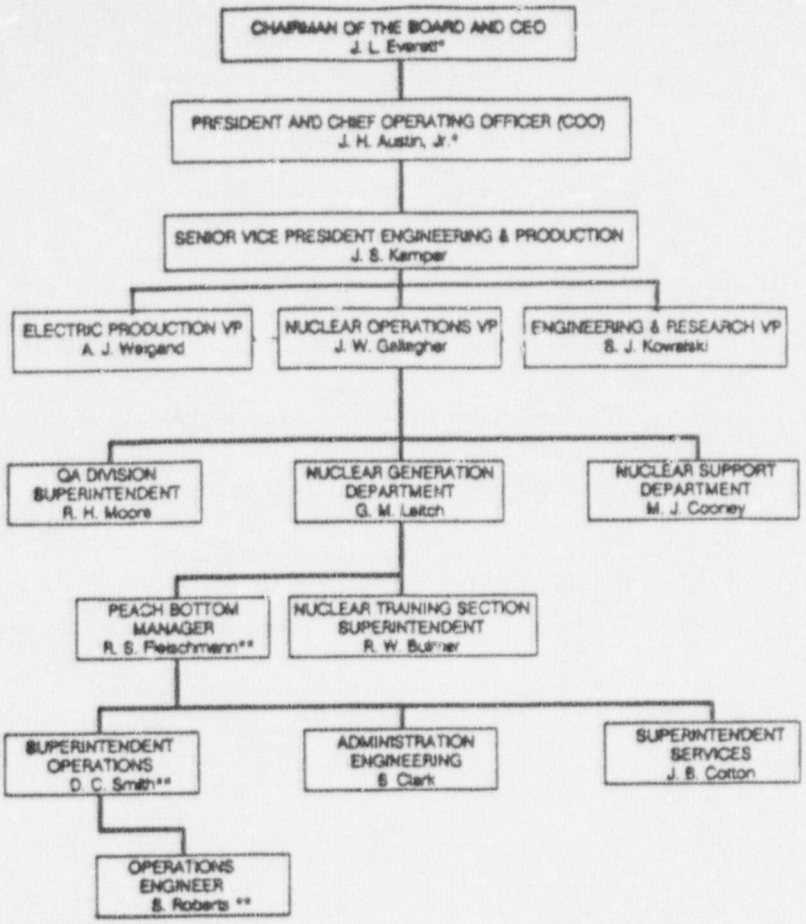


Figure 2.5 PECo organization on March 31, 1987, for Peach Bottom

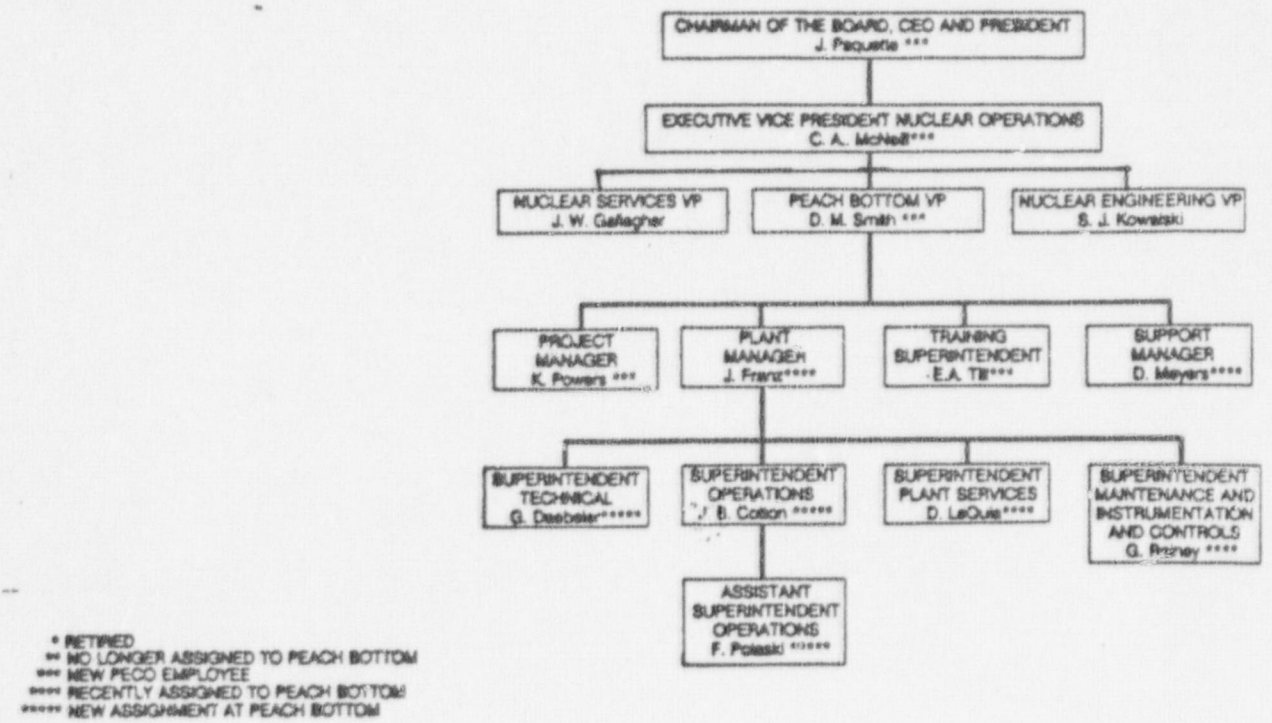


Figure 2.6 PECo organization in September 1988 for Peach Bottom

3 CORPORATE MANAGEMENT

The licensee stated that the root cause of the failure of corporate responsibility was that "corporate management failed to recognize the developing severity of the problems at Peach Bottom Atomic Power Station (PBAPS) and thus, did not take sufficient corrective actions." To address this root cause, the licensee identified the following three corrective action objectives:

(1) Change the organizational structure to increase control, accountability, and corporate direction of nuclear operations.

(2) Develop the management systems and managerial skills that will strengthen self-assessment and problem resolution capabilities within the nuclear organization.

(3) Strengthen the independent assessment process to increase upper management's involvement in timely problem solving.

The staff evaluated these corrective action objectives and the corrective actions identified by the licensee to meet the objectives to determine if they constitute an adequate basis, from a corporate management standpoint, to support plant restart and continued safe operations. This evaluation of corporate management effectiveness involved an assessment of whether the plan for restart provides reasonable assurance (1) that the appropriate general management processes are occurring and are effective such that management is adequately involved in program direction, (2) that adequate levels of personnel accountability are attained, and (3) that a commitment to safety exists in the organization.

3.1 Organizational Restructuring for Increased Control, Accountability, and Corporate Direction of Nuclear Operations

To meet this objective the licensee identified the following four corrective actions: (1) development of a nuclear-dedicated organization, (2) reorganization of the corporate management team to include an onsite corporate officer, (3) establishment of accountability of onsite employees and, (4) clarification and documentation of management authorities and accountability.

3.1.1 Nuclear-Dedicated Organization

The licensee has implemented a revised corporate structure that differs from the former structure wherein a senior corporate executive had responsibility for nuclear power-generation activities as well as other company power-generation activities. The former structure involved a company-wide matrix arrangement to provide the engineering, maintenance, and construction support for nuclear operations. The present structure reflects a vertical integration of functions wherein the responsibility for all nuclear power activities is focused under the office of the Executive Vice President-Nuclear who reports to the Chief Executive Officer.

The revised organizational structure has been implemented as discussed in the licensee's activity item status report and in related Amendments 132 and 135 to the facility Technical Specifications for Units 2 and 3, respectively.

The licensee has identified the functions for each part of the organization in the restart plan, specifically as shown in summary form by Figures 3, 4, 5, and 6 and Appendix A of Section I of the restart plan. Other tasks involved the assignment of personnel to management positions, documentation of management and operating policies, development of organizational mission statements, a review of corporate personnel policies with respect to management authorities, and documentation of interface responsibilities on personnel management issues have been completed. Team building meetings have been held in support of these activities and to develop a transitional management plan. The licensee's transitional management process is directed at tracking the progress of the reorganization and resolving transitional issues in a timely manner.

These corrective actions are in response to shutdown issues SD-7, SD-8, and SD-9, which involved lack of adequate management involvement in dissemination of goals and policies, in communications between different organizations, and in focusing on root causes of problems. The staff concludes that the licensee's response, if effectively implemented, provides an adequate assurance of management involvement and personnel accountability in the establishment of a nuclear-dedicated organization.

3.1.2 Corporate Management Team and Accountability of Onsite Employees

The licensee has eliminated two management positions in the reporting chain and has added the corporate management position of Vice President-PBAPS who will be located on site. Regular staff meetings have been established with the Executive Vice President-Nuclear and those organizations that report to him, which include the Vice President-PBAPS. The Vice President-PBAPS will have full authority with regard to the work of all site organizations and all regular site employees except for those involved in independent assessment and oversight. The independence of these personnel as well as the accountability of the corporate Nuclear Maintenance Division to the Vice President-PBAPS are acceptable.

These corrective actions are in response to shutdown issues SD-6 and SD-8, which involved management's responsibility to be aware of compliance of its staff with regulatory requirements and with management involvement in communications between different organizations. The staff concludes that establishment of this senior onsite corporate management position in the manner defined increases management involvement in program direction because it provides a link between site activities and other levels of corporate senior management and between site activities and related corporate support activities. The staff also concludes that specification of the responsibilities and relationships of the Vice President-PBAPS as discussed above improves the accountability of personnel and organizations. The position of Vice President-PBAPS is also discussed in Section 4 of this SER.

3.1.3 Management Authorities and Accountability

Whereas the corrective action discussed in Section 3.1.1 above was to describe functional responsibilities for organizations, this corrective action was developed by the licensee to describe functional responsibilities and

transitional interface agreements for nine program areas that include the Operating Experience Assessment Program, the Commitment Tracking Program, configuration management, systems and project engineering, materials management, budget and cost control, and the Independent Safety Engineering Group (ISEG). The licensee also is developing position descriptions that reflect mission statements and interface agreements.

This corrective action is in response to shutdown issues SD-7, SD-8, and SD-9, which involved inadequate management involvement in dissemination of goals and policy, communications between different departments and divisions, and focussing on the root causes of problems. The staff concludes that, if effectively implemented, the establishment, documentation, and communication to the personnel involved in the implementation of these programs of the functional responsibilities and position descriptions will increase the effectiveness of these programs.

3.2 Improved Self-Assessment and Problem Resolution Within the Nuclear Organization

To meet this objective the licensee has made the following changes to provide its management with the structures and systems necessary to effectively monitor the three key areas of safety, quality, and organizational performance. The terms "nuclear employee" and "nuclear management" as used in this SER refer to those personnel dedicated to the licensee's nuclear power plant activities.

3.2.1 Philosophy for Assurance of Quality

The licensee has developed a ten-point program expressing its philosophy in regard to the assurance of quality. Six of the ten points address the responsibility of nuclear line management.

(1) Line management is responsible for ensuring the quality of the operations and services which it provides.

(2) Line management establishes performance goals to achieve excellence as well as the indicators to be used in assessing the performance of its organizations.

(3) Line management communicates regularly about the quality of operations with each other, its employees, and other company organizations through field visits, meetings, retreats, and written reports.

(4) Line management monitors the performance of its organization through direct observation and involvement in ongoing activities and ensures corrective action when there is a variance between actual performance and the indicators used to assess performance.

(5) Line management reports on its performance with respect to established goals.

(6) Line management is responsible for effectively closing out all open items on a timely basis.

Two of the ten points address the responsibilities of nuclear employees and of nuclear management reporting directly to the Executive Vice President-Nuclear:

(1) Every nuclear employee is responsible for identifying and reporting observed quality problems/deficiencies in a timely manner.

(2) Each individual reporting to the Executive Vice President-Nuclear is responsible for ensuring that effective problem/deficiency reporting programs are in place for employees to use.

Two of the ten points address the responsibilities of the Nuclear Quality Assurance (NQA) organization:

(1) The NQA organization is responsible for monitoring and assessing the performance of the other nuclear organizations and providing independent audit reports and evaluations to line management and upper management.

(2) The NQA organization is responsible for monitoring and assessing the effectiveness and timeliness of followup actions in regard to open items.

The licensee has committed to implement and support this philosophy as follows:

(1) Publish the philosophy in the company and site newspapers, display it on appropriate corporate and site bulletin boards, and refer to it in written and oral communication with nuclear employees.

(2) Establish a nuclear performance management program to achieve and maintain excellence (see Section 3.2.5 of this SER).

(3) Provide effective feedback information systems to ensure that line management is aware of the quality performance level of its organizations.

(4) Communicate management expectations for--and management's assessment of--quality performance during face-to-face employee performance reviews.

(5) Develop formal systems and informal programs for reporting problems related to quality.

The staff concludes that publication and implementation of this philosophy for the assurance of quality, as committed to by the licensee, provides an acceptable program for critical self-assessment and problem resolution within PECo's nuclear organization.

3.2.2 Nuclear Quality Assurance

The functional relationship of the Nuclear Quality Assurance (NQA) organization is shown in Figures 2.1 and 2.2 of this SER. The NQA organization has been strengthened by (1) elevating the reporting relationship to the Executive Vice President-Nuclear level and (2) integrating previously separate quality assurance/quality control (QA/QC) organizations into one centralized QA organization and program managed by the General Manager-NQA.

QA/QC activities at each site are under the direction of the site Quality Manager. The Manager-Quality Support is responsible for quality support of such activities as manuals and procedures, vendor audits and surveillance, QA/QC training, procurement controls, and oversight of the activities of the Nuclear Engineering

and Nuclear Support groups. Each of these three managers is responsible for identifying functional and programmatic deficiencies, tracking these deficiencies until they are fully resolved, and performing trend analyses.

The scope of NQA audits has been expanded to include comprehensive technical and performance-based audits in addition to audits of the adequacy and effectiveness of the QA program. Technical experts from outside the NQA organization are used, as necessary, to assist the experts in the NQA organization in the performance of these audits. NQA personnel will thus be able to focus on the adequacy and appropriateness of the technical activities of the various nuclear organizations. Trending and evaluation of the results of the independent QA/QC activities will highlight significant areas of concern for line management's attention. Periodic status reports on overdue closeouts on audit findings, together with quarterly trending reports, will be distributed to PECo's nuclear management to keep it informed of problem areas.

The Performance Assessment Section, responsible for assessing organizational performance and providing independent evaluations of the effectiveness of PECo's nuclear program, has been added to the NQA organization. These assessments and evaluations will be based on information such as plant performance trends, QA/QC reports, ISEG reports, trend analyses, direct observation of plant conditions and activities, internal evaluations similar to those performed by the Institute of Nuclear Power Operations (INPO), and special investigations and reviews.

The ISEG function also has been added to the NQA organization. The ISEG is responsible for performing independent reviews of plant operations, reviewing operating experiences that may indicate the need for improvements, recommending needed improvements, advising management on the overall quality and safety of operations, and maintaining independent oversight of the adequacy and timeliness of actions taken by line management in response to the Operating Experience Assessment Program (see Section 3.2.3 of this SER). The NQA organization is consistent with 10 CFR Part 50, Appendix B, and is an improvement because it reports at a sufficiently high level in the management chain so that it should be free of undue cost and schedule pressures and should be able to effect corrective actions for conditions adverse to quality. The integration of the separate QA/QC organizations into NQA should increase the visibility of NQA and enhance its functionability. Therefore, the NQA organization is acceptable to the staff.

3.2.2.1 General Manager-Nuclear Quality Assurance

The General Manager-NQA reports directly to the Executive Vice President-Nuclear. He is one of the six PECo members of the Nuclear Review Board (NRB). Reporting to him are the Assistant General Manager of NQA, the managers of the PBAPS and LGS Quality Divisions, the Manager of the ISEG, the Manager of Quality Support, and the Manager of the Performance Assessment Division.

Figure 6 in Section II of the restart plan shows the functional responsibilities of these managers. The reporting relationship of the General Manager-NQA and the functional responsibilities assigned to him are acceptable to the staff.

3.2.2.2 Shift Inspectors

As one of the steps to strengthen the site QA program, the licensee proposed to increase QC monitoring of shift activities. Recognizing that line management has primary responsibility for monitoring operating activities, the licensee discontinued continuous QA/QC monitoring of operating activities after the shift managers and their operating teams completed training and had demonstrated proficiency on shift.

The licensee has committed that QA/QC monitoring of operations will be conducted randomly so that all shifts and shift crews will be periodically monitored with the appropriate level of coverage determined by the General Manager-NQA and the site Quality Manager, depending on the level of shift activity and performance. This function is independent of the line organization, goes beyond the regulatory requirements of Appendix B, and is acceptable to the staff.

3.2.3 Operating Experience Assessment Program

The licensee has strengthened its Operating Experience Assessment Program (OEAP). The OEAP Manager, reporting to the Manager-Nuclear Support, is responsible for implementation of the program, including the following activities:

(1) receiving and screening information from both external sources (e.g., service information letters, significant event reports, significant operating experience reports, NRC information notices and bulletins, and significant event notifications) and internal sources (e.g., licensee event reports and ISEG event reports)

(2) forwarding appropriate information to involved line organizations and independent assessment groups

(3) consulting with involved line organizations to clarify, research, and evaluate the implications of information received; determine the need for new or corrective actions with respect to procedures, design, or practices; and determine lead responsibility for that action

(4) transmitting action requirements to the functional managers responsible for implementing the actions

(5) ensuring that copies of relevant information are received by the nuclear training, emergency planning, and other organizations that need this information

(6) maintaining the OEAP tracking program

(7) preparing monthly status reports, flagging overdue items and areas of concern

(8) annually assessing the effectiveness of the OEAP

The ISEG is responsible for maintaining independent oversight of the adequacy and timeliness of the actions taken by line managers in response to OEAP items.

Item I.C.5 of NUREG-0737, "Clarification of TMI Action Plan Requirements," provides guidance regarding procedures for feedback of operating experience to plant staff. PECo's OEAP is responsive to the NUREG-0737 guidance in this area and is, therefore, acceptable to the staff. Implementing procedures would be expected to provide more detail regarding OEAP functions.

3.2.4 Commitment Tracking Program

The licensee has developed a strengthened Commitment Tracking Program (CTP) to ensure integrated commitment tracking and effective, timely management of corrective action programs. Commitments made to NRC, INPO, and other organizations as well as those made by the licensee's NRB, ISEG, and NQA organization and under the OEAP will be tracked. Responsibility for implementing the CTP rests with the Licensing Manager in the corporate Nuclear Services group. As discussed in Sections 3.5 and 5.2 of Section I of the restart plan and in the licensee's letter dated July 22, 1988, line management is responsible for the making and completion of commitments. The Licensing Manager provides support to line management, which includes tracking the status of commitments and providing management reports on the status of each organization's commitments. The Superintendent-Technical has administrative responsibility for the CTP at the site.

The CTP will consolidate the past commitment tracking efforts of various licensee organizations. The program has been defined by the Executive Vice President-Nuclear, and an administrative procedure has been developed to implement the program as of July 1, 1988. The licensee cites the benefits of the CTP as establishment of a single point of line accountability, facilitation of commitment plan and schedule development, proactive management review of commitment activity, and facilitation of problem resolution at the lower management levels.

The staff concludes that the CTP is a useful tool for enhancing management processes in that it provides a systematic approach to commitment tracking, strengthens accountability, and will provide opportunities for management involvement up to the Executive Vice President-Nuclear in commitment management.

3.2.5 Nuclear Performance Management Program

The licensee has committed to establish a nuclear performance management program to achieve and maintain excellence. This program will include performance goals for excellence as well as technical and operational performance standards for each nuclear line organization. Performance indicators for tracking and reporting actual performance against the performance goals and standards will also be established. The Executive Vice President-Nuclear is responsible for having this program implemented throughout the nuclear organization by April 1989.

Measurement of performance against the established performance goals and standards will be tracked and reported to management. The timeliness and effectiveness of required corrective action at each management level will be monitored

and emphasized in the performance appraisal process. The NQA organization will assess the effectiveness of the program and report the results to the involved line management and the Executive Vice President-Nuclear.

Although not required by NRC and not required for implementation before restart, this program represents a good initiative by the licensee. The NRC will review its effectiveness during inspection activities.

3.2.6 Restart Readiness Self-Assessment

As noted above, the licensee has implemented programs to improve its self-assessment capabilities. The licensee's self-assessment of its readiness for restart will constitute an early test of these capabilities. The staff will evaluate the licensee's report in this regard and will report the results of its evaluation in conjunction with its own evaluation of readiness of the Peach Bottom plant for restart.

3.3 Company Management Oversight of Nuclear Operations

To meet this objective of strengthening the independent assessment process, the licensee has revised the Nuclear Review Board (NRB) charter and reporting relationship and has established a Nuclear Committee of the Board of Directors.

3.3.1 Nuclear Review Board

3.3.1.1 Membership

The NRB consists of nine members, six PECo personnel and three recently added outside consultants. The Peach Bottom Technical Specifications state that the qualification requirements for members of the NRB shall be an academic degree in an engineering or physical science field and a minimum of 5 years of technical experience, of which a minimum of 3 years shall be in one or more specified areas. The staff concludes that the incumbent members meet these qualifications.

3.3.1.2 Role and Relationships

The NRB is a group of individuals independent of plant operations charged with providing an independent review of safety-related activities. The specific responsibilities are described in the Peach Bottom Technical Specifications. The NRB reports directly to the Executive Vice President-Nuclear and submits copies of reports to the Chief Executive Officer of PECo. In addition, the Chairman of the NRB will meet directly with the Chairman of the Nuclear Committee of the Board and will report to this board at least annually.

The staff reviewed the provisions for the NRB and finds that they meet the guidance for independent review as described in Section 13.4 of the Standard Review Plan (NUREG-0800) and are acceptable.

3.3.2 Nuclear Committee of the Board of Directors

3.3.2.1 Membership

The membership of the Nuclear Committee of the Board of Directors (NCB) will consist of not more than four nonemployee directors from the PECo Board of Directors and one or more outside consultants to serve as advisors to the committee. The licensee has identified the consultants, and the staff considers them qualified to perform this function.

3.3.2.2 Role and Relationships

PECo has established the NCB as a standing committee of the Board of Directors. As such, it reports to the Board of Directors. Its role is to advise and assist the Board of Directors in its responsibilities for oversight of the company's nuclear operations. The NCB will receive information by directly meeting with the vice presidents of Peach Bottom and the Limerick Generating Station, other department managers, and the Chairman of the NRB and will receive information from and monitor the NRB, the Nuclear Quality Assurance Organization, and the Plant Operations Review Committee.

The staff reviewed the provisions for the NCB and concludes that the NCB, as an organizational group, goes beyond NRC regulatory requirements. The staff considers it a useful adjunct in keeping the PECo Board of Directors informed about the nuclear activities of PECo.

4 STATION MANAGEMENT LEADERSHIP

The licensee's analysis of the root cause of poor leadership by plant management, as discussed in Section II of the restart plan, follows:

> Leadership skills at PBAPS [Peach Bottom Atomic Power Station] were inadequate to develop employee understanding of and willingness to comply with high nuclear standards. Plant management's goals and performance expectations had not been communicated effectively to Peach Bottom employees; organizational and individual accountabilities had not been clearly established; and little effort had been made to establish a team approach to site work planning and implementation. In general, there were poor communications among site work groups, and between the station and off-site work groups. Much of the communication downward in the organization was handled by memos and there was a lack of open two-way communications between station management and employees. This lack of adequate leadership skills had resulted in poor morale in general. The operators, who were also feeling the results of the second root cause [failure to initiate timely licensed operator replacement training programs], had developed serious attitude problems evidenced by their lack of professionalism in the control room and by the hostility which they occasionally expressed toward other work groups, upper management, and visitors.

The licensee has developed the two corrective action objectives given below to address the lack of site leadership.

(1) establish a PBAPS management team with strong leadership and management skills

(2) increase the number of site management positions to ensure effective supervision and accountability for each function

The licensee proposed to identify individuals with strong leadership and management skills to staff each superintendent-level position and above to implement the first objective. The licensee stated it would conduct a search, internally or externally, as appropriate, to identify and select qualified candidates to staff positions at the superintendent level and above.

The licensee proposed to develop an organizational structure to provide increased management direction, control, authority and accountability for site work activities to implement the second objective. The licensee planned the following major activities to accomplish this task:

- identify work functions that should be removed from the responsibility of the plant manager to allow increased plant manager focus on day-to-day plant operations, while simultaneously providing additional dedicated management attention to areas such as outage management and station support

- establish a revised site organizational structure based on this analysis

- clarify and document functional accountabilities for each superintendent-level organization within the revised site organizational structure

The staff reviewed the qualifications and training of the Peach Bottom station management personnel against the staff guidance in Regulatory Guide (RG) 1.8, "Qualifications and Training of Personnel for Nuclear Power Plants" (Rev. 2, April 1987). This guide endorses ANSI/ANS-3.1-1981 or ANSI/ANS-N18.1-1971 for different personnel positions (see Regulatory Positions C.1 and C.2 in RG 1.8). The licensee has committed to ANSI N18.1-1971 except for the positions of senior health physicist and shift technical advisor.

4.1 Establishment of Management Team

To meet the first objective of establishing a management team with strong leadership and management skills, the licensee restructured the site organization.

4.1.1 Onsite Management Team

Figure 2.3 is a functional organization chart of the reorganized onsite management team with four positions reporting to the Vice President-PBAPS. The four positions are Plant Manager, Project Manager, Support Manager, and Training Superintendent. The staff reviewed the qualifications and training of PBAPS managers as given in Appendix B of the restart plan, with a special emphasis on the operations organization (see Section 4.1.2 of this SER), to ascertain that the qualification and experience of each meet the licensee's first objective to establish a Peach Bottom management team with strong leadership and management skills and satisfy the guidance of RG 1.8 and licensee commitments.

Vice President-Peach Bottom Atomic Power Station

On May 4, 1987 the licensee appointed Dickinson M. Smith, Rear Admiral, U.S. Navy (retired) as Manager-PBAPS. During his 25 years of Navy nuclear experience, Mr. Smith served as Chief of Staff, Allied Command Atlantic, where he directed an international military staff of 450 personnel. Previously he was Senior Military Commander in the Philippines, managing the largest U.S. Naval installation overseas with a total military and civilian work force of 35,000. Mr. Smith has introduced several major improvements in site management and organizational communications such as methodology for employees to report concerns, the "Tell it to the Manager" program, and regular meetings with personnel. After the corporate reorganization in October 1987, Mr. Smith assumed the responsibilities of the newly created position of Vice President-Peach Bottom Atomic Power Station.

On the basis of its review of Mr. Smith's qualifications, the staff concludes that he has sufficient leadership and management skills to meet the criteria of the first objective. Further, his education, experience, and training meet the staff guidance in RG 1.8 for a manager.

Plant Manager

To staff the redefined position of Plant Manager-PBAPS, the licensee selected John F. Franz, who, as Manager-Limerick Generating Station (LGS), provided leadership to the management team that achieved high ratings in the NRC's systematic assessment of licensee performance (SALP) for Limerick. Mr. Franz has 25 years of experience, including a variety of supervisory positions at Peach Bottom before 1976, 9 years as Superintendent-Operations, LGS, and nearly 2 years as Plant Manager, LGS. He has held NRC senior reactor operator (SRO) licenses for Peach Bottom Units 1, 2, and 3 and LGS Unit 1.

On the basis of its review of Mr. Franz's qualifications, the staff concludes that he has sufficient leadership and management skills to meet the criteria of the first objective. Further, his education, experience, and training meet the staff guidance in RG 1.8 for a plant manager.

Project Manager

The site Project Manager position has been filled by Kenneth P. Powers, who has over 20 years experience in engineering, craft supervision, quality control, cost engineering, and planning and scheduling, as well as Navy nuclear shipyard service. Thirteen years of his experience have been in the commercial nuclear industry, including seven years with Bechtel, where he was assigned for over four years as Project Field Engineer at LGS. There, he led an organization of 1,000 professional personnel through fuel loading and initial operations. Earlier in his career, while working for United Engineers and Constructors, he served as Project Engineering Manager at Seabrook Nuclear Power Station from pre-reactor pressure vessel hydrostatic testing through hot functional testing. He had demonstrated ability in planning, organizing, and leading complex organizations to achieve their stated goals.

On the basis of its review of Mr. Powers' qualifications, the staff concludes that he has leadership and management skills to meet the criteria of the first objective. Further, his education, experience, and training meet the staff guidance in RG 1.8 for a technical manager.

Support Manager

David R. Meyers is the Support Manager at Peach Bottom. He has leadership skills gained during his 23 years of experience in PECo's Electric Production Department. Mr. Meyers has held supervisory and management positions since 1973. In 1974 he became Assistant Superintendent at PECo's Delaware Station where he served until accepting the position at Peach Bottom. He was Vice Chairman and Chairman of the Pennsylvania Electric Association's System Operation Committee in 1982-1983 and 1984-1985, respectively.

On the basis of its review of Mr. Meyers' qualifications, the staff concludes that he has leadership and management skills to meet the criteria of the first objective. Further, his education, experience, and training meet the staff guidance in RG 1.8 for technical support personnel.

Training Superintendent

The licensee assigned Ernest A. Till as Training Superintendent. During 1986 and 1987, Mr. Till served as Nuclear Training Manager for Illinois Power Company, where he instituted major changes in the training department to ensure the success of general and INPO accredited training programs. Mr. Till has brought a wide range of professional experiences to his new position, including 33 years of service as a career Naval officer assigned to command positions in the nuclear field and 3 years as Director of the Mathematics and Science faculty at the U.S. Naval Academy in Annapolis, Maryland.

On the basis of its review of Mr. Till's qualifications, the staff concludes that he has sufficient leadership and management skills to meet the criteria of the first objective. Further, his education, experience, and training meet the staff guidance in RG 1.8 for technical support personnel.

4.1.2 Operations Organization

The Operations organization consists of Superintendent-Operations, Assistant Superintendent-Operations, Operations Support Engineer, shift managers and the shift crew. The Superintendent-Operations reports to the Plant Manager who, in turn, reports to the Vice-President, PBAPS. Figure 4.1 is an organization chart for the Plant Manager. The following is an evaluation of the qualifications and experience background of the key management personnel at the site.

Superintendent-Operations

John B. Cotton was appointed Superintendent-Operations in November 1987 upon successful completion of his SRO examination for Peach Bottom. Mr. Cotton later received his SRO license at Peach Bottom. Before accepting this position, Mr. Cotton served as Superintendent-Plant Services, PBAPS. He has had 15 years of experience with PECo, including 6 years as Maintenance Engineer at LGS, where he was SRO-licensed. During his 5 years as a U.S. Naval officer, Mr. Cotton completed Navy nuclear power training and performed in a variety of supervisory roles.

Assistant Superintendent-Operations

Frederick W. Polaski, who has over 16 years of experience as an engineer with PECo, has been assigned by the licensee as Assistant Superintendent-Operations. He has held positions of increasing responsibility in nuclear operations since he joined PECo in 1972. Mr. Polaski assumed the duties of Operations Engineer at Peach Bottom in April 1987, following the shutdown. Before that assignment, he had served as Outage Planning Engineer for 6 years. Mr. Polaski holds an NRC SRO license at Peach Bottom.

On the basis of its review of the qualifications of Messrs. Cotton and Polaski, the staff concludes that they have sufficient leadership and management skills to meet the criteria of the first objective. Further, their education, experience, and training meet the staff guidance in RG 1.8 for an operations manager.

Operations Support Engineer

The Operations Support Engineer is Thomas M. Mitchell, who is on loan to PECo from the Institute of Nuclear Power Operations (INPO). At INPO, he served as Assistant Manager, and Manager of the Radiological Protection Department, and as Secretary of the Corporation and Staff Assistant to the President. He has 10 years of experience in nuclear engineering and certification as a health physicist (power reactors). He has a B.S. degree in nuclear engineering and an M.S. degree in mechanical engineering.

On the basis of its review of Mr. Mitchell's qualifications, the staff concludes that he has sufficient leadership and management skills to meet the criteria of the first objective. Further, his education, experience, and training meet the staff guidance in RG 1.8 for technical support personnel.

Shift Managers

The newly created positions of shift managers complete the operations management team. These positions have been filled by six licensed senior reactor operators.

They each hold a degree in engineering and have had 6 to 14 years of experience with PECo in a variety of technical and supervisory roles. Each of the shift managers has completed "Managing for Excellence," which is a 4-week intensive management training program specifically designed to enhance managerial skills for this new position. They have demonstrated their leadership ability by building shift teams that have a high degree of cohesion and proficiency, as demonstrated, to the satisfaction of NRC evaluators, by the performance of these teams during simulator training (see Section 6.2.2).

On the basis of its review of the qualifications of the six shift managers, the staff concludes that they have sufficient leadership and management skills to meet the criteria of the first objective. Further, their education, experience, and training meet the staff guidance in RG 1.8 for supervisors requiring NRC licenses.

4.1.3 Overall Evaluation of the Management Team

The licensee has assembled a sufficiently strong leadership team to provide new direction at Peach Bottom station. All five senior site managers (the Vice President, Plant Manager, Project Manager, Support Manager, and Training Superintendent) have demonstrated records of successful leadership and achievement across a broad spectrum of relevant backgrounds. Three of the five (the Vice President, Project Manager, and Training Superintendent) were hired from outside PECo and contribute new managerial perspectives from other organizational cultures.

The Operations organization at Peach Bottom has been similarly infused with management talent, as have other management positions in the expanded site organization. Of the top 16 PBAPS line managers at the superintendent level or above, 7 have been brought in from outside PECo, 2 have been transferred from LGS, 4 have been assigned from the corporate organization, and 3 have come from within the Peach Bottom organization. Collectively, these managers provide a

sufficiently strong leadership team with a balanced combination of new perspectives and adequately solid continuity and a common mandate to establish a proper site culture.

On the basis of its review of the qualifications of personnel, the staff concludes that the licensee has established a site management team with strong leadership and management skills. The team has the necessary managerial and technical resources to provide assistance to the plant staff for normal and emergency operation. The staff concludes that these staffing changes adequately address the objective to establish a Peach Bottom management team with strong leadership and management skills and, therefore, are acceptable. The staff further concludes that these personnel meet the guidance of RG 1.8 and the standards of ANSI N18.1-1971.

4.2 Supervision and Management Accountability

The licensee provided detailed information in Appendix E to Section II of the restart plan and a summary in Section 2.2.2 of the same document. The staff reviewed the information to determine if it met the second objective to increase the number of site management positions to ensure effective supervision and accountability for each function. The staff also reviewed the licensee's new operating organization and plant staffing plan against applicable portions of staff guidance in Sections 13.1.2 and 13.1.3 of the Standard Review Plan (NUREG-0800), with special emphasis on supervision and management accountability. The following is a summary description of the licensee's corrective actions and the staff's evaluation of those actions.

As part of the licensee's corporate analysis preceding the nuclear reorganization, the distribution of work within the corporate matrix organization in existence at that time was reviewed by the licensee to determine which work functions should be reassigned to the emerging nuclear organization. At the site level, each work function was analyzed to determine if it was a necessary part of the Nuclear Plant Manager's responsibilities for day-to-day plant operations or if it could be reassigned to other site organizations responsible for support activities. This analysis resulted in the establishment of a nuclear-dedicated corporate organization and a revised site organization that provides more focused management direction and accountability for plant operations, outage planning and management, and other station support activities.

Table 4.1 provides a comparison of Plant Manager's staff and site management positions at Peach Bottom at the time of the shutdown order (March 1987) and after the reorganizations (April 1988).

In the new site organization, there are now 54 management positions at the senior engineer level or above (as compared with 23 such positions before the reorganization) to provide dedicated management attention to each site function and to ensure increased supervision of site personnel.

In addition to increased management accountability, there also is more employee accountability in the revised organization. All permanent and contract employees assigned on a regular basis to Peach Bottom work locations are accountable through their PECo or contract management reporting chains to the Vice

President-PBAPS, except for those personnel involved in independent assessment and oversight activities. This reporting structure enables the Vice President-PBAPS to have full authority for planning, directing, coordinating, and controlling all site activities.

Figure 2.3 shows the top management reporting structure and division of functional responsibilities for the site organization. Figure 4.1, which shows the Plant Manager's organization, provides more information about the reporting structure and functional responsibility assignments at the superintendent level.

The Plant Manager and his organization are responsible for operating the station safely, reliably, efficiently, and in compliance with all applicable regulatory requirements. The revised definition of functional responsibilities for this organization emphasizes the day-to-day operations of the station and eliminates some of the Plant Manager's former responsibilities for outage planning and management, modifications, personnel administration, security, and other support activities that have been assigned to the Project and Support organizations. The Plant Manager serves as PBAPS Emergency Director in accordance with the PBAPS Emergency Plan.

Previously, there were two superintendents reporting to the Manager-PBAPS; with the reorganization, there are now four superintendents.

- Superintendent-Operations is responsible for shift operations, including supervision of shift managers and shift technical advisors; for operations support, including blocking coordination; shift training; and administration.

- Superintendent-Maintenance/Instrumentation and Control (I&C) is responsible for developing and implementing preventive, predictive, and corrective maintenance programs for station mechanical, electrical, and I&C equipment.

- Superintendent-Plant Services is responsible for providing on-site plant chemistry, health physics, and radwaste management services in support of plant operations.

- Superintendent-Technical is responsible for providing plant technical support; reactor system and test engineering; fire protection; site coordination of the Licensee Event Report Program, the Commitment Tracking Program, and the Operating Experience Assessment Program; and site interfaces with Federal agencies, states, and industry.

The licensee's restart plan describes the structure and accountability of the new organizations under all four site managers (Plant Manager, Project Manager, Support Manager, and Training Superintendent). Although the staff performed a general review of these organizations, staff emphasis was directed toward the Plant Manager's organization, particularly the operations staff under the Superintendent-Operations.

Figure 4.2 shows the management structure for shift operations. The licensee established and filled the new position of Assistant Superintendent-Operations to assist the Superintendent-Operations in day-to-day shift operations management and administration and to ensure that one of these two senior operations managers is routinely available to operations personnel on shift.

The licensee established the position of shift manager (one for each of six shifts), reporting to the Assistant Superintendent-Operations, to provide a higher level of management authority on each shift so that the past problems of operators being isolated from management could be avoided. The shift managers serve as the Plant Manager's direct representatives on shift and have the authority to control shift operations. They coordinate and direct the activities of health physics, chemistry, maintenance, instrumentation and control, security, and construction personnel as well as vendor personnel and other site personnel during their shift as these activities relate to operating the plant. The shift managers directly supervise the shift supervisors and shift technical advisors (STAs).

The licensee established the position of the floor foreman who is responsible for coordinating and monitoring the activities of the non-licensed operators and overseeing such areas as watchstanding performance, attentiveness to duty, training, and overtime. The floor foreman reports to the shift supervisors.

The licensee established the position of Operations Support Engineer to head the new Operations Support organization. The Operations Support Engineer reports directly to the Assistant Superintendent-Operations. The Operations Support organization was developed to support the daytime shift organization by relieving operators and shift management of some of their administrative burden and ensuring coordination of all work associated with control room activities.

Reporting to the Operations Support Engineer is the Operations Support Superintendent, another new position. In addition to other support duties, this person is responsible for overseeing training and administrative matters for the shift supervisors.

The blocking coordinator reports to the Operations Support Superintendent. The new blocking coordinator position, available to licensed SROs on a rotational basis, was established to ensure the efficiency and safety of the blocking permit process. The blocking coordinator will supervise a group of licensed operators temporarily assigned to the processing of blocking permits for 2 to 3 months at a time. This arrangement will provide off-shift rotational opportunities to licensed SROs and ROs.

At the time of restart, each of the six shifts is to be staffed by a shift manager, two shift supervisors, three ROs, an STA, and a number of non-licensed operators. This shift complement reflects an increase of one additional shift supervisor beyond the requirements of the Technical Specifications and provides additional supervisory direction for shift operations activities and backup relief to the lead shift supervisor. One shift supervisor will remain in the control room; the other will be available to go where needed to observe, supervise, and direct activities throughout the rest of the plant.

A fourth licensed RO is to be added to the team as additional licensed-operator resources become available. Thus, each shift team will be augmented to provide greater flexibility for relief and rotation of operators and increased resources to handle unusual occurrences. The licensee believes that these changes, combined with an increased reserve of licensed operators, will be sufficient to ensure that any overtime will be managed effectively. The control of overtime is discussed in Section 6.4.2.5.

The licensee also changed the shift rotation schedule from reverse rotation to forward rotation. The schedule change was a result of licensee analysis performed by a task force of operators and management. The licensee management included operators in the task force to ensure that any change in shift policy would have a positive effect on morale. Early feedback from the operations staff indicates that the change in the shift rotation schedule has had a positive effect.

The new nuclear organization eliminates the company-wide matrix under which the licensee formerly provided engineering, maintenance, and construction support for its nuclear operations. The new site organization provides single-point accountability and control for site operations under the Vice President-PBAPS.

The licensee analyzed each site function to determine if it was a necessary part of the nuclear Plant Manager's responsibilities for day-to-day plant operations or if it could be reassigned to other site organizations responsible for support activities. This analysis resulted in a revised site organization (expanded from 23 to 54 management positions at the senior engineer level or above) that provides more focused direction and accountability for plant operations, outage planning and management, and other station support activities, including contractor activities.

The revised organizational structure also provides for a sufficiently strong corporate management presence on site, shortens and strengthens the nuclear operations chain of command, and strengthens interactive communications between members of the station organization and the management personnel of offsite support organizations.

The responsibilities and authorities of the personnel involved in the many disciplines required to safely operate a nuclear plant have been allocated among several upper-management positions to ensure more concentrated attention to those activities while establishing a direct line of accountability to the Vice President-PBAPS and ultimately to the Chief Operating Officer.

The revised site organizational structure will assist the Plant Manager in focusing his attention on safe and reliable operations by designating separate management and accountability authority for outage planning and site support activities, thus relieving the Plant Manager of these duties. The reassignment of outage planning and site support functions also will assist in focusing management attention in these areas.

A site-dedicated training function has been established to ensure more attention and responsiveness to site training needs, and the corporate Nuclear Training Division is intended to provide technical direction and support.

Sufficient changes have been made to the Peach Bottom Operations organization to provide additional managerial and supervisory focus on shift control room operations and floor activities. The addition of the shift manager position also addresses the past problem of the isolation of operators from management.

The new daytime Operations organization relieves operators of some of their administrative burden, while ensuring effective coordination of all administrative work associated with shift control room activities.

Additional reactor operator coverage on each shift, once more licensed personnel become available, will provide more flexibility for relief and rotational assignments and increased resources to handle any unusual occurrences on shift.

On the basis of its review of the information in the restart plan, the staff concludes that the licensee has sufficiently increased the number of site management positions to provide for effective supervision and accountability for each function and to meet the criteria of the second objective.

The staff further concludes that the licensee's operating organization is acceptable and meets the applicable requirements of 10 CFR 50.40(b) and 50.54(j) through (m). The licensee has described the assignment of plant operating responsibilities, the reporting chain up through the Chief Executive Officer of the company, the proposed size of the regular plant staff, the functions and responsibilities of each major plant staff organization, the proposed shift crew complement for two-unit operation, and the qualification requirements for members of its plant staff. The licensee also provided the resumes for its management and principal supervisory and technical personnel.

Therefore, the staff concludes that the licensee's new operating organization and plant staffing plans are acceptable.

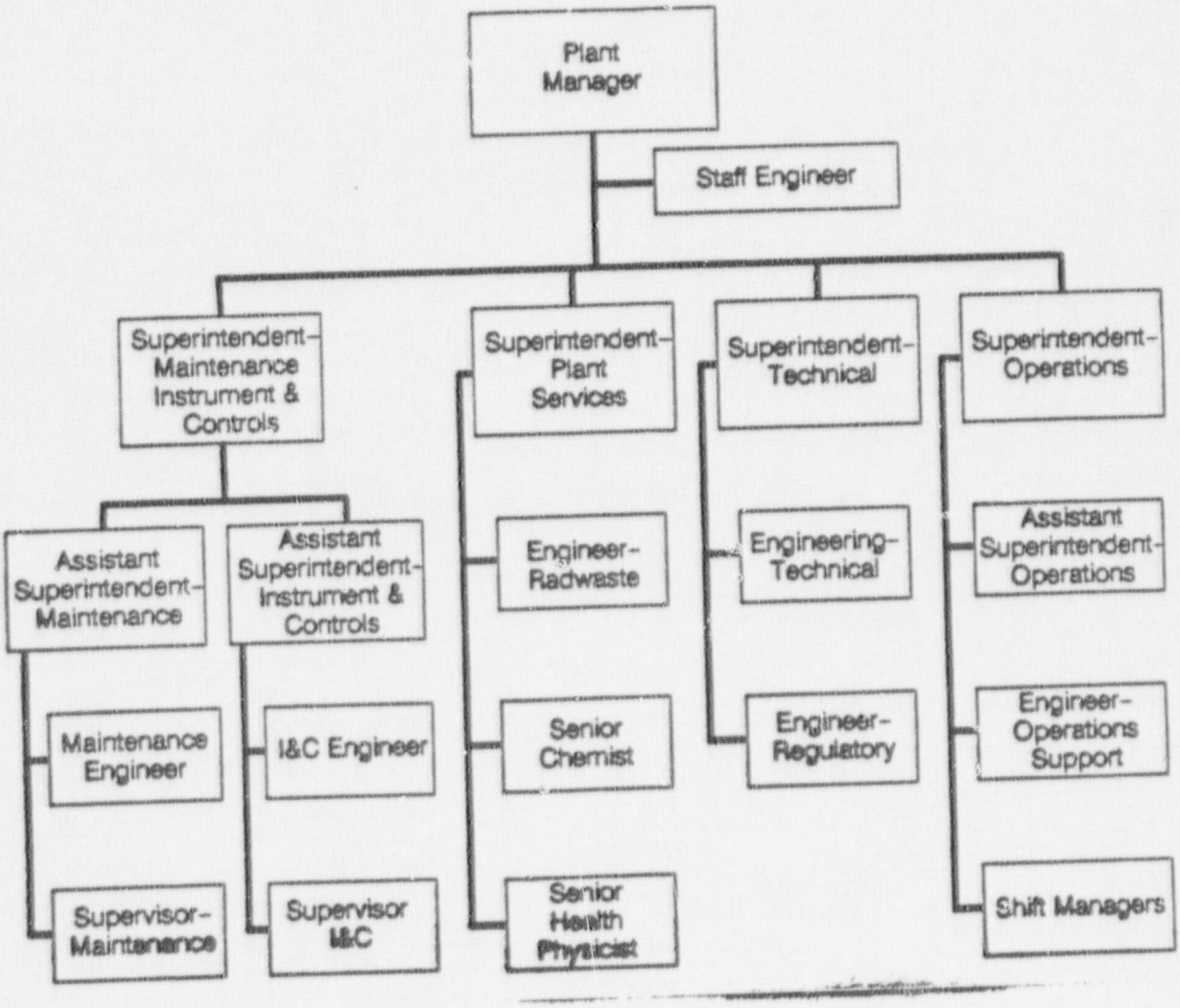


Figure 4.1 Plant Manager organization chart

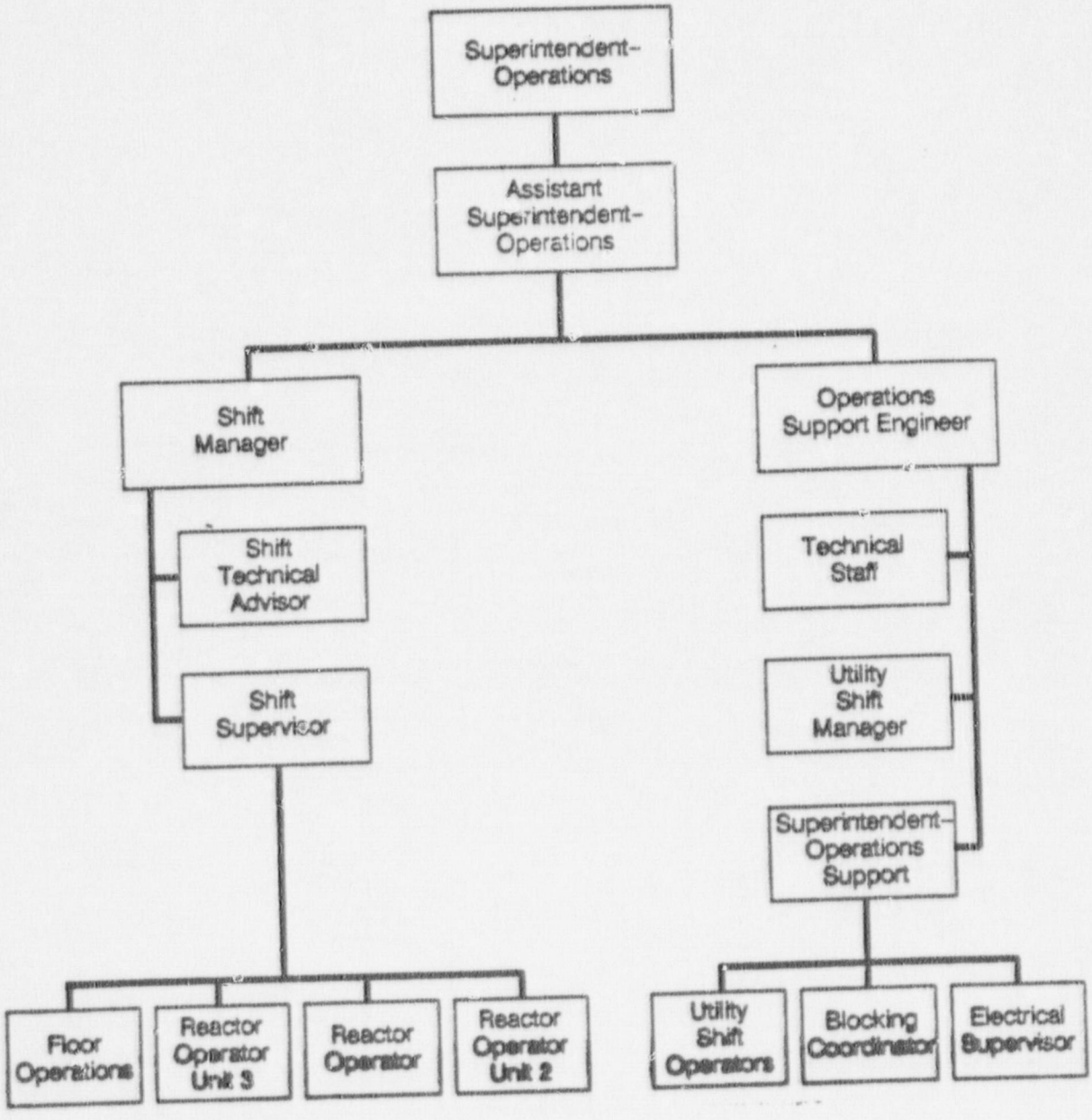


Figure 4.2 Shift operations management organization chart

Table 4.1 Plant Manager's staff and site management positions

March 1987		April 1987	
PBAPS Plant Manager's Staff[1]			
Plant Manager	1	Plant Manager	1
Superintendents	2	Superintendents	4
Staff engineer	1	Staff engineer	1
Senior engineers	8	Senior engineers	10
		Shift managers	6
Totals	12		22

PBAPS Site Management Positions[1]

Plant Manager's staff		Additional matrixed management[2]		PBAPS line management reporting through the nuclear organization[2]	
Manager	1	Superintendents	3	Vice President-PBAPS	1
Superintendents	2	Assistant super-intendents or equivalents	3	Managers	4
Staff engineer	1	Senior engineers or equivalents	5	Superintendents	10
Senior engineers	8			Staff Engineer	1
				Assistant superintendents	6
				Senior engineers or equivalents	26
				Shift managers	6
Totals	12		11		54

[1] Management staff is defined as those positions included in the company's Management Salary Plan.
[2] Does not include site quality organization management staff.

5 LICENSED OPERATOR RESOURCE DEVELOPMENT

Chapter 3 of Section II of the restart plan addresses corrective action objectives, corrective actions, and associated major activities to eliminate or mitigate the root cause of the licensee's failure to initiate timely licensed operator replacement training programs.

The licensee's analysis of this root cause is as follows:

> There were not enough reserve licensed operator personnel or new replacements ready to take over as the existing work force transferred, retired, or resigned. Although shift coverage met safety requirements and Technical Specifications, there was an inadequate supply of licensed operator personnel to provide flexibility for relief or rotational assignments, handle the shift administrative workload effectively, or assure direct supervision of floor activity.
>
> Many licensed operator personnel were complaining about the negative impact on their family lives created by having to work extensive overtime. They were also seriously concerned about the lack of opportunities to pursue alternative career paths or to have some relief from shift work at some point in their career progression with the company.

To address this root cause, the licensee established the following corrective action objectives:

(1) Ensure an adequate reserve of licensed operators to provide flexibility for relief and rotational assignments and add additional supervisory and reactor operator coverage beyond the safety requirements on each shift. Specifically,

- ensure availability of sufficient numbers of qualified licensed operators to restart Peach Bottom station
- develop and initiate plans to create and maintain an adequate reserve of licensed personnel ready to fill temporary and permanent vacancies
- staff, on a rotating basis, a blocking and support group to reduce the administrative burden on the control room shift

(2) Ensure that shift personnel have opportunities to pursue alternate career paths and to have relief from shift work during their career progression at PECo. Specifically,

- develop additional career paths for shift personnel
- develop educational programs for operator personnel who wish to progress into technical and/or management positions

The staff analyzed the corrective actions proposed and/or implemented by the licensee. This analysis is presented in the sections that follow.

5.1 Current Resources

The following lists give the current licensed operator positions at Peach Bottom station and present staffing:

Senior Reactor Operator Licensed Personnel

- 1 superintendent-Operations
  Current schedule: in place

- 1 assistant superintendent-Operations
  Current schedule: in place

- 1 operations support engineer
  Current schedule: in place

- 6 shift managers
  Current schedule: in place

- 2 backup shift managers
  Current schedule: One with an inactive license is in place. One with a license that is restricted to operation during cold shutdown and refuel modes only.

- 12 shift supervisors
  Current schedule: in place

- 12 plant staff and/or licensed engineers
  Current schedule: 10 plant staff senior reactor operators with inactive licenses are in place.

Reactor Operator Licensed Personnel

- 24 operators
  Current schedule: 25 are in place: 14 are licensed to operate during all modes and 11 are restricted to operate during the shutdown and refueling modes only.

The licensee analyzed the number of licensed operators required for safe restart. Although the number currently available meets the requirements of the Technical Specifications, the licensee determined that augmenting the licensed operator staff with people from outside PECo would be beneficial in order to release additional Peach Bottom reactor operators for senior reactor operator training and to provide assistance with the processing of blocking permits.

The current staffing levels are sufficient to fill the Superintendent-Operations, the Assistant Superintendent-Operations, and the Operations Support Engineer positions. Current staffing levels also support the complement of six shift crews with each crew composed of one shift manager, two shift supervisors, and three reactor operators.

The licensee currently has 14 reactor operators with licenses applicable to all modes of operation and 11 reactor operators with licenses restricted to the cold shutdown and refueling modes of operation. There are 6 shift managers and 12 shift supervisors. The 11 reactor operators with licenses restricted to the cold shutdown and refueling modes of operation require additional training to have their licenses converted to allow operation in all modes. The staff will review the work hours of the operators and the effectiveness of training during the startup period.

The current staffing levels for licensed personnel described above satisfy the guidance of American National Standards Institute (ANSI) Standard N18.1-1971 as endorsed by Regulatory Guide 1.8, "Qualification and Training of Personnel for Nuclear Power Plants" (Rev 2, April 1987), 10 CFR 50.54(m), and the facility Technical Specifications for the startup and operation of a single unit. On the basis of its review, the staff concludes that the licensee satisfies the requirements for safe startup and operation of a single unit. Startup and operation of both units will be possible only after more operators holding unrestricted licenses are available.

5.2 Future Staffing Levels

The licensee has committed to establishing a staff of at least 42 active licensed members for two-unit operation. The breakdown of this goal is:

6 - shift managers (SRO)
12 - shift supervisors (SRO)
24 - reactor operators

As noted in Section 5.1, this goal is satisfied, except that 11 of the reactor operators have licenses restricted to the shutdown and refueling modes of operation.

The licensee also has committed to having licensed operators with either active or inactive licenses at the site. These additional licensed operators will be available in the future as staffing permits; the licensee projects them to be in place by 1991.

To ensure adequate reserves of licensed operators, the licensee has proposed corrective actions to (1) develop and initiate plans to create and maintain an adequate reserve of licensed personnel ready to fill temporary and permanent vacancies and (2) staff a blocking and support group, on a rotating basis, to reduce the administrative burden on the control room shift. The major activities associated with these corrective actions are listed below.

- develop higher entry standards and appropriate compensation schedules for the recruitment and hiring of future candidates for licensed operator positions

- develop and initiate a plan for additional operator training programs to provide an ongoing reserve of licensed operators

- accelerate the operator training program to increase the number of available licensed operators more quickly

- develop a plan to identify and train qualified personnel to staff a blocking and support group

- clarify and document the responsibilities of the work control group

The licensee has taken several actions to accelerate the recruitment and training of candidates for licensed operator training. These actions include:

(1) Existing personnel policies and compensation practices related to the hiring of new employees were reviewed to determine what changes were needed to permit nuclear personnel to be hired more promptly and at other than entry levels. Following the review, both the written policy and compensation practices were appropriately changed.

(2) In July 1987, higher standards of screening for candidates for the licensed operator progression were adopted to include a minimum of 2 years of post-high-school technical education, U.S. Navy nuclear training, or equivalent education and work experience. Successful candidates are paid more money at the starting level. The hiring procedures have been revised to include three new provisions: (a) a review by the site vice presidents is conducted to establish budgeted positions critical to the operation at each nuclear plant; (b) an "open posting" is maintained for these critical positions so that the licensee's ability to expand forces and/or replace losses will be maximized; and (c) any requisitions for employment in these critical areas are expedited by simultaneous processing of potential candidates for transfer from within the company and newly hired people from outside the company.

(3) The licensee's Personnel and Industrial Relations organization was requested to recruit and hire additional licensed operator candidates in accordance with these revised requirements. Fifteen employees (14 newly hired people with Navy nuclear experience and 1 internal PECo transfer) were recruited in the summer of 1987 and successfully passed a plant operator screening test. They are completing qualification as auxiliary operators at Peach Bottom. The licensee also is hiring 20 additional employees in 1988 to enter training as helpers.

(4) An accelerated license training program for experienced Peach Bottom plant operators started in August 1987. This led to the licensing of additional operators who are restricted to operation in the shutdown and refueling modes in the summer of 1988. A continuing series of licensed operator training classes will be conducted to fill new licensed operator positions, maintain an adequate reserve of licensed personnel ready to fill temporary and permanent vacancies, provide career path opportunities, and manage overtime of operators effectively.

(5) For the short term, the licensee had a team of three Hope Creek licensed personnel, provided by Public Service Electric and Gas Co., to assist in processing blocking permits which had previously consumed significant amounts of time and attention of control room operators. The operators on loan from Hope Creek did not perform licensed duties and were released when additional licensed operators were available to work at Peach Bottom.

(6) An adequately staffed training department is needed to support initial training of operators and continuing requalification training. The licensee recognizes that effective and timely training of all nuclear personnel is a critical element in improving self-assessment and problem-resolution capability within the nuclear line organizations. A corporate training organization reporting to the Vice President-Nuclear Services has been established.

The onsite training organization has been established as a superintendent-level position reporting directly to the Vice President-Peach Bottom. The Training Superintendent will also work with the corporate training organization.

The licensee's plans for recruitment, hiring, training, and licensing of operators represent a commitment to establishing a large body of trained and trainable operators. The plans allow for increased hiring flexibility with higher initial standards for entry at a higher starting wage. These plans should increase the licensee's ability to recruit qualified employees. To evaluate the aptitude of the applicants, the licensee administers a new-employee screening test. Additionally, a candidate who is enrolled in a licensed operator training program is screened during this program to verify that he/she is ready for licensing. This screening is intended to ensure that candidates for license application are adequately qualified.

On the basis of its review, the staff concludes that the licensee's plans to increase its licensed operator staff are appropriate because of revised recruitment practices, accelerated training programs, management restructuring of the training organization, and management commitment to the goal of increased staffing.

5.3 Offshift Rotation and Alternative Career Paths

The licensee has proposed corrective actions to develop (1) additional career paths for shift personnel and (2) educational programs for operator personnel who wish to progress into technical or management positions. The major activities to support these corrective actions are listed below.

- develop additional career path and rotational offshift assignment opportunities within the shift job progression for non-degreed personnel.

- develop additional opportunities for lateral transfers and/or promotions for shift personnel into other functional areas where additional operating experience would be beneficial

- research available options and recommend a program leading to a bachelor's degree in engineering for licensed operators

- research available options and recommend a program leading to a certificate in nuclear science for operator personnel

To implement some of the corrective actions and major activities, the licensee has established additional career path opportunities for licensed and non-licensed operator personnel by the new structure of the Operations organization described in Chapter 2 of Section II of the restart plan. The new position of

operations support superintendent establishes an additional career progression opportunity for licensed personnel beyond operating shift assignments. The new position of blocking coordinator provides licensed operators with an additional offshift assignment possibility. The shift managers will also rotate to and from other management positions every 3 to 5 years to increase their understanding of other organizations.

As more licensed operators become available for shift assignments, the licensee plans to open other career path opportunities for licensed operators who choose to accept offshift assignments in training, quality assurance, outage planning, and other site and corporate support functions that would benefit from the addition of more staff with operating experience.

The licensee has stated its commitment to support the career advancement of licensed operator personnel into positions requiring college degrees. A special program at a local university is being investigated for licensed operators who wish to earn a bachelor's degree in engineering. The licensee intends to provide support in terms of tuition and paid leave for selected personnel who wish to pursue this educational opportunity. The licensee is also investigating a continuing education alternative with the University of Maryland off-campus program in nuclear operations technology. Both programs will offer licensed operators the opportunity to progress into plant and corporate management or professional assignments, including the position of shift manager.

The current plans for offshift rotation and career advancement depend greatly on the continuing development of available licensed personnel to take their places on the crews. The licensee's plans to develop licensed personnel are adequate to satisfy these goals; however, attrition of licensed personnel and failure by candidates in training to become licensed will directly affect these goals.

On the basis of its review, the staff concludes that these actions are sufficient to meet the objectives of providing opportunities for offshift rotation and career advancement paths for licensed personnel.

5.4 Overall Conclusions

On the basis of its review, the staff concludes that the licensee satisfies current requirements for shift staffing per 10 CFR 50.54 and the facility Technical Specifications for the startup and operation of one unit. Also, the licensee's plans for resource development are adequate to increase the number of licensed operators to allow two-unit operation.

6 CULTURAL CHANGE

Chapter 4 (Section 4.2) and Chapter 5 (Section 5.3) of Section II of the plan for restart address the root cause stated as "the station culture, which had its roots in fossil and pre-TMI [Three Mile Island] operations, had not adapted to changing nuclear requirements." In evaluating the licensee's responses to this issue, the staff has used the knowledge gained from the extensive body of theoretical and applied research in the fields of management and organization development. The staff also has relied on its experience in assessing utility management as part of the licensing function of the NRC.

To address this root cause, the licensee has established the following four corrective action objectives:

(1) identify and communicate the cultural values which PECo and PBAPs management are committed to supporting in the pursuit of nuclear excellence

(2) provide training and team building support for management to live by these values

(3) provide training and communication processes which support employee commitment to these values

(4) ensure that management policies, programs and control systems support these cultural values

Section I of the plan for restart (Sections 3.8 and 5.2) addresses aspects of corporate management's failure to recognize the developing severity of the problems at Peach Bottom; thus, not taking sufficient corrective actions. The licensee has proposed to develop the management systems and managerial skills that will strengthen self-assessment and problem-resolution capabilities within the nuclear organization as one of its objectives to correct this problem.

The corrective actions being performed or planned to meet each of the specific corrective action objectives are evaluated in the sections that follow.

6.1 Identification and Communication of Cultural Values

The licensee's management states in its restart plan that it is building nuclear cultural values on the themes of:

- individual accountability for performance
- individual responsibility for safety and assurance of quality
- teamwork
- open and candid communications
- striving for excellence in all aspects of nuclear operational and organizational performance

To support these themes, licensee management has developed a variety of written communications as described in Sections 4.2.1 and 5.3.1 of Section II of the restart plan. These communications include

- the nuclear group vision, mission statement, and objectives
- plant objectives and goals to support nuclear group objectives
- nuclear group management philosophy for assurance of quality

A variety of methods have been used to impart the contents of these communications to all employees: the written communications have been published in company newspapers, they have been discussed at meetings, they have been included in general employee training, and they have been posted on bulletin boards.

In addition, Section 2.3 of Section I of the restart plan indicated that the Manager-Organization and Management Development Division will assist the nuclear management team to establish and implement specific objectives for change in terms of management and work behaviors (i.e., cultural change) and to monitor progress toward meeting those objectives. In supplementary communications, the licensee provided additional information on the process to be used to ensure the assimilation of the nuclear group's vision, mission, and values throughout the organization. Behaviors identified as indicative of the nuclear group's vision, mission, and values will provide the basis for ensuring their assimilation. This process will be initiated in early 1989. Another program to support cultural change is the program, "Managing Organizational Change" (MOC) implemented across the entire nuclear group and whose objective is to develop implementation strategies for moving the organization toward its desired cultural values.

The staff finds that the cultural values as described in the plan for restart and in supplementary information have been identified and communicated.

6.2 Management Training and Team Building for Cultural Change

6.2.1 Managing for Excellence Evaluation

The staff's review of Section I of the restart plan (Sections 3.8 and 5.2) and Section II of the restart plan (Sections 4.2.2 and 5.3.2) indicates that the licensee has initiated a number of activities related to management training and management team building. The training activities include formal training (e.g., the "Managing for Excellence" (MFE) course), individual coaching/consulting by organizational development personnel, training in working with personnel management policies and managing meetings, and management modeling and visits to well-managed plants. In supplementary communications, the licensee provided additional information and a syllabus of the manager/supervisor training program that will proceed from the MFE course and will focus on improving organizational performance. Other training activities will be developed after the results of a training needs assessment survey have been considered.

The team-building activities include formal training, for example, the MFE course, the simulator team training, and the "Personal Effectiveness" (PE) course for non-operations department first- and second-line supervisors; intergroup meetings; a variety of site management meetings to discuss program development, progress, plans, and priorities.

On the corporate level, the licensee established an Organization and Management Development Division; this division has two sections: (1) Organization Development and (2) Management and Professional Development. This division is responsible for providing processes by which nuclear managers can identify blocks to goal achievement, develop strategies to move from the present state to the desired state and monitor the progress of the transition, and also to assist managers with monitoring and assessing the "people management" aspects of organization performance. A key element in this process is helping nuclear managers to specify the changes desired in terms of management and employee work behaviors and communications and to routinely assess progress toward achieving the desired organizational values, performance, and culture. This division is also responsible for developing the management potential of technically competent individuals who currently do not fill management roles and to assess managerial skills and abilities of present managers and upgrade their knowledge, skills, and competencies through a variety of training activities.

In addition to evaluating the plan for restart, the staff observed the MFE course and simulator team training course and interviewed several shift managers. The staff found, as stated in Inspection Report 50-277/278-88-10, that the training programs were effective in building basic managerial skills, interpersonal communication skills, and team work skills. Furthermore, interviews with the shift managers confirmed earlier staff observations of the MFE course that the shift managers appear to be thoroughly committed to their new roles and to creating a healthy operational environment by promoting safety, quality, and scheduled in that order of priority.

The staff finds that the actions undertaken or proposed in the plan for restart are acceptable and should respond to staff concerns cited in Inspection Report 50-277/278-88-10 about the need for managers to reinforce the new behaviors, support improved communications, and promote understanding of personnel, management, discipline, and administrative policies. However, the NRC staff will periodically monitor the training programs to determine whether they continue to be effective and whether management will continue to reinforce the new culture.

6.2.2 Shift Team Evaluations

As a component of initiating a cultural change in the operations staff, the licensee formed new operating crews under the leadership of the shift managers. These crews were given training on a team basis to integrate the benefits of previous training in communications, attitude skills, and management into shift operations.

The NRC assessed all operating shift crews and the shift managers to measure the following eight areas:

(1) overall crew interaction
(2) knowledge and use of Peach Bottom procedures
(3) knowledge and use of Technical Specifications
(4) crew communications
(5) operator responsibility

(6) supervisory ability
(7) shift managers' abilities to supervise and lead the operating crews
(8) shift managers' implementation of the emergency plan

This assessment was performed to evaluate how effectively the shift manager and operating crews had been trained in the above areas to ensure that the operating crews performed acceptably for the safe restart of the Peach Bottom reactors.

The staff reviewed the fidelity of and the similarity of the Limerick simulator to the controls at Peach Bottom; and, on the basis of this review, the staff determined that the Limerick simulator was suitable for assessment of the Peach Bottom operating crews, if the assessment areas would be limited to those described above.

The training staff at Peach Bottom provided the NRC staff with copies of the simulator training scenarios and an evaluation of how compatible these scenarios were for use on the Limerick simulator. Information also was provided on the cause and effect of simulator malfunctions. The NRC used the simulator training scenarios and other information to develop scenarios for the crew evaluations. A typical scenario contained at least one of each of the following events: a normal evolution, a component failure not expected to cause a scram, an instrument or controller failure not expected to cause a scram, and a major failure causing a transient.

The training staff at Peach Bottom provided the NRC with its team training learning objectives, its evaluation checklist, the administrative procedures that define the conduct of operations, and position descriptions for the shift manager and the other members of the operating crew. From the information provided, NRC operator licensing examiner experience, and other sources, the staff developed performance standards for making the assessments.

Each operating crew was evaluated, in real time, during its performance of two simulator scenarios that the NRC staff had prepared.

At the completion of the assessments in January 1988, the staff found that all shift operating crews satisfied the performance standards in all areas assessed.

The shift managers were effective in their roles as crew supervisors and leaders. They called the operators' attention to plant conditions, when appropriate; conducted shift briefings on existing conditions and planned actions; correctly implemented the emergency plan, when warranted; and coordinated support from other organizations, as necessary. The performance standards, the assessments and their results are documented in Inspection Report 50-277/278-87-35.

Subsequent NRC evaluations of the shift operating crews were performed during August and September 1988 at the Peach Bottom simulator. During these evaluations, some performance deficiencies were found in the use of the plant transient response procedures, performance of surveillance procedures, and in the implementation of the emergency plan. The licensee has committed to additional training to correct these deficiencies. The staff will perform additional assessments to determine the effectiveness of this training. The results of the additional assessments will be needed to make a final assessment of readiness for restart.

6.3 Employee Training and Communications for Cultural Change

The staff's review of Section II of the restart plan (Sections 4.2.3 and 5.3.3) indicates that the licensee has undertaken a wide variety of activities related to employee training and communications to effect cultural change. The major activities include a 6-week attitude assessment and training program for licensed operators - the course, "People - The Foundation of Excellence" (PFE); an 8-day shift team training at the simulator; a 2-week attitude training program for non-licensed operators - the course, "Personal Effectiveness" (PE); an employee/management communication program, "Tell It to the Vice-President;" an employee involvement program (referred to as PB-Team); an organizational survey - the "Productivity/Quality Profile" and feedback process; all-employee meetings; and an emphasis on management by walking around (MBWA).

In addition to evaluating the plan for restart, the NRC staff observed parts of the PFE and the simulator team training courses and interviewed several operators who had completed this training, as well as individuals responsible for developing the training programs and individuals responsible for selecting the operators who would participate in the program. The staff's evaluations, based on these observations and interviews, are given in Inspection Report 50-277/278-88-10. The staff determined that the training programs were effective in providing operators with personal insights, interpersonal skills, and effective team work and communication skills. In addition, the interviews confirmed that operators apparently understood the consequences of inattentiveness to duty and its effect on plant safety and, furthermore, understood their obligations to their individual license to actively monitor plant conditions, etc.

To support the knowledge and insight gained from the formal training course, the licensee has developed a followup training program entitled "Interaction" that will include appropriate elements of the PFE and MFE courses. In addition, progression training for operators will include appropriate elements of the PFE and MFE courses. Analysis and review of the knowledge and interpersonal skills and abilities needed at each level of progression will help determine which elements of the formal training course should be included in the progression training. The process will accommodate new and transferred operators entering the progression cycles. The analysis and review will begin in the fourth quarter of 1988; a target period to begin phased-in implementation of the appropriate curriculum elements for each level in the progression is the second quarter of 1989. This process will ensure proper coverage of interpersonal skills training for all current and future operators. To support the phased-in implementation of interpersonal and professional effectiveness training in the progression, continuing, and requalification training cycles, non-supervisory plant personnel outside the operations chain will participate in a program similar to the followup training. This program will add to the framework, language and skills in support of cultural change. The licensee intends to begin implementing this training in the second quarter of 1989.

On the basis of its review of the plan for restart and on its observations and interviews, the staff finds that many of the activities undertaken to support employee training and communications for cultural change have been appropriate. Furthermore, the licensee's actions to follow up on the initial training programs and to include elements of such programs in progression training should help to ensure that the requisite cultural changes will occur. Because the training programs and communications activities are significant actions developed in direct response to the issues raised in the shutdown order, the NRC staff will monitor activities over a period of time to determine that these activities have produced positive results.

6.4 Human Resource Practices, Policies, and Programs of Management

6.4.1 Personnel Evaluations

In Section II of the restart plan (Section 5.3.4), the training course for managers and supervisors is outlined; the course will provide instruction on all phases of performance appraisal, including writing performance standards and effective performance evaluations, effective praise and reprimand, and practice in writing and presenting clear goals. In supplementary information, the licensee has stated that, before restart, managers and supervisors will be trained on how to conduct face-to-face performance appraisals. The training, which was developed by staff of the Management and Professional Development Section, is being conducted by outside consultants. The NRC staff finds the licensee's response acceptable.

The licensee also has stated that all employees at Peach Bottom will discuss their performance face to face with their immediate supervisors. In the discussions, performance standards will be established for each employee. In addition to reviewing employee performance annually, as is required, the plant manager will review performance face to face at nominal 6-month intervals with each employee reporting directly to him; the plant manager will provide more frequent opportunities for reviewing the performance of management staff and for taking corrective actions required in a timely manner. Management personnel have been instructed to discuss performance with their employees as often as needed. In supplementary information, the licensee has provided a copy of a written message from the site Vice President that was sent to all employees to assist them in understanding their role in the performance appraisal process. The message emphasizes how important it is that employees understand the purpose of performance appraisals, the value of an employee preparing for appraisals, the employee's contribution to the appraisal, and the employee's understanding of what is expected in the future. The staff finds that the licensee's activities in the area of strengthening its performance appraisal system are acceptable.

6.4.2 Disciplinary Policy

In Section II of the restart plan (Section 5.3.2), the licensee has committed to revise disciplinary policy to ensure that its management will be provided with the appropriate authority to require employee performance standards consistent with nuclear requirements. The licensee has stated that training on these revised disciplinary policies and work rules will be completed for the plant manager through shift-manager levels before Peach Bottom restarts. This

training was developed by the Director of Management and Professional Development of the nuclear group and by the personnel administrator at Peach Bottom. The personnel administrator will conduct the training. The staff finds this response acceptable.

The licensee also has stated that the new disciplinary guidelines and procedures will be issued to all employees in the handbook, "You and Your Company." The handbook is being revised and will be reissued to all employees.

The handbook is being revised and will be reissued to all employees. Supplementary information provided by the licensee states that when the revised handbook is distributed, employees will be required to sign a statement that they have received the handbook. In addition to the handbook, all employees have been given copies of the revised disciplinary guidelines and grievance procedures. The licensee has provided a copy of the memorandum from the Vice-President, PBAPS, to the senior staff that transmits these guidelines and procedures. The memorandum directs the senior staff to (1) provide all personnel with the material, (2) ensure that employees are familiar with the grievance procedures, and (3) direct any questions on the policies to the PBAPS Personnel Administrator. In this supplementary information, the licensee has also committed to keeping track of the employees' questions directed to the plant personnel administrator for a period of 90 days following the distribution to assess the employees' understanding of the procedures and guidelines and determine the need for document revision. The staff finds that these are acceptable measures for ensuring that disciplinary policy is disseminated among Peach Bottom employees.

The licensee also has described the tracking procedure that has been developed to ensure that each step in the grievance process has been performed and the generic schedule to ensure timely resolution of grievances. The handbook, "You and Your Company," also instructs employees to direct questions or concerns regarding grievances to their immediate supervisors. The revised nuclear group grievance procedures require first-level supervisors to respond to employee concerns within 20 days. If this time period is not met or if the employee finds the response unsatisfactory, the employee can present the concern to successively higher levels of supervisors up to and including the department head; for example, for operations, this would be the Vice President-Peach Bottom Atomic Power Station. Each level is required to respond in a timely manner, not to exceed 20 days. The employee is responsible for keeping track of the grievance up to this point. If the employee's concern is still not resolved, the employee can present a formal grievance to the licensee's Personnel and Industrial Relations Department. The Manager of Industrial Relations tracks each grievance submitted to the Personnel and Industrial Relations Department by maintaining a file that indicates its status. This file is periodically reviewed by the licensee's Manager of Industrial Relations to ensure timely resolution of grievances.

The licensee also has stated that a consultant has been retained to review the licensee's industrial relations protocols. This effort is expected to be completed in November 1988. The comprehensive review will result in a revised set of protocols that will form the basis for discipline and grievance-handling procedures for the plant. Managers and supervisors will be trained in 1989, after the protocols have been developed. The licensee has made a commitment to

provide the results of the review before restart. This process and its tracking system should be followed over time by the licensee to ensure its continued implementation.

6.4.3 Career Paths

The licensee discussed a number of long- and short-term program activities for management and professional development in Section II of the restart plan (Section 3.8.2). Planned off-shift rotations were part of the licensee's review of its career path program for operators. The licensee stated that operations personnel going on rotation will be assigned to positions where their operations experience will add to the organization's capabilities. This job rotation is designed to increase the experience level of the entire PECo nuclear group. In a similar light, shift managers will rotate approximately every 4 years, bringing their control room experience and supervisory training to other parts of the organization. The licensee states that this will help other work groups understand operations requirements, increasing the ability of shift managers to work well with operations personnel and support operations activities.

The staff finds these mechanisms constitute acceptable means for providing both operations and managerial personnel with the tools to pursue career paths throughout the Peach Bottom organization.

The licensee also has provided the training syllabus for the 27-day course, "People - The Foundation of Excellence" (PFE), which was given to the currently licensed operators and shift technical advisors at Peach Bottom. The course is divided into four units of study that incorporate fundamental core elements of supervisory and leadership training. The course begins with training in personal insight and interpersonal skills and builds up to, and concludes with, group dynamics and conflict management. The licensee states that these awareness skills constitute the basic building blocks of supervisory behavior and leadership skills required for executing licensed operator responsibilities and, ultimately, shift supervisor responsibilities.

The staff has reviewed this syllabus and has observed the training in progress at Peach Bottom during its interim and final inspections of the rehabilitation program. The staff has concluded that this training provides interpersonal and self-awareness skills that would prove of value to operators, both in their current positions and in career paths they may pursue throughout the organization.

In its restart plan, the licensee has also identified a number of short-term and long-term plans for career development that include assessments of managerial skills and abilities, development of technical personnel for promotion to supervisory and management positions, an improved nuclear performance appraisal program, and the establishment of individual development plans.

The staff finds these methods for developing career paths acceptable. However, the staff expects to review the mechanisms both in its inspections before restart and over a longer period of time to ensure the licensee continues to implement them.

6.4.4 Shift Rotation

In Section II of the restart plan (Section 2.2.2), the licensee states that the shift rotation schedule has been switched from a reverse or backward rotation to a forward rotation. This change was made as the result of an analysis by a task force of operators and management and was facilitated by Circadian Technology, Inc. This consultant also had a role in the PFE training course for operators. During the staff's interviews with operators as part of the interim and final inspections of the rehabilitation program, operators stated that they were generally satisfied with the change in the direction of the shift rotation and reported that they felt less fatigued. A number of those interviewed indicated that they learned several coping mechanisms for dealing with the fatigue inherent in shift work.

The staff finds forward rotation an acceptable mechanism for reducing the fatigue associated with shift rotation. This type of rotation has been extensively researched by a number of specialists in circadian rhythm technology and has generally been found to be less fatiguing over long periods.

6.4.5 Control of Overtime

Section II of the restart plan (Section 2.2.2) and supplementary information provided by the licensee state that the licensee has as its goal to minimize the use of overtime through a number of initiatives that are currently in progress. These initiatives are as follows:

(1) The licensee plans to staff the Peach Bottom operations groups with seven licensed operators on a six-shift rotation basis. This exceeds the shift staffing required by the licensee's Technical Specifications, which is two SROs and three ROs.

(2) The licensee has made a long-term commitment to increase the number of licensed operators at Peach Bottom.

(3) Staffing and work assignments for plant personnel will provide adequate coverage so that routine use of overtime becomes unnecessary. The objective will be to have shift operations personnel work an 8-hour day, 40-hour week while the plant is operating. However, overtime work may be required on a temporary basis during periods of extended shutdown for refueling or during periods when major modification or maintenance is taking place.

(4) The licensee submitted a proposed revision to the Peach Bottom Technical Specifications on September 7, 1988, designed to ensure control of the overtime worked by ROs and SROs. The licensee has stated that the proposed revision is incorporating the guidance in the NRC's current recommendations on the overtime issue as contained in its proposed updated policy statement. The licensee also has stated that the increase in staffing, basic changes in work distribution philosophies, performing maintenance on all three shifts rather than on day shift only, and scheduling routine maintenance throughout the year instead of waiting

until outages to perform such tasks should eliminate the need for excessive overtime. The blocking work group is also tasked with reducing the overtime demands on operators.

The staff finds these methods acceptable for reducing unnecessary and excessive overtime. However, the staff will review the licensee's proposed revision to its Technical Specifications to ensure that appropriate controls are established.

7 CONCLUSION

In Sections 3, 4, 5, and 6 of this SER, the staff evaluated the licensee actions to correct the four root causes of the conditions that led to the issuance of the NRC order of March 31, 1987, requiring that the Peach Bottom facility be shut down. The staff concluded that the root causes identified by the licensee, listed below, adequately characterize the problems leading to the order.

(1) Failure of the Corporate Organization To Identify and Correct the Problems at Peach Bottom: The licensee has restructured the organization to focus management involvement on nuclear operations, put in place new key senior executives with demonstrated success in managing similar organizations, and strengthened its self-assessment and independent assessment capabilities. The staff concludes that these measures appropriately address the root cause.

(2) Inadequate Leadership at the Peach Bottom Site: The licensee has a new site management team from both inside and outside the licensee organization with strong leadership and management skills and has restructured the site organization to provide effective supervision and ensure accountability for all functions. The staff concludes that these measures are acceptable to address the root cause.

(3) Failure To Initiate a Timely Licensed Operator Replacement Training Program: The licensee has raised the entry-level standards and starting salary to ensure a sufficient number of qualified applicants for licenses and has provided for short-term and long-term rotational and developmental positions for licensed operators. More operators have been licensed since the order was issued than the number with licenses that had expired. The staff concludes that the licensee's plan to develop adequate licensed operator resources is acceptable. In addition, when training activities are completed for a sufficient number of the operators currently holding restricted licenses, then the licensee will have a sufficient number of operators to operate the second unit.

(4) A Station Culture That Had Not Adapted to Post-TMI Changing Nuclear Requirements: The licensee has identified and communicated new cultural values; has provided licensed operator and management training and fostered team building to support these values; and has developed management policies, programs, and control systems to support these values. The staff concludes that licensee actions to improve the culture are appropriate to address the root cause.

On the basis of its review and evaluation, the staff concludes that the revised plan for the restart of Peach Bottom Atomic Power Station submitted on April 8, 1988, as clarified by supplemental information listed in Appendix B, meets Requirement V.C. of the March 31, 1987 Order Suspending Power Operations and Order To Show Cause that the licensee submit a detailed and comprehensive plan and schedule to ensure that the facility will be operated safely and comply

with all requirements including station procedures. The NRC staff will continue to monitor the effectiveness of the implementation of this plan by the licensee. For example, the NRC staff will conduct an integrated assessment team inspection after the licensee has certified to the NRC the readiness of the Peach Bottom facility for restart based on a self-assessment and a scheduled evaluation by the Institute of Nuclear Power Operations.

APPENDIX A

CHRONOLOGY

June 12, 1986, letter, V. Stello, NRC, to J. L. Everett, III, PECo, regarding NRC assessment at Peach Bottom Atomic Power Station.

March 31, 1987, V. Stello, NRC, to PECo, Order Suspending Power Operation and Order to Show Cause.

April 6, 1987, J. S. Kemper, PECo, to T. E. Murley, NRC, Subject: Order Suspending Power Operation, Peach Bottom Atomic Power Station Units 2 and 3.

April 20, 1987, J. L. Everett, PECo, to V. Stello, NRC, regarding the order to show cause issued March 31, 1987.

August 7, 1987, letter, J. H. Austin, PECo to W. T. Russell, NRC, transmitting the "Commitment to Excellence Action Plan."

August 24, 1987, letter, W. T. Russell, NRC, to J. H. Austin, PECo, requesting additional information to CTE plan.

September 11, 1987, letter, W. T. Russell, NRC, to J. H. Austin, PECo, requesting additional information to CTE plan.

September 28, 1987, letter, J. H. Austin, PECo, to W. T. Russell, NRC, responding to requests for information to CTE plan.

October 8, 1987, letter, W. T. Russell, NRC, to J. H. Austin, PECo, noting concerns and suspending staff review.

November 19, 1987, letter, E. J. Bradley, PECo, to T. E. Murley, NRC, transmitting application for amendment of operating licenses DPR-44 and DPR-56 to reflect organization changes.

November 25, 1987, letter J. H. Austin, PECo, to W. T. Russell, NRC, submitting "Plan for Restart of Peach Bottom Atomic Power Station," Section I, "Corporate Plan."

December 11, 1987, letter, V. Stello, NRC, to J. H. Austin, PECo, transmitting performance assessment.

December 18, 1987, letter, W. T. Russell, NRC, to J. W. Gallagher, PECo, forwarding the amended Systematic Assessment of Licensee Performance Report for February 1, 1986 through May 31, 1987.

December 24, 1987, letter, W. T. Russell, NRC, to J. H. Austin, PECo, discussing restart plan review, Section I.

January 29, 1988, letter, J. H. Austin, PECo, to W. T. Russell, NRC, transmitting a report by the Institute for Nuclear Power Operations January 11, 1988.

February 12, 1988, letter, J. Everett, PECo, to W. T. Russell, NRC, transmitting "Plan for Restart of Peach Bottom Atomic Power Station", Section II, "PBAPS Action."

March 18, 1988, letter, J. F. Paquette, PECo, to W. T. Russell, NRC, on appointments of PECo personnel.

April 8, 1988, letter, J. F. Paquette, PECo, to W. T. Russell, NRC, transmitting Revision I to Sections I and II of the plan for restart and a schedule of major activities in the revised plan.

April 8, 1988, letter, C. A. McNeill, PECo, to W. T. Russell, NRC, information regarding Peach Bottom quality control shift operations monitoring.

May 18, 1988, letter, C. A. McNeill, PECo, to W. F. Kane, NRC, transmitting Inspection Report 50-277/278-88-10 for the routine resident safety inspection from March 12 to April 22, 1988.

May 31, 1988, letter, J. W. Gallagher, PECo, to R. M. Gallo, NRC, transmitting additional information regarding training of plant operators on changes to plant procedures.

June 1, 1988, letter, W. T. Russell, NRC, to C. A. McNeill, PECo, requesting additional information.

June 22, 1988, letter, R. E. Martin, NRC, to W. M. Alden, PECo, transmitting license amendments on the organizational structure.

July 8, 1988, letter, V. Stello, NRC, to J. F. Paquette, PECo, regarding performance assessment.

July 22, 1988, letter, C. A. McNeill, PECo, to W. T. Russell, NRC, responding to request for information regarding plan for restart.

August 9, 1988, letters, J. M. Taylor, NRC, to 36 individual PECo employees, issuing enforcement actions.

August 10, 1988, letter, J. M. Taylor, NRC, to J. F. Paquette, PECo, issuing enforcement action to PECo.

August 15, 1988, letter, J. A. Basilio, PECo, to R. Martin, NRC, providing additional information regarding plan for restart.

August 15, 1988, letter, C. A. McNeill, PECo, to W. T. Russell, NRC, describing PECo's restart self-assessment program.

August 22, 1988, letter, J. A. Basilio, PECo, to R. Martin, NRC, providing additional information regarding plan for restart.

August 23, 1988, letter, J. W. Gallagher, PECo, to W. T. Russell, NRC, providing copies of the restart power testing program.

September 7, 1988, J. W. Gallagher, PECo, to W. T. Russell, NRC, transmitting "Peach Bottom Atomic Power Station Restart Power Testing Program."

September 8, 1988, letter, J. F. Paquette, PECo, to J. Lieberman, NRC, transmitting reply to notice of violation and proposed imposition of civil penalty.

September 20, 1988, J. A. Basilio, PECo, to R. E. Martin, NRC, transmitting additional information regarding the plan for restart.

October 10, 1988, letter, J. A. Basilio, PECo, to R. E. Martin, NRC, providing information in response to issues raised during meeting of September 29, 1988.

APPENDIX B

BIBLIOGRAPHY

ANSI N18.1-1971, American National Standards Institute, Selection and Training of Nuclear Power Plant Personnel; March 8, 1971.

ANSI/ANS-3.1-1981, ANSI/American Nuclear Society, American National Standard for Selection and Training of Nuclear Power Plant Personnel; January 17, 1978.

Federal Register, Vol. 52, No. 67, p. 11386 (52 FR 11386), Philadelphia Electric Co., Peach Bottom Atomic Power Station, Units 2 and 3; Order Suspending Power Operation and Order to Show Cause; U.S. Nuclear Regulatory Commission; April 8, 1987.

APPENDIX C

PUBLIC COMMENTS AND NRC RESPONSE

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APPENDIX C

PUBLIC COMMENTS AND NRC RESPONSE

C.1 INTRODUCTION

Meetings were held on the dates and locations noted below to provide the public the opportunity to comment on the revised "Plan for Restart of the Peach Bottom Atomic Power Station," which was submitted to the U.S. Nuclear Regulatory Commission (NRC) on April 8, 1988. This appendix summarizes those comments and provides the NRC responses to them. Comments were provided at public meetings on September 24 and November 4, 1987, on the licensee's earlier plan, which was superseded by the revised plan for restart. The NRC staff has not responded to the earlier comments, except indirectly if they were similar to those summarized in this appendix.

Fawn Grove, Pennsylvania	May 16, 1988
Pylesville, Maryland	May 16, 1988
Quarryville, Pennsylvania	May 17, 1988

Many comments were similar in nature and were thus grouped into appropriate categories to be covered by a single response. For individual comments that covered multiple categories, the reader is directed to various sections in this safety evaluation report (SER) for a complete response. The summarized comments do not reflect judgment on what was said by the commenters; they merely attempt to capture what was said in language close to that used by the individual commenters. Identical comments made by the same people at more than one meeting are treated as one comment and are only listed once.

Section C.2 lists the names of the commenters and their residences. The commenters are numbered in order of appearance and in the order of the meetings as listed above. Section C.3 provides a summary of the comments with a key to the response number for each comment. Section C.4 provides the staff's responses to specific comments.

C.2 LIST OF COMMENTERS

Fawn Grove, Pennsylvania, May 16, 1988

1 Margaret Dardis, Newtown, Pennsylvania
2 Allan Young, Middletown, Pennsylvania
3 David Grove, New Park, Pennsylvania
4 John Tucker, Dallastown, Pennsylvania
5 Francis Boltz, Sr., Fawn Grove, Pennsylvania
6 Jack Winzenried, Delta, Pennsylvania
7 Bob Hughes, Fawn Grove, Pennsylvania
8 Judy Williams, Delta, Pennsylvania

Pylesville, Maryland, May 16, 1988

9 Ernest Eric Guyll, Nottingham, Pennsylvania
10 George Field, Street, Maryland
11 Joanne Parrott, Harford County, Maryland
12 Jean Ewing, Darlington, Maryland
13 Ginna Bennett, Havre de Grace, Maryland
14 John Casey, Bel Air, Maryland
15 J. Michael Pratt, Virginia
16 David Watson, Street, Maryland
17 Rev. Jeffrey D. Wilson, Street, Maryland
18 Patricia Jeanschild, Delta, Pennsylvania
19 Kenneth J. Trzcinski, Street, Maryland
20 Pat Birnie, Columbia, Maryland
21 Pat Lane, Baltimore, Maryland
22 Greg Skinner, Norrisville, Maryland
23 William G. Shimek, Darlington, Maryland
24 Ernest Eric Guyll, Nottingham, Pennsylvania
25 Stan Kohler, Pylesville, Maryland
26 Barbara A. Risacher, Harford County, Maryland
27 Bryan Merryman, New Park, Pennsylvania

Quarryville, Pennsylvania, May 17, 1988

28 Fred Moser, Quarryville, Pennsylvania
29 Bernard Raftovich, Holtwood, Pennsylvania
30 Wayne Dobson, Douglassville, Pennsylvania
31 Leonard Peoples, Quarryville, Pennsylvania
32 Edward Bailey, Conestoga, Pennsylvania
33 Eric Epstein, Harrisburg, Pennsylvania
34 Frances Skolnick, Lancaster, Pennsylvania
35 Ernest Eric Guyll, Nottingham, Pennsylvania
36 Robert Hughes, Fawn Grove, Pennsylvania
37 H. Eugene Carrigan, New Providence, Pennsylvania
38 Richard Ryan, Quarryville, Pennsylvania
39 Mary Corthouts, West Lampeter, Pennsylvania
40 Rodney Lingo, Holtwood, Pennsylvania
41 Margaret Dardis, Newtown, Pennsylvania
42 Susan Ellenberg, Holtwood, Pennsylvania
43 Donald Kemper, Quarryville, Pennsylvania
44 Phyllis Gilbert, Philadelphia, Pennsylvania
45 Mitzi Samples, Little Britian, Pennsylvania
46 Marie Inslee, Downington, Pennsylvania

C.3 SUMMARY OF COMMENTS

Commenter	Comment	
1	Wants public debate on startup issues.	C.4.1
2	Should not start up with present management in control.	C.4.2
	Alleges past history of inadequate welder examinations.	C.4.6

	Alleges poor welding practices.	C.4.6
	Alleges inadequate shielding was provided for welders.	C.4.6
3	In favor of restart.	C.4.2
4	Believes new management is capable of safely operating plant.	C.4.2
5	Feels confident of new management.	C.4.2
6	Believes new management and personnel will operate plant safely.	C.4.2
7	In favor of restart.	C.4.2
8	Confident of new management.	C.4.2
9	Desires information on accidental releases of radiation at Peach Bottom (amounts), and what is "safe."	C.4.7
	How do cancer, stillbirth, and birth defect rates near Peach Bottom compare with national averages?	C.4.8
	Concerned that monetary issues at plant will take back seat to safety.	C.4.11
	How does warm water affect fish in the Susquehanna River?	C.4.9
10	Does not feel management change has had any effect.	C.4.2
11	Wants INPO [Institute of Nuclear Power Operations] evaluation before startup.	C.4.11
	Alleges improprieties concerning security guards (sleeping at their posts, drinking alcohol, long hours, inadequate staffing, inadequate breaks, poor facilities, etc.)	C.4.5
	Alleges Susquehanna River water quality reports were altered to downgrade radiation levels.	C.4.13
	Alleges contaminated items were stored in faulty containers.	C.4.19
	Concerned about quality of maintenance actions being performed by PECo personnel in light of the illicit drug activity at the plant.	C.4.4
	Concerned about lack of fire drills with local fire-fighting companies.	C.4.14

12	What is probability of containment failure in event of core melt - 90 percent?	C.4.15
	Mark I containment is not safe.	C.4.15
	Concerned about cracks in the concrete, piping, and welds.	C.4.11
	Concerned about cost of cleanup of the plant after decommissioning.	C.4.16
13	Concerned about dangers of plutonium and cost of cleanup.	C.4.16
14	Confident of PECo management.	C.4.2
15	Management is committed to do a good job.	C.4.2
16	Peach Bottom problems need further attention by NRC and PECo to correct and prevent recurrence.	C.4.3
	Drugs still a problem.	C.4.4
	Concerned about Mark I containment.	C.4.15
17	Confidence in PECo has been restored. Delaying startup further would demoralize employees and reverse gains made.	C.4.3
18	Alleges some PECo employees are not fit to operate plant (brag about heavy drinking and taking drugs). Poor attitude toward work exists.	C.4.4
19	What assurance is there that management will not deteriorate in the future?	C.4.2
20	Wants adjudicatory hearing to address restart issues.	C.4.1
	Peach bottom has unsafe design and should not restart unless redesigned.	C.4.12
	New emission monitoring device should be installed with public access to monitoring information.	C.4.7
	Wants comprehensive health studies around Peach Bottom.	C.4.8
	Nuclear plants are not economical.	C.4.17
	Doubts evacuation possibility.	C.4.18
	Concerned about radwaste storage. Wants spent fuel transferred to dry cask storage.	C.4.19
21	Concerned about amounts of radwaste.	C.4.19
	Concerned about Mark I containment.	C.4.15

	Generic problems are addressed too slowly, thus causing lack of faith in NRC.	C.4.20
22	More emphasis needs to be placed on training with local fire agencies.	C.4.14
23	Concerned about Mark I containment.	C.4.15
24	Duplicate of comments by commenter 9.	C.4.7, 8,11,9
25	Wants assurances of personnel reliability, no future mechanical failures, and no spurious radioactive releases or else do not start up.	C.4.3
26	Wants Mark I containment issue resolved before startup.	C.4.15
	Desires PECo response to INPO letter regarding unanswered General Electric service letters and outstanding work orders.	C.4.10
	Wants Advisory Committee on Reactor Safeguards to do safety analysis of Peach Bottom before restart.	C.4.12
27	Encouraged by new management's commitment to safety.	C.4.2
28	In favor of restart (cites employment, taxes, and recreation provided by plant. Ecologically sound.)	C.4.2
29	Plant was shut down because of poor management. This has been corrected. Plant should now restart.	C.4.2
30	Sees positive changes in management and employee attitudes.	C.4.2
31	Restart plan is adequate and should be accepted.	C.4.2
32	PECo employees have genuine commitment to excellence.	C.4.3
33	Concerned about INPO letter of October 1987, especially lack of accountability and excessive open maintenance items.	C.4.10
	Concerned about INPO president's criticism of January 11, 1988, of PECo's management and reorganization plan.	C.4.2
	Concerned about drug use at plant.	C.4.4
	Illegal to consider economic benefits to community in considering restart.	C.4.17
	Peach Bottom is not needed.	C.4.17
	Concerned about security practices at plant (long hours for guards, no meal breaks, no rotation, etc.).	C.4.5

	Wants hearings on restart issues.	C.4.1
34	Concerned whether PECo has resources to carry out restart plan.	C.4.10
	Concerned that NRC is too cozy with nuclear industry to regulate it.	C.4.20
	Plan does not address containment, spent fuel reracking, and adequacy of offsite radiation monitoring equipment.	C.4.21
	Wants hearings on proposed amendments of the Technical Specifications.	C.4.1
	What are NRC's restart criteria?	C.4.22
35	Duplicate of comments by commenter 9.	C.4.7, 8,9,11
36	Environmental monitoring at plant began in 1966 and results are available in library.	C.4.7
	Personnel changes will improve operation at Peach Bottom.	C.4.3
37	PECo has vested interest in Peach Bottom and would not want an accident destroying it and its customers.	C.4.2
	Peach Bottom is needed to prevent acid rain and minimize need to import oil.	C.4.17
38	In favor of restart.	C.4.2
39	Concerned about plant being on a geological fault that had two earthquakes in last 10 years.	C.4.23
40	In favor of restart.	C.4.2
41	Concerned about provision of the evacuation plan to use schools as shelters (dismissing the children) in violation of Pennsylvania guidelines.	C.4.18
42	In favor of restart.	C.4.2
43	In favor of restart.	C.4.2
44	Wants evidentiary hearings on restart.	C.4.1
	Concerned about Mark I containment.	C.4.15
	Concerned about nuclear waste.	C.4.19

	Concerned about provision of the evacuation plan to use schools as shelters (dismissing the children) in violation of Pennsylvania guidelines.	C.4.18
	Wants independent safety investigation before startup.	C.4.12
45	Concerned about plant decommissioning.	C.4.16
46	Nuclear power is unsafe.	C.4.12

C.4 NRC RESPONSE TO COMMENTS

Commenter	Comment C.4.1: Requests For Public Hearings
1	Wants public debate on startup issues.
20	Wants adjudicatory hearing to address restart issues.
33	Wants hearings on restart issues.
34	Wants hearings on proposed amendments of the Technical Specifications.
44	Wants evidentiary hearings on restart.

Response:

Numerous meetings have been held with the licensee, State and local governmental groups, and the public since the shutdown of Peach Bottom station to provide all interested parties an opportunity to comment on the deliberations on the station.

The Commonwealth of Pennsylvania and the State of Maryland provided comments dated July 12 and May 26, 1988, respectively. These comments were forwarded to the licensee for consideration, and the licensee's submittal of July 22, 1988, provided an itemized response to the State of Maryland's comments.

In addition to its comments, the Commonwealth of Pennsylvania has chosen to intervene in certain of the PBAPS proceedings by filing a "Petition To Intervene, Request for Hearings and Comments Opposing No Significant Hazards Consideration" on January 22, 1988. This petition concerned the licensee's application for amendment of the facility's Technical Specifications in regard to the administrative controls on the licensee's organizational structure. The Commonwealth supplemented this petition on August 24, 1988, which included seven contentions. The Commonwealth and the licensee have recently agreed to a postponement of a formal response to these contentions, before the Atomic Safety and Licensing Board appointed for this matter, until November 7, 1988, pending the potential resolution of these issues by the parties before that date.

Commenter	Comment C.4.2: Adequacy of Management
2	Should not start up with present management in control.
3, 7, 28, 38, 40, 42, 43	In favor of restart.
4	Believes new management is capable of safely operating plant.
5	Feels confident of new management.
6	Believes new management and personnel will operate plant safely.
8	Confident of new management.
10	Does not feel management change has had any effect.
14	Confident of PECo management.
15	Management is committed to do a good job.
19	What assurance is there that management will not deteriorate in the future?
27	Encouraged by new management's commitment to safety.
29	Plant was shut down because of poor management. This has been corrected. Plant should now restart.
30	Sees positive changes in management and employee attitudes.
31	Restart plan is adequate and should be accepted.
33	Concerned about INPO president's criticism of January 11, 1988, of PECo's management and reorganization plan.
37	PECo has vested interest in Peach Bottom and would not want an accident destroying it and its customers.

Response:

Several versions of the PECo plan for restart have all addressed management. The INPO report of January 11, 1988, was highly critical of an interim version of the plan for restart, and INPO's conclusions and recommendations were similar to concerns raised by the NRC during its review of the several versions of the plan.

The initial corrective action plan was submitted by the licensee in August 1987 and was followed by an NRC staff position in October 1987 that stated that the plan failed to address a fundamental staff concern. In November 1987, the licensee submitted Section I of its revised corrective action plan for restart in

response to the issue raised by the staff. In February 1988, the licensee completed the plan with the submittal of Section II, which addressed actions specific to the onsite organization and the plant.

The licensee's actions in response to the INPO report were discussed in its letter of April 8, 1988, which submitted Revision 1 of the plan for restart. The licensee indicated that it had incorporated the second and third recommendations of the INPO letter into the revised plan. These recommendations dealt with minimizing actions that bypassed or undermined line management and with establishing accountability for the unsatisfactory situation that had developed over a period of years.

The licensee also stated in this letter that an independent consultant had been retained to respond to INPO's first recommendation that a detailed analysis of the licensee's internal investigation material be developed.

By letter dated March 4, 1988, the staff requested that any information the licensee provided to INPO in response to the issues in the INPO report also be provided to the NRC and that the NRC be apprised of the results of INPO evaluations before restart.

The NRC will complete its evaluation of Peach Bottom's readiness for startup only after all appropriate information, including the results of the INPO evaluations, have been provided by the licensee.

Since the staff is concluding that the licensee's plan for restart is acceptable, subject to the conditions stated in this report, no further response is provided to the comments listed above that generally expressed satisfaction with the status of Peach Bottom.

Commenter	Comment C.4.3: Readiness for Restart
16	Peach Bottom problems need further attention by NRC and PECo to correct and prevent recurrence.
17	Confidence in PECo has been restored. Delaying startup further would demoralize employees and reverse gains made.
25	Wants assurances of personnel reliability, no future mechanical failures, and no spurious radioactive releases or else do not start up.
32	PECo employees have genuine commitment to excellence.
36	Personnel changes will improve operation at Peach Bottom.

Response:

The issues identified by the NRC as restart items have been or will be evaluated by the NRC to verify that they have been adequately resolved. The NRC plans to perform a systematic assessment of licensee performance and conduct an

integrated assessment team inspection to evaluate the effectiveness of the licensee's corrective action programs and the readiness of the plant equipment and personnel to resume power operation before it makes any decision on restart.

The NRC will complete its evaluation of Peach Bottom's readiness for startup only after it has received all appropriate information and plan revisions from the licensee and has reviewed all followup inspection results.

Commenter	Comment C.4.4: Fitness for Duty
11	Concerned about quality of maintenance actions being performed by PECo personnel in light of the illicit drug activity at the plant.
16	Drugs still a problem.
18	Alleges some PECo employees are not fit to operate plant (brag about heavy drinking and taking drugs). Poor attitude toward work exists.
33	Concerned about drug use at plant.

Response:

The NRC expects management at all nuclear power plants to aggressively implement effective fitness-for-duty programs. PECo is responsible for ensuring the fitness for duty of all employees at Peach Bottom. The basic fitness-for-duty program at Peach Bottom includes those elements that are expected to be implemented at all operating nuclear power plants. These include worker training in drug awareness and company policy, supervisory training in observation of behavior, an employee assistance program, and drug testing on a preemployment and for-cause basis. On the basis of the results of the program and an NRC inspection of the program, the staff concludes that the licensee has implemented an adequate program at Peach Bottom to detect and correct drug abuse.

In addition to implementation of industrywide programs, such as preemployment and for-cause drug testing, the licensee has taken additional steps at Peach Bottom, including annual and random drug testing, undercover investigations, searches of the plant by trained dogs, and a policy that encourages confidential reporting of drug involvement by concerned coworkers. The NRC will continue to monitor activities at Peach Bottom to ensure that responsible actions are taken when management becomes aware of any case of drug involvement. A proposed rulemaking being developed by the NRC staff would further strengthen the ability of PECo and other utilities to identify and correct drug abuse problems by prescribing sanctions against those individuals possessing or using drugs while on the job at nuclear power plants.

Regarding concerns about the quality of maintenance performed in light of the drug activity at the plant, the licensee has an extensive quality assurance program to identify and correct poor or improper maintenance actions irrespective of their cause. This detailed program serves as a double check on maintenance work to minimize the possibility that an improperly maintained item is left uncorrected to degrade the performance of a safety-related system. Additionally, as discussed further in this appendix, to analyze the quality of the

maintenance effort of the licensee's employees, an NRC inspection team has completed a programmatic review by evaluating maintenance and postmaintenance testing records, witnessing selected maintenance and postmaintenance testing activities, and inspecting the physical condition of equipment in the plant.

Commenter	Comment C.4.5: Security
11	Alleges improprieties concerning security guards (sleeping at their posts, drinking alcohol, long hours, inadequate staffing, inadequate breaks, poor facilities, etc.)
33	Concerned about security practices at plant (long hours for guards, no meal breaks, no rotation, etc.).

Response:

These and several previous concerns regarding the guard force at Peach Bottom have been investigated by the NRC in the past and have been partially substantiated. During certain periods in the past, security force staffing was insufficient to permit the desired frequency of post rotation and relief. The staffing shortage resulted in substantial overtime so that security personnel typically worked 60 to 70 hours a week.

Although the problem has not been fully resolved, the licensee has made significant inroads in correcting it. Staffing has been increased by 50 percent in the past year. The security force now rotates guards on posts at 2- to 3-hour intervals, and overtime for the security force is now averaging less than 4 hours a week per individual (watchmen and armed guards). A policy to reduce overtime has been implemented. The licensee has transferred or reassigned its two senior security managers at Peach Bottom and has recently switched to a new security contractor.

During an NRC security inspection conducted during the week of July 25-29, 1988, the staff noted that staffing problems still exist. The NRC informed the licensee of its continuing concerns and intends to conduct an additional security inspection to assess the effectiveness of corrective actions before it makes a decision on startup.

Commenter	Comment C.4.6: Welding
2	Alleges past history of inadequate welder examinations.
2	Alleges poor welding practices.
2	Alleges inadequate shielding was provided for welders.

Response:

NRC inspectors conducted two programmatic safety inspections at Peach Bottom during March 14-18 and May 9-20, 1988. These inspections focused on welding and nondestructive testing associated with a recently completed pipe replacement program. In addition, the NRC conducted another inspection on June 14 and 15, 1988, to investigate an unrelated allegation regarding welding.

During the two programmatic safety inspections, the inspectors observed welding in progress, visually inspected completed welds, and reviewed work and material certification packages for selected welds. The inspectors then conducted onsite independent measurements to verify the adequacy of the licensee's nondestructive examination program. Testing included x-ray alloy analysis, dye penetrant examination, visual examination, ferrite examination, and ultrasonic testing. No violations were identified on any weld tested. The plant's quality assurance (QA) program was evaluated by a review of licensee audit and surveillance reports. The inspectors concluded that the licensee had significantly increased its effort in this area through meaningful and indepth reviews of contractor activities. Inspection Reports 50-277/88-08, 50-278/88-08, and 50-278/88-14 contain the results of the inspections.

The inspection on June 14 and 15, 1988, revealed improper welds on some reactor water cleanup (RWCU) system piping, but the cause was not inadequate pipe fitup as alleged. All the welds had been previously identified by QA personnel and subsequently were repaired. During this inspection, the inspectors also learned that as a result of an unrelated review, two welders were found welding on small-bore pipe for which they were not qualified. The welds were removed and rewelded by properly qualified welders. The licensee reported this incident in a nonconformance report. In another unrelated instance, a welder was found welding with a metal electrode on which he was not qualified. The licensee also reported this incident in a nonconformance report. Thus, 3 of approximately 900 welders were found unqualified for specific tasks that they were performing.

The inspectors concluded that no violation or safety issue existed. Although some conditions were substantiated by the inspector (e.g., rejection of welds in the RWCU system and unqualified welders), these situations had been identified by the licensee's QA program and appropriate corrective action had been taken.

Commenter	Comment C.4.7: Environmental Monitoring
9	Desires information on accidental releases of radiation at Peach Bottom (amounts), and what is "safe."
20	New emission monitoring device should be installed with public access to monitoring information.
36	Environmental monitoring at plant began in 1966 and results are available in library.

Response:

Environmental radiation monitoring in the Peach Bottom vicinity began in March 1960 as part of the preoperational tests for Unit 1 (now decommissioned). The monitoring program has continued to the present and was expanded with the advent of Units 2 and 3. Twelve environmental sampling stations were set up in locations ranging from local areas, which included the plant site, Delta, Holtwood, and Conowingo Dams, and Wakefield, to more distant areas, which included Philadelphia and Hackett Point Bar.

This environmental program is designed to monitor various types of pertinent materials in the food chains of both animals and humans. Samples are taken of the atmospheric, terrestrial, and aquatic environments, using those media that are sensitive indicators of changes in the environmental radioactivity such as particulate matter in air, water, soil, and sediment, as well as those that could enter the human food chain such as potable water, milk, vegetation, and fish. The program also monitors the general levels of radioactivity in the environment. Dose assessment began in May 1971 at eight locations and was later expanded to 35 locations. Periodic reports of the data are provided and are available to the public.

The general levels of radioactivity at the site and in the surrounding regions were found to be generally low at the beginning of the survey period, but rose rapidly in 1961 because of weapons testing, and continued at a relatively high level into 1963. From late 1963 through 1967, dispersion and decay generally reduced activity levels to the 1960 levels. Radioactivity levels again rose in 1968 through 1971 because of additional weapons testing in various parts of the world, then decreased again in 1972 and 1973. In contrast, releases from Peach Bottom, even though local to the monitors, were essentially undetectable by the general radiation monitors and produced no measurable lasting radioactive deposits. This brief history should provide a helpful background for examining the actual data contained in the periodic reports.

The Commission conducts a separate, independent dose monitoring program around Peach Bottom and other reactors. The data are published quarterly in NUREG-0837, "NRC TLD Direct Radiation Monitoring Network." Data for Peach Bottom are available since 1982. Doses measured by the NRC (which are averaged over 3 months) during releases at Peach Bottom have been indistinguishable from natural background radiation.

Commenter	Comment C.4.8: Health Effects
9	How do cancer, stillbirth, and birth defect rates near Peach Bottom compare with national averages?
20	Wants comprehensive health studies around Peach Bottom.

Response:

Due to the general nature of the comment a specific response which focuses on any specific aspect of the Peach Bottom plants' operation cannot be prepared. However, the staff notes that in addition to its routine monitoring around all of the nuclear power plants in the Commonwealth of Pennsylvania, the Pennsylvania Department of Health, Division of Epidemiological Research is currently conducting a comprehensive health study in the vicinity of Peach Bottom. Among the items being evaluated are the rates of new cancers, stillbirths, and birth defects. The study is expected to be completed in the near future.

The staff is not aware of any well founded studies which indicate a significant increase (or decrease) in infant mortality or the incidence of cancer related to the operation or the recent shutdown of the Peach Bottom plant.

The effects of radiation on living systems have been studied for decades by individual scientists as well as by select committees that have been formed to objectively and independently assess the risk from radiation. These studies were considered in the development of the public health and safety limits that apply to the Peach Bottom plant, as well as to other nuclear power plants. The studies have not detected a statistically significant increase in cancer for doses and dose rates normally encountered in the vicinity of nuclear power plants. However, as a prudent measure, the NRC staff assumes that there is a linear relation between cancer and low doses of radiation. NRC limits are selected so that the statistical probability of risk is extremely low.

Commenter	Comment C.4.9: Warm Water Effects on Fish
9	How does warm water affect fish in the Susquehanna River?

Response:

Because the effects of thermal discharges on aquatic life have been extensively discussed in the literature, a detailed answer would be too lengthy. A suitable reference is Heated Effluents and Effects on Aquatic Life With Emphasis on Fishes: A Bibliography by E. C. Raney, B. W. Menzel, and E. C. Weller. Two of the more important points are that thermal discharges are not as detrimental to aquatic life as originally thought, and many aquatic organisms, particularly fishes, are capable of sensing and avoiding lethal temperatures if given a chance to do so.

To ensure protection of the river and compliance with river water quality criteria, the Pennsylvania Department of Environmental Resources regulates the quantity and quality of the waste water discharged from the station, including heat dissipation: Cooling towers are used at Peach Bottom to dissipate a large amount of its heat to the atmosphere to comply with these regulations. Environmental studies done at Peach Bottom before the plant was initially permitted to operate have documented the minimal effect on aquatic life resulting from thermal discharges within the allowed limits.

Commenter	Comment C.4.10: INPO Evaluations
11	Wants INPO evaluation before startup.
26	Desires PECo response to INPO letter regarding unanswered General Electric service letters and outstanding work orders.
33	Concerned about INPO letter of October 1987, especially lack of accountability and excessive open maintenance items.
34	Concerned whether PECo has resources to carry out restart plan.

Response:

The large number of open maintenance items is not unusual for a plant in shutdown. During periods of operation, any plant accumulates a backlog of outstanding maintenance items that can or must be deferred until an outage. When a plant shuts down for a major outage, additional preventive maintenance items

that must be completed during the outage are added to the backlog. This occurs for any type of plant regardless of its power source. Moreover, potential problems identified to the utility by the NRC or INPO that require maintenance actions to investigate and correct frequently add to the backlog. For example, a generic industry problem with a particular type of valve (of which there may be several hundred in the plant) could lead to several hundred maintenance items. During an outage, maintenance activities would be scheduled so that tasks on safety-related equipment would have a high priority. Consequently, some open maintenance items on non-safety-related equipment (having a lower priority) may be deferred until a subsequent outage. Therefore, these low-priority items also contribute to the backlog. Additionally, the maintenance backlog is further influenced by the inability to complete testing on a refurbished component because of existing plant conditions (certain testing requires the plant to be operating).

In its review of the PECo restart plan, the NRC is paying particular attention to the maintenance backlog as part of the plant readiness criteria, including equipment operability and sufficient maintenance resources.

In addition, the Commission issued its Policy Statement on Maintenance of Nuclear Power Plants on March 23, 1988. This policy statement identifies the activities that form the basis of an adequate maintenance program and provides guidance to the industry on improving maintenance programs. The NRC also will review the Peach Bottom maintenance program in light of this policy statement. An inspection team completed a programmatic review by evaluating maintenance and postmaintenance testing records, witnessing selected maintenance and postmaintenance testing activities, and inspecting the physical condition of equipment in the plant.

Commenter	Comment C.4.11: Priority of Safety Concerns
9	Concerned that monetary issues at plant will take back seat to safety.
12	Concerned about cracks in the concrete, piping, and welds.

Response:

Current programs require licensees to identify and monitor the condition of reactor system components vulnerable to corrosion or embrittlement. These programs are required to ensure that any degradation of components is detected and evaluated. If necessary, plant modifications may be required to ensure that operation of the plant will be within the previously approved design envelope.

Although the NRC recognizes that repair/replacement costs for some components may be substantial, its primary emphasis and concern is to ensure that necessary plant modifications restore the plant condition to the original design basis so that operation of the plant does not endanger the health and safety of the public.

Commenter	Comment C.4.12: Safety Investigations
20	Peach Bottom has unsafe design and should not restart unless redesigned.
26	Wants Advisory Committee on Reactor Safeguards to do safety analysis of Peach Bottom before restart.
44	Wants independent safety investigation before startup.
46	Nuclear power is unsafe.

Response:

The General Accounting Office (GAO) is studying the Peach Bottom case. The NRC staff will consider all information relevant to a Peach Bottom restart decision, including information provided by GAO, that is available at the time such a decision is made. In addition, the Advisory Committee on Reactor Safeguards plans to conduct deliberations on the Peach Bottom restart during meetings that will be open to the public. The opportunity for public comment and other aspects of the conduct of these meetings will be provided in the Federal Register notice announcing the time and dates of such meetings.

Commenter	Comment C.4.13: Water Quality
11	Alleges Susquehanna River water quality reports were altered to downgrade radiation levels.

Response:

During an interview between PECo and the alleger, it was determined that the allegation regarding Susquehanna River water quality reports was based on information received second hand from a contractor employee last employed at Peach Bottom in 1976. Specific information on or any first-hand knowledge of such activity or any indication that it is continuing could not be provided. Lacking any details of the allegation and considering the time period in which it was alleged to have occurred, no further investigation is considered appropriate.

Commenter	Comment C.4.14: Fire Protection
11	Concerned about lack of fire drills with local fire-fighting companies.
22	More emphasis needs to be placed on training with local fire agencies.

Response:

PECo's Peach Bottom Fire Protection Program has received extensive NRC review and approval. The program identifies numerous fire protection features that minimize the potential for fires, ensure timely and effective fire-fighting capability, and ensure safe shutdown of the plant in the event of a fire. These capabilities do not rely on support from the local fire department. The

five-man fire brigade is trained to handle most station fires without support from the fire department. The local fire department will be requested to respond if its support is deemed necessary. To ensure that local fire departments can effectively support station fire-fighting efforts, they are provided with annual training in accordance with the PBAPS Emergency Plan. This training was last conducted on August 22 and 24, 1988.

Commenter	Comment C.4.15: Containment
12	What is probability of containment failure in event of core melt - 90 percent?
12	Mark I containment is not safe.
16	Concerned about Mark I containment.
21	Concerned about Mark I containment.
23	Concerned about Mark I containment.
26	Wants Mark I containment issue resolved before startup.
44	Concerned about Mark I containment.

Response:

The containment structure is designed to prevent the release of substantial quantities of radioactivity in the event of any one of a number of postulated accidents which are referred to as design basis accidents. Our safety research on reactor accidents has provided us with a number of insights. Among these are that the Mark I containment design provides a significant safety margin for accidents even worse than the design basis accident, and that such severe accidents have a low probability of occurrence.

The NRC believes that the BWR Mark I plants are safe and that they pose no undue public health risk. Nevertheless, the NRC is pursuing a vigorous program to reduce even further the already very low likelihood of occurrence of a severe accident and to improve the capability of plants to mitigate the consequences of such accidents. The NRC's most recent program in this regard was begun several years ago and a final report with recommendations by the NRC staff is expected in the near future.

Commenter	Comment C.4.16: Decommissioning
12	Concerned about cost of cleanup of the plant after decommissioning.
13	Concerned about dangers of plutonium and cost of cleanup.
45	Concerned about plant decommissioning.

Response:

Section 50.54(bb) of Title 10 of the Code of Federal Regulations (10 CFR) requires that no later than 5 years before the expiration of the reactor operating license, licensees of operating nuclear power reactors shall submit written notification to the Commission, for its review and preliminary approval, of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor upon expiration of the reactor operating license until title to the irradiated fuel and possession of the fuel is transferred to the Secretary of Energy for its ultimate disposal in a repository. Final Commission review will be undertaken as part of any proceeding for continued licensing under 10 CFR Parts 50 or 72. The licensee must demonstrate to the NRC that the elected actions will be consistent with NRC requirements for licensed possession of irradiated nuclear fuel and that the actions will be implemented on a timely basis.

The issue of spent fuel repositories is discussed elsewhere in this appendix.

Commenter	Comment C.4.17: Economics and Need for Power
20	Nuclear plants are not economical.
33	Illegal to consider economic benefits to community in considering restart.
33	Peach Bottom is not needed.
37	Peach Bottom is needed to prevent acid rain and minimize need to import oil.

Response:

The NRC staff does not routinely evaluate issues such as need for power, alternate energy sources, or economic benefits in connection with the continued authorization of operation of operating nuclear power plants unless such issues arose that would require an environmental impact statement pursuant to 10 CFR 51 or a consideration of a backfit issue pursuant to 10 CFR 50.109. To date the staff's consideration of the Peach Bottom issues, as discussed in this SER, have not involved such issues. The staff does recognize, however, that such economic issues may typically be considered by local public utility commissions.

Commenter	Comment C.4.18: Emergency Planning
20	Doubts evacuation possibility.
41	Concerned about provision of the evacuation plan to use schools as shelters (dismissing the children) in violation of Pennsylvania guidelines.
44	Concerned about provision of the evacuation plan to use schools as shelters (dismissing the children) in violation of Pennsylvania guidelines.

Response:

Evacuation is one element considered in emergency planning. Although it is highly unlikely that evacuation would be required, the NRC requires that such a contingency be considered in developing emergency plans.

The Peach Bottom emergency plan was prepared using a variety of sources as guidance including NRC acceptance criteria primarily based on lessons learned from TMI-2. Experience gained in developing and demonstrating previous Peach Bottom emergency plans and the PECo Procedures for Electric Service Restoration in Major Emergencies has been incorporated into this emergency plan. Close cooperation with State and county civil agencies has been established so that State, county, and facility emergency plans are compatible.

PECo has written agreements with Pennsylvania and the counties of Chester, Lancaster, and York as well as memos of understanding with Maryland and the counties of Cecil and Harford. If a situation requiring sheltering or evacuation should occur, the utility's responsibility is to provide notification, supply continuing information, and make recommendations to the State and counties at risk. It is the State and county plans that cover alerting of the general public in the affected area and give details for protection of this population, including provisions for protective actions such as sheltering or evacuating personnel from affected sections. These plans in general call for sirens, police patrol cars, and other emergency vehicles with public address systems to warn and evacuate appropriate sectors within the plume exposure emergency planning zone (EPZ). The Pennsylvania Emergency Management Agency plan recognizes that the safety of school children is the key factor in any protective action. Its plan calls for school children whose schools are located outside the EPZ to be retained in the schools they attend, or if located inside the EPZ, to be evacuated to host schools. The children will be retained in the school until they are picked up by their parents or guardians. School children will not be sent home at any time when an evacuation is in progress. In any case, the responsibility for any protective action for the public, including evacuation, lies with the State.

Training on the Peach Bottom emergency plan is provided to emergency organization personnel who are assigned to positions on the basis of experience during normal operations. Training by lecture, drills and exercises is used to familiarize personnel with specific emergency responsibilities. Training and education are applicable to PECo personnel, supporting agencies, private citizens, and news media personnel. PECo conducts periodic exercises to test plan effectiveness that are monitored by the NRC. State and local agencies also carry out field practices of their emergency plans to evaluate their ability to carry out evacuations. These exercises are observed by the Federal Emergency Management Agency (FEMA). Provisions within the emergency plan provide for periodic review and revision of the emergency plan. The plan and associated procedures are reviewed annually to consider their effectiveness and organization; results of drills, exercises, and training; and new or revised regulations. Results obtained from past exercises have demonstrated the ability to implement protective actions, including evacuation.

Commenter	Comment C.4.19: Radwaste
11	Alleges contaminated items were stored in faulty containers.
20	Concerned about radwaste storage. Wants spent fuel transferred to dry cask storage.
21	Concerned about amounts of radwaste.
44	Concerned about nuclear waste.

Response:

The "faulty containers" refer to drums that were stored outdoors on pallets near the diesel generator building in a tented area. These drums were in a temporary storage area awaiting offsite disposal. They contained low-level oil solidified with Environstone, which is a cement-based solidification agent. The average dose rate from each was approximately 0.2 millirem/hr on contact. All of the containers were properly covered with lids, and although a number had some rust, they did not pose a radiological hazard.

The NRC initiated a rulemaking proceeding on October 25, 1979, to assess generically the degree of assurance that radioactive waste can be disposed of safely, to determine when such disposal or offsite storage will be available, and to determine if radioactive wastes can be safely stored on site past the expiration of existing facility licenses until offsite disposal or storage is available. This proceeding became known as the "Waste Confidence Rulemaking." The Commission's decision is summarized in the following findings:

(1) The Commission found reasonable assurance that safe disposal of high-level radioactive waste and spent fuel in a mined geologic repository is technically feasible.

(2) The Commission found reasonable assurance that one or more mined geologic repositories for commercial high-level radioactive waste and spent fuel will be available by the years 2007-08, and that sufficient repository capacity will be available within 30 years beyond the expiration of any reactor operating license to dispose of existing commercial high-level radioactive waste and spent fuel originating in such reactor and generated up to that time.

(3) The Commission found reasonable assurance that high-level radioactive waste and spent fuel will be managed in a safe manner until sufficient repository capacity is available to ensure the safe disposal of all high level radioactive waste and spent fuel.

(4) The Commission found reasonable assurance that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impact for at least 30 years beyond the expiration of that reactor's operating license at that reactor's spent fuel storage basin, or at either onsite or offsite independent spent fuel storage installations.

(5) The Commission found reasonable assurance that safe independent onsite or offsite spent fuel storage will be made available if such storage capacity is needed.

In keeping with its commitment to issue rules providing procedures for considering environmental effects of extended onsite storage of spent fuel in licensing proceedings, the Commission issued changes to 10 CFR Parts 50 and 51. In adopting changes to 10 CFR 50.54, the Commission established procedures to confirm that there will be adequate lead time for whatever actions may be needed at individual reactor sites to ensure that the management of spent fuel following the expiration of the reactor operating license will be accomplished in a safe and environmentally acceptable manner. Accordingly, no discussion of any environmental impact of spent fuel storage for the period following expiration of the license or amendment applied for is required in connection with the issuance or amendment of an operating license for a nuclear reactor.

For a more extensive discussion of these rulemakings, see the Federal Register (49 FR 34658, August 31, 1984).

Commenter	Comment C 4.20: NRC
21	Generic problems are addressed too slowly, thus causing lack of faith in NRC.
34	Concerned that NRC is too cozy with nuclear industry to regulate it.

Response:

Among its responsibilities, the NRC is charged with conducting research in support of the licensing and regulatory process. This function is performed through evaluation of operating experience and confirmatory research. Regulations are proposed on the basis of the information obtained from this process. Although a specific rule issued by the Commission may, according to the current body of scientific and technical knowledge, be viewed as the most sound, future operating experience or research may show otherwise. In evaluating the growing body of operating experience and technical knowledge, the Commission weighs the cost of a rule change against the benefits that change would produce. In many instances, additional operating experience or research (requiring additional time) is needed to establish the basis for a rule change. When existing rules (or generic issues) have allowed extended safe operations with an acceptable level of risk, a significant body of evidence must be produced to warrant a change.

The NRC staff would not agree that the actions taken with respect to Peach Bottom, which as detailed in Section 2 of the SER include the shutdown of the plant for over a year and enforcement actions against PECo and certain of its employees, support the proposition that NRC is "too cozy with the nuclear industry to regulate it."

Commenter	Comment C.4.21: Spent Fuel Reracking
34	Plan does not address containment, spent fuel reracking, and adequacy of offsite radiation monitoring equipment.

Response:

The spent fuel reracking issue is not directly related to those issues addressed by the NRC's shutdown order of March 31, 1987, and, therefore, is not addressed by the licensee's plan for restart. Nevertheless, it is noted that the currently installed capacity will last until 1995, with a reserve full-core discharge, for Unit 2, and until 1996, with a reserve full-core discharge, for Unit 3 when in-progress modifications are completed in early 1989. Containment and offsite radiation monitoring are responded to under the categories covering concerns about the containment and environmental radiation monitoring, respectively.

Commenter	Comment C.4.22: Restart Criteria
34	What are NRC's restart criteria?

Response:

The staff's review of the issues associated with the shutdown of Peach Bottom that includes the staff's approach to enforcement actions, the staff's review of PECo's response to the shutdown issues, and other activities involved in any determination of readiness for restart are discussed in Sections 1 and 2 of this SER.

Commenter	Comment C.4.23: Seismology
39	Concerned about plant being on a geological fault that had two earthquakes in last 10 years.

Response:

Peach Bottom lies in an area that has experienced a moderate amount of minor earthquake activity. Most of the reported earthquakes have occurred in the Piedmont Province in which the site is located. The closest fault is associated with the Peach Bottom Syncline located approximately 1 mile south of the site. Studies indicate that the Peach Bottom fault and similar nearby faults have completely healed. The most recent fault movement in the region is believed to have occurred during Mesozoic time between 140 and 200 million years ago.

Records of the occurrence of earthquakes in southeastern Pennsylvania and the surrounding areas date back to the early 18th century. Many earthquakes have been reported since that time and some of these caused minor structural damage; however, none can be considered to be of great or catastrophic proportion. On the basis of the seismic history of the area, a maximum credible earthquake was selected against which the plant was designed. This earthquake is considered to be the largest shock in the region at the closest epicentral distance to the site consistent with geologic structure. Class I (safety-related) facilities

at the plant are designed to withstand ground accelerations that could result from a shock of about the same size as the earthquake of 1871 (Wilmington), 1883 (Harford County), or 1889 (southeast Pennsylvania) at the closest approach to the site of their related geologic structure.

Additional details on the geologic and seismologic characteristics of the area and the supporting studies and surveys can be found in Section 2.5 of the Peach Bottom Final Safety Analysis Report.

APPENDIX K

Integrated Assessment Team Inspection Report

No. 50-277/89-81; 50-278/89-81

Dated March 6, 1989

B. Boyle
NRR

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

06 MAR 1989

Docket No. 50-277
50-278

Philadelphia Electric Company
ATTN: Mr. C. A. McNeill
Executive Vice President - Nuclear
Correspondence Control Desk
Philadelphia, PA 19101

Gentlemen:

Subject: INTEGRATED ASSESSMENT TEAM INSPECTION 50-277/89-81; 50-278/89-81

This letter transmits the findings of the Integrated Assessment Team Inspection (IATI) led by Mr. J. Linville of this office on February 3 - 17, 1989 at the Peach Bottom Atomic Power Station (PBAPS), Delta, Pennsylvania. The results were discussed with you and others of your staff at the conclusion of the inspection.

The purpose of this team inspection was to perform an independent, in-depth assessment of the readiness of management controls, programs, and personnel to support safe restart and operation of the facility. The inspection team performed an integrated evaluation of various functional areas including site management/operations, licensed operator resource development, station cultural changes, corporate oversight, radiation protection, maintenance/surveillance, engineering/technical support and security. Within these areas, the inspection consisted of interviews with personnel, observations of plant activities, and examinations of procedures, records, and documents by the inspectors.

Within the scope of its review, the team concluded with high confidence that Philadelphia Electric Company (PECo) management controls, programs, and personnel are performing at a level to support safe startup and operation of the facility. Those technical items requiring resolution or completion prior to restart are being addressed and tracked by PECo. The team identified a relatively small number of additional items for which actions or evaluations are needed; PECo has made commitments in those areas, as detailed in section 2.4 of the enclosed report. As a result of this inspection, the team concluded that there are currently no fundamental flaws in PECo's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

If your understanding of any matter discussed in the enclosed report differs from that stated, please contact Mr. Linville or me promptly. Please inform us in writing within 30 days of the status of those commitments detailed in Section 2.4 of the enclosed report. Subsequent periodic responses are also requested in section 2.4. The NRC will review the status of these issues prior to any restart of PBAPS. The results of this team inspection will be one of the principle considerations of the NRC staff's deliberations as it develops its decision regarding a PBAPS restart recommendation to the Commission.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosures will be placed in the Public Document Room. The response requested by this letter and the accompanying notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Your cooperation is appreciated.

Sincerely,

William F. Kane, Director
Division of Reactor Projects

Enclosure: Inspection Report 50-277/89-81; 50-278/89-81

cc w/encl:
John S. Kemper, Sr., Senior Vice President-Nuclear
Jack Urban, General Manager, Fuels Department, Delmarva Power
D. M. Smith, Vice President, Peach Bottom Atomic Power Station
J. W. Gallagher, Vice President, Nuclear Services
E. C. Kistner, Chairman, Nuclear Review Board
W. H. Hirst, Director, Joint Generation Projects Department, Atlantic Electric
B. W. Gorman, Manager-External Affairs, Public Service Electric & Gas Company
J. F. Franz, Plant Manager, Peach Bottom Atomic Power Station
Troy B. Conner, Jr., Esquire (Without Report)
Eugene J. Bradley, Esquire, Assistant General Counsel (Without Report)
Raymond L. Hovis, Esquire (Without Report)
Thomas Magette, Power Plant Siting, Nuclear Evaluations
W. M. Alden, Director, Licensing Section
Doris Poulsen, Secretary of Harford County Council
Dane Honan
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Pennsylvania

06 MAR 1989

bcc w/encl:
Region I Docket Room (with concurrences)
Management Assistant, DRMA (w/o encl)
J. C. Linville Section Chief, DRP
PAO (2) SALP Reports Only + All Inspection Reports
Robert J. Bores, DRSS
M. Shanbaky, Chief, FRPS, DRSS
SRI, Limerick I
Karl Abraham, Public Affairs Officer (2)
R. E. Martin, Project Engineer, NRR
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R. Gallo, DRS
R. Bellamy, DRSS
W. Schmidt, DRP
G. Meyer, DRP
D. Caphton, DRS
D. Florek, DRS

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket/Report No. 50-277/89-81
50-278/89-31

License No. DPR-44
DPR-56

Licensee: Philadelphia Electric Company
Philadelphia, Pennsylvania

Facility Name: Peach Bottom Atomic Power Station

Inspection at: Delta, Pennsylvania

Dates: February 3 - 17, 1989

Inspectors: See Appendix E

Approved by: J. C. Linville, Chief, Reactor Projects Section 2A, Division of Reactor Projects, Team Leader

3/6/89
date

Summary

Areas Inspected: Integrated Assessment Team Inspection 1171 hours of direct inspection (including 691 hours Unit 2 and 481 hours Unit 3; and 71 hours of deep backshift) to assess the effectiveness of the restart plan corrective actions and the degree of readiness of licensee management controls, programs, and personnel to support safe restart and operation of the plant. The scope of the inspection is further detailed Section 2.2.

Results: The Team concluded that licensee management controls, programs and personnel are generally ready and performing at level to support safe startup and operation of the facility. Results are further summarized in sections 1.0 (Executive Summary) and 2.3 (Summary of Findings).

TABLE OF CONTENTS

ACRONYMS

A	-	Administrative Procedure
ACO	-	Assistant Control Operator
ADEPT	-	ALARA Dose Exposure Process Trending
AG	-	Administrative Guideline
ALARA	-	As Low As Reasonably Achievable
AMS	-	Airborne Monitoring System
ANI	-	Authorized Nuclear Insurer
ANSI	-	American National Standards Institute
AO	-	Air Operated (Valve)
AO/APO	-	Auxiliary Operator/Assistant Plant Operator
APRM	-	Average Power Range Monitor
ARI	-	Alternate Rod Insertion
ASME	-	American Society for Mechanical Engineers
ASTA	-	Advanced Science and Technology Associates
BWR	-	Boiling Water Reactor
CA/CAR	-	Corrective Action (Request)
CFR	-	Code of Federal Regulations
CHAMPS	-	Computerized History and Maintenance Planning System
CM	-	Corrective Maintenance
CO	-	Chief Operator
COL	-	Checkoff List
CPM	-	Counts Per Minute
CS	-	Core Spray (System)
CTP	-	Commitment Tracking Program
CV	-	Control Valve
DG	-	Diesel Generator
D/P	-	Differential Pressure
DV/IV	-	Double Verification/Independent Verification
ECCS	-	Emergency Core Cooling System
ECW	-	Emergency Cooling Water (System)
ECT	-	Emergency Cooling Tower
ENS	-	Emergency Notification System
EOP	-	Emergency Operating Procedures
EPA	-	Environmental Protection Agency
EQ	-	Environmental Qualification
ESF	-	Engineered Safety Feature
ESW	-	Emergency Service Water (System)
EVP-N	-	Executive Vice President-Nuclear
EWL	-	Engineering Work Letter
FAR	-	Failure Analysis Report
FSAR	-	Final Safety Analysis Report
GE	-	General Electric
GET	-	General Employee Training

GP	-	General Plant Operating Procedure
HP	-	Health Physics
HPCI	-	High Pressure Coolant Injection (System)
HPES	-	Human Performance Evaluation System
HPSW	-	High Pressure Service Water (System)
HRA	-	High Radiation Area
HS	-	Hand Switch
I	-	IST/ISI Acceptance Criteria
IATI	-	Integrated Assessment Team Inspection
I&C	-	Instrumentation and Control
IM	-	Interaction Management
IMS	-	Interaction Management Support
INPO	-	Institute of Nuclear Power Operations
ISEG	-	Independent Safety Engineering Group
ISI/IST	-	In-Service Inspection/Testing
JUMA	-	Joint Utility Management Association
LCO	-	Limiting Condition for Operations
LER	-	Licensee Event Report
LPCI	-	Low Pressure Coolant Injection
LPRM	-	Local Power Range Monitor
MAC	-	Management Analysis Company
MARC	-	Management Action Response Checklist
MAT	-	Modification Acceptance Test
MBWA	-	Management By Walking Around
MCC	-	Motor Control Center
MFE	-	Managing for Excellence (Training)
MO/MOV	-	Motor Operated Valve
MOD	-	Modification
MOIL	-	Master Open Items List
MOVATS	-	Motor Operated Valves Analysis Testing System
MPC	-	Maximum Permissible Concentration
MRF	-	Maintenance Request Form
MSIV	-	Main Steam Isolation Valve
NCB	-	Nuclear Committee of the Board
NCR	-	Nonconformance Report
NED	-	Nuclear Engineering Department
NGAP	-	Nuclear Group Administrative Procedure
NQA	-	Nuclear Quality Assurance
NRB	-	Nuclear Review Board
NRC	-	Nuclear Regulatory Commission
NRR	-	Office of Nuclear Reactor Regulation (NRC)
NSS	-	Nuclear Security Specialist
OEAP	-	Operating Experience Assessment Program
OMD	-	Organization and Management Development Group
OT	-	Operational Transient (Procedure)
OVF	-	Operational Verification Form

PAD	-	Performance Assessment Division
PBAPS	-	Peach Bottom Atomic Power Station
PB-TEAM		Peach Bottom - Together Employees and Management
PCIS	-	Primary Containment Isolation System
P&ID	-	Piping and Instrument Diagram
PE	-	Personnel Effectiveness (Training)
PFE	-	People - The Foundation of Excellence (Training)
PECo	-	Philadelphia Electric Company
PI	-	Pressure Indicator
PM	-	Preventive Maintenance
PO	-	Plant Operator
PCIS	-	Primary Containment Isolation System
PORC	-	Plant Operations Review Committee
PSTG	-	Plant Specific Technical Guidelines
PWR	-	Pressurized Water Reactor
QA/QC	-	Quality Assurance/Quality Control
QATTS	-	Quality Assurance Trending and Tracking System
RCIC	-	Reactor Core Isolation Cooling (System)
RHR	-	Residual Heat Removal (System)
RO	-	Reactor Operator
ROR	-	Radiological Occurrence Report
RT	-	Routine Test
RWP	-	Radiation Work Permit
S	-	System Operating Procedures (Old)
SALP	-	Systematic Assessment of Licensee Performance
SDV	-	Scram Discharge Volume
SGTS	-	Standby Gas Treatment System
SI	-	Surveillance Instruction (I&C)
SIL	-	Service Information Letter
SLC	-	Standby Liquid Control (System)
SER/SE	-	Safety Evaluation Report/Safety Evaluation
SES	-	Senior Executive Service
SO	-	System Operating Procedures (New)
SP	-	Special Procedure
SRO	-	Senior Reactor Operator
ST	-	Surveillance Test
STA	-	Shift Technical Advisor
STARS	-	Surveillance Test and Records Systems
TC	-	Temporary Change (Procedure)
TI	-	Temperature Indicator
TPA	-	Temporary Plant Alteration
TRIP(T)	-	Transient Response Implementation Plan (Procedure)
TRIPOD	-	Plan of the Day (Scheduling Document)
TS	-	Technical Specifications
VOTES	-	Valve Operator Test and Evaluation System

DETAILS

1.0 EXECUTIVE SUMMARY

Following an extensive period of declining performance at the Peach Bottom Atomic Power Station (PBAPS) and an inability of Philadelphia Electric Company (PECo) management to reverse this trend, in March 1987 the NRC received information that control room operators had been observed sleeping while on duty and were otherwise inattentive to their license obligations. Shift and plant management either knew or should have known these facts and either took no action or inadequate action to correct this situation.

Lacking reasonable assurance that the facility would be operated in a manner to assure that the health and safety of the public would be protected, the NRC ordered the licensee to shut down its one operating PBAPS unit on March 31, 1987, and maintain both units in a cold shutdown condition. The Order also required that a comprehensive plan be developed to assure that the facility would be operated safely. On October 19, 1988, the NRC approved the licensee's restart plan. On February 2, 1989, the licensee reported that subject to resolution of certain identified issues, PBAPS was ready for startup and safe operation. In order to assess the status and results of PECo's corrective actions, the NRC performed an independent review of the effectiveness of the licensee's management control, programs and personnel during the Integrated Assessment Team Inspection conducted February 3-17, 1989.

The team consisted of an SES-level manager, a team leader and members of the NRC Region I and Headquarters staff. The inspection team also included an observer representing the Commonwealth of Pennsylvania and one representing the State of Maryland. These observers had access and input to all aspects of the inspection as provided by the established protocol. The areas reviewed during the inspection included site management/operations, licensed operator resource development, station culture, corporate oversight, radiological controls, maintenance/surveillance, engineering/technical support, and security. The team reported directly to the Regional Administrator of Region I.

Overall, the team concluded with high confidence that PECo management controls, programs, and personnel were generally ready and performing at a level to support safe startup and operation of Peach Bottom Unit 2. The team also concluded that the corrective actions implemented as stated in the Plan for Restart of PBAPS were generally effective in addressing the four root causes. Further, although the team identified certain items which require licensee actions or evaluations, there were no fundamental flaws found in the licensee's management structure, performance, programs or implementation that would inhibit its ability to assure reactor or public safety.

2.0 INTRODUCTION

This report details the findings, observations and conclusions of the NRC's Integrated Assessment Team Inspection ("team") conducted at the Peach Bottom Atomic Power Station on February 3-17, 1989. The results of this team inspection are to be considered during the NRC staff's deliberations as it reaches its decision regarding a restart recommendation.

2.1 Background

Peach Bottom has experienced a deteriorating performance history in recent years as documented through inspections, Systematic Assessment of Licensee Performance (SALP) reports, and enforcement actions. There was a complacent attitude toward procedural compliance in plant operations, and management involvement and effectiveness toward improving operations activities was not evident.

In March 1987, the NRC received information that control room operators at Peach Bottom had been observed sleeping while on duty in the control room, reading materials not directly job related, and being otherwise inattentive to licensed duties. The NRC confirmed this information during the initial phase of an investigation and determined that all levels of plant management at that time either knew or should have known of these facts and took either no action or inadequate action to correct this situation. As a result, the NRC staff no longer had reasonable assurance that the facility would be operated in a manner to ensure that the health and safety of the public would be protected. The NRC issued an Order to PECo on March 31, 1987, suspending power operations of the Peach Bottom Units. Subsequently, the NRC determined that the inattentiveness described in the Order had occurred over an extended period of time and was pervasive, and that the failure by site and corporate management to identify, investigate, and correct these conditions and report them to the NRC demonstrated a significant lack of management attention to, and control of, operations at Peach Bottom.

The Order issued to the licensee addressed concerns including failure of both the line organization and the quality assurance program to identify conditions adverse to safety. Additionally, prior to further proposing operation of the Station, the licensee was required to provide for NRC approval, a detailed and comprehensive plan to assure that the facility would be operated safely and comply with all requirements.

In response to the Order, the licensee identified four principal root causes of the issues that led to the shutdown of Peach Bottom and proposed a plan for restart that included discrete tasks to correct these root causes.

During the extended shutdown, PECo has initiated numerous management and organizational changes, conducted extensive training, implemented complex plant modifications, and made various program improvements. During this same period the NRC has performed numerous inspections to determine the status and adequacy of the improvements. The objective of the IATI was to review the adequacy of issues which required follow-up inspection, determine if improvements made are effective and appear long lasting, and determine if PECo is prepared to support the restart and safe operation of Peach Bottom.

2.2 Scope of Inspection

The team inspection was performed to provide an independent, in-depth assessment of the degree of readiness of licensee management controls, programs, and personnel to support safe restart and operation of the facility. The inspection team performed an integrated evaluation of various functional areas as detailed below.

Within these areas, the inspection consisted of interviews with licensee personnel, observations of plant activities, and selective examinations of procedures, records, and documents by the inspectors. The team also directly observed on-going plant activities on all shifts from February 5-8, 1989.

The team focused on the following:

Shutdown Order Root Causes
- -- Site Management/Operations
- -- Licensed Operator Resource Development/Training
- -- Station Culture
- -- Corporate Oversight/Safety Assessment/Quality Verification

Other functional areas
- -- Radiological Controls
- -- Maintenance/Surveillance
- -- Engineering/Technical Support
- -- Security

The following attributes were also considered and examined in the team inspection:

- -- Development and implementation of management goals/objectives and how they are understood/implemented at various levels of the licensee's organization;

- -- Planning/controlling routine activities along with effective program implementation;
- -- Level of understanding by workers/supervisors of potential impact of day-to-day actions on nuclear safety;
- -- Attitudes of licensee personnel with respect to nuclear safety;
- -- Involvement by senior management in day-to-day operation of the plant including visibility of senior site and corporate management;
- -- Effectiveness of training, direction, guidance and supervision by first-line supervisors;
- -- Adequacy of staffing in light of planned accomplishments;
- -- Role of QA/QC in monitoring activities and how their reports are used by plant management;
- -- Role of licensee in working with and overseeing contractor personnel;
- -- Effectiveness of safety review committees; and,
- -- Communications/problem solving process.

The team reviewed the following generic/long term problem areas and issues:

- -- Stability and effectiveness of the management team;
- -- Timeliness and effectiveness of corrective actions (including management attention to ensure resolution and escalation to senior management if necessary);
- -- Interfaces, communication and cooperation among operations, maintenance, quality assurance, security, engineering and health physics personnel;
- -- Quality of plant procedures and procedure changes generated as a result of rewrite projects and plant modifications;
- -- Status of the maintenance backlog;
- -- Overall material condition including housekeeping and decontamination effort of the plant;
- -- Overtime controls in all functional areas;
- -- Validity of licensee interpretations of Technical Specifications and other regulatory bases;
- -- Worker and management support of radiological controls, especially ALARA;
- -- Worker perception of the following items:
  - (i) management policies
  - (ii) management and supervisory involvement and effectiveness

-- Worker morale and attitudes; and,
-- Licensee internal tracking systems and validity of closeouts.

2.3 Summary of Results

2.3.1 Overall Summary

The team concluded, with high confidence, that licensee management controls, programs, and personnel are generally ready and performing at a level to support safe startup and operation of the facility. Technical items requiring resolution or completion prior to restart are being addressed and tracked by the licensee. The team identified a relatively small number of additional items for which licensee actions or evaluations appear appropriate. During the inspection, the licensee made acceptable commitments in these areas. There are currently no fundamental flaws in the licensee's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

The inspection generally confirmed the results of the report for June 1, 1987 through July 31, 1988, as well as validated the general SALP conclusion that performance was improving at the end of the SALP period. Further, licensee performance appeared to be consistent or improving in all functional areas examined during the IATI, with the current level of achievement for overall safety performance equal to or better than that described in the SALP. For security and safeguards, the performance is noticeably improved.

The inspection generally confirmed the effectiveness of Restart Plan and other various licensee self-improvement programs, including the licensee's self-assessment process. The team identified relatively few issues that had not been previously identified by the licensee. In the interest of continually improving its self-assessment process, the licensee should evaluate those cases where the NRC either identified new issues or assigned a higher sense of priority than identified by the licensee.

Based on a review of the management structure, staffing, goals, policies and administrative controls, the team concluded that the licensee has an acceptable organization and administrative process, with adequate management and technical resources to assure that the plant can be operated in a safe and reliable manner during normal and abnormal conditions. Further, this performance-based inspection provided an integrated look at overall management effectiveness in ensuring high standards of nuclear safety. The overall conclusions of this inspection confirm facility management effectiveness, especially its ability to perform self-assessment functions, to improve performance, and to raise nuclear safety awareness and attitudes throughout the organization.

2.3.2 Summary of Results by Functional Areas

Within each functional area, conclusions were reached including the identification of various strengths and weaknesses. These strengths and weaknesses are summarized below. The basis for these items, as well as the many significant observations made by the team, are explained in Section 3 of this report.

2.3.2.1 Site Management/Operations

Strengths

-- Shift Manager leadership.
-- MBWA program success by noted improvements in plant material condition.
-- Shift communications within the shift and between shifts.
-- Operational event and problem follow-up by shift and operations management.
-- Quality of the new system operating procedures.
-- Control of overtime.

Weaknesses

-- Some key new system operating procedures initially scheduled for completion after restart.

2.3.2.2 Licensed Operator Resource Development

Strengths

-- None

Weaknesses

-- Alternate career paths and educational plans not formalized or promulgated.

2.3.2.3 Cultural Change

Strengths

-- Effective shift crew teamwork, communications, and interaction within the shift crew and with other personnel.
-- Management guidance to operations personnel provided as expectations in the Operations Management Manual/Operations Manual.
-- Support by management of Organization Development/Human Resource activities.
-- Regularly scheduled operations meetings designed to enhance communications, specifically Shift Management Meetings and Shift Team Meetings.
-- Accessibility and openness of all levels of management.
-- Willingness of shift crew to question suitability of direction provided by shift crew supervision, and shift crew supervision openness to such questioning.

Weaknesses

-- Lack of trust in site and operations management due to:

    o Perception that management may not meet its commitments with respect to career paths and rotational and permanent off-shift assignments.
    o Lack of timely response to shift crew recommendations on various operations concerns and personnel issues.
    o Quality and timeliness of communications and feedback loops.

-- Inconsistency among shift crews in the implementation of some policies such as vacation schedules and performance evaluations.
-- Need for effective direct organizational link between shift crews and Superintendent for Operations to provide for clearer guidance and more effective and responsive feedback.
-- Timeliness of follow-up Interaction Training for licensed and non-licensed operators.
-- Incorporation of parts of PFE/PE training into operator progression training.

2.3.2.4 Corporate Oversight

Strengths

-- On site involvement and presence of senior management including the EVP-N in virtually all major activities.
-- Positive attitude that has been fostered by corporate management in station personnel as seen in personal interaction skills, generally being in control of situations and open mindedness toward sharing information and in critiques.
-- Enhanced tools to support management self assessment of issues (MOIL, CTP, OEAP).
-- Comprehensive scope of NQA audits providing feedback to management regarding identified problems.
-- Technical monitoring provides real time assessment of ongoing activities.
-- Effectiveness of ISEG root cause analysis.

Weaknesses

-- QC installation/inspection procedures need improvement.
-- More focus needed by some auditors on quality and safety as indicated by the IST audit.
-- No electrical or I&C expertise on ISEG.
-- Failure of QC to identify deficiencies in tubing installation and support.
-- 1989 NQA master audit plan and schedule not yet approved.

2.3.2.5 Radiological Controls

Strengths

-- Reduction of contaminated areas and good housekeeping including aggressive goals. Improved use of engineering controls such as tents and containment to reduce contamination spread.
-- Operational HP interface with other groups continues to improve.
-- Corporate and plant management support of ALARA including goal setting and planning.
-- New aggressive HP technician management chain from first line supervisory personnel to Superintendent.
-- High radiation area controls.
-- Improvement in radiological occurrence report closeout timeliness.

Weaknesses

-- HP technicians lack Peach Bottom operational power experience.
-- Radiological occurrence reports continue to reflect poor radiation worker practices and contamination controls.

2.3.2.6 Maintenance/Surveillance

Strengths

-- Particularly effective surveillance scheduling and tracking system (STARS).
-- Problems resolved by engineering (system/test) personnel indicate they are knowledgeable of their systems.
-- Professionalism of technical personnel including system/technical engineers, I&C Technicians and maintenance craft.

Weaknesses

-- Some weak surveillance test procedure acceptance criteria.

2.3.2.7 Engineering/Technical Support

Strengths

-- Modification team approach that includes the integration of plant personnel with design engineers during modification design and revision process.
-- Timely revision of control room P&IDs on red line drawings to show completed modification works.
-- Use of double verification/independent verification on MATs and system engineer understanding of the intent and expected practices.

Weaknesses

-- Lack of clearly defined acceptance criteria on MATs and, poor application of design basis to modification acceptance testing.

2.3.2.8 Security/Safeguards

Strengths

-- Security responsiveness to NRC questions.
-- Oversight and knowledge of Nuclear Security Specialist.
-- Improved attitudes of security force members.
-- Good integration of security into the shift team.

Weaknesses

-- Security procedure concerning hand search of hand carried items after alarming explosive detector.
-- Security and HP interfaces.

2.4 Licensee Commitments

During the team inspection, the licensee made certain commitments to the inspection team. These commitments relate to licensee

corrective or enhancement actions planned in response to team findings or concerns. These commitments, summarized below, are discussed in more detail in subsequent sections of this report as shown in parentheses. Commitments were confirmed during the exit interview. The status of these issues will be reviewed by the NRC prior to restart of the plant as appropriate.

2.4.1 Prior to restart ensure new system operating (SO) procedures that are important to safe operation are implemented prior to startup or system operations. (Section 3.1.6)

2.4.2 Prior to restart provide your plans and schedule for improving the permit and blocking rules. (Section 3.1.7)

2.4.3 Prior to restart complete response to LaSalle BWR Power Oscillations NRC Bulletin 88-07. (Section 3.2.7)

2.4.4 By May 31, 1989 provide schedule for development and implementation of revision 4 of the Emergency Procedure Guidelines. (Section 3.2.9)

2.4.5 Beginning in July 1989 and continuing for two years, provide semi-annual human resource status reports on progress towards meeting operator resource development and cultural related commitments.

- Career paths and off-shift rotational assignments for operations staff. (Section 3.2.3 and 3.3.4.2)
- More comprehensive operations newsletter which would include explanations for decisions on policies and programs that affect operations staff, status on resolving issues, concerns, recommendations, and other pertinent information. (Section 3.3.3)
- Improvement on quality and timeliness of communications and feedback loops. (Section 3.3.3)
- Improving consistency between shift crews in implementation of policies. (Section 3.3.4.1)
- Increasing the number of licensed operators towards the goals of 42 on shift and 85 total licensed experienced personnel (Section 3.2.3).
- Implementing interaction training for licensed operators and non-licensed personnel. (Section 3.3.2)
- Incorporation of parts of PFE/PE training into operator progression training. (Section 3.3.2)

2.4.6 Prior to restart provide to the NRC a revised commitment regarding the schedule for implementation of follow-up Interaction Training for licensed operators and non-licensed personnel and for incorporation of parts of PFE/PE training into licensed operator progression training. (Section 3.3.2)

2.4.7 Prior to restart provide to the appropriate HP technicians orientation and training in the area of Peach Bottom power operations experience and radiological expectations. (Section 3.5.2)

2.4.8 Prior to restart review torque switch settings for Limitorque motor operated valves settings below the vendor recommended values. (Section 3.6.2.8)

2.4.9 Prior to restart provide the results of a review of instrument air tubing and support installations and show that the root cause of analysis of modifications adequately encompasses the installation deficiency. (Section 3.7.3.1)

2.4.10 Prior to restart demonstrate the operability and maintainability of the Emergency Cooling Water System. (Section 3.7.4)

3.0 DETAILS OF INSPECTION

3.1 Site Management/Operations

3.1.1 Scope of Review

The team assessed the organizational structure including site management effectiveness currently in place at Peach Bottom Atomic Power Station. Areas reviewed included: (1) interviews with operations personnel, both licensed and non-licensed, as well as operational staff and management; (2) around the clock shift coverage to ascertain operations conformance with operating and administrative procedures; (3) review of procedures to assure conformance with NRC requirements. The team also attended management and staff meetings, as appropriate, to determine how present and future licensee plans are applied to Peach Bottom operations.

During the course of plant tours, event follow-up, interviews with personnel and meeting attendance, the team emphasized management leadership, conduct of operations, Plant Operations Review Committee, procedure compliance and adherence, staffing and overtime controls, operator attentiveness and attitude, operator insight and worker perception of management policies, involvement, effectiveness and their resulting impact on reactor safety.

3.1.2 Management Team/Leadership

The team assessed the organizational structure in place at the Peach Bottom Atomic Power Station (PBAPS). Interviews were conducted with station management including Shift Managers, Assistant Superintendent of Operations, Superintendent of Operations and Plant Manager. The administrative process currently in place to coordinate and control the activities and action affecting the safe operation of the facility was also assessed.

The team attended several management meetings to assess the interactions of managers and the effectiveness of the policies and procedures being implemented. The management overview in the areas of policy setting, awareness of current plant activities and continual oversight of policy changes that were incorporated by PECo in the "Plan for Restart of PBAPS" were found to be effective by the team.

The team interviewed managers, supervisors and operational staff members to determine current attitudes regarding operator morale, current shift rotation, promotional opportunities, communications within and outside of operations, training, and general overview of the current operational philosophy. The results of these interviews are discussed in section 3.3.

After the Shutdown Order of March 31, 1987, the licensee replaced management throughout the station and in corporate headquarters. One of the changes was the institution of Shift Managers to replace the Shift Superintendents. The Shift Managers were observed during three days of continuous shift observation of shift operations. The Shift Managers demonstrated good leadership and managerial skills. Evidence of this included team building among shift workers, procedural adherence, and communications within the shift and with other departments interfacing with the shift operational personnel.

The licensee has also incorporated a system of Management by Walking Around (MBWA). The MWBA process includes tours by managers of different departments who record and report their observations. Observations include work ethics of those working on plant components, plant housekeeping, radiological protection, industrial safety, and other important observations. The team reviewed MBWA reports for six months. As time progressed, the comments within these reports ranged from general comments, that were very broad in perspective, to finite statements, that were more specific. This trend indicates that plant conditions have improved by this management method. The team also noted the improved material condition of the facility. Improvements in housekeeping and radiological cleanliness were evident throughout the entire plant.

3.1.3 Conduct of Operations

The team reviewed the Operations Management Manual and Operations Manual which were issued in August 1988. These documents describe the organization, accountability, responsibilities, and communications for the operations department. These manuals specify in detail how the conduct of operations is to be performed at PBAPS. The interviews with the operators revealed that this document is perceived, by the operators, to be very useful in informing them of their exact duties for day to day safe operation. Each operations staff member received a personal copy of the manual.

During the shift coverage and individual interviews, the team noted that there was doubt in the minds of the Shift Managers, Shift Supervisors, and control room operators regarding the specific duties of the Superintendent of Operations and the Assistant Superintendent of Operations. A memorandum dated December 23, 1988, was issued by the Plant Manager to clarify these individuals' duties. However, some confusion still exists which could have an impact on the conduct of operations. This issue is addressed further in sections 2.3.2.3 and 3.3.4.1.

3.1.4 Plant Operations Review Committee (PORC)

Team members attended portions of several PORC meetings to assess the adherence with Technical Specification and administrative procedural requirements regarding PORC review of required material. Although no specific deviations of PORC activies from the specified requirements were identified, the Team noted that there appeared to be a consistent reliance on alternate members and alternates to the Chairman to establish quorums for meetings. There was also much rotation of the designated attendees for successive meetings. These conditions have the potential to detract from the continuity of PORC consideration of issues. Similar conditions were previously noted by the licensee's Performance Assessment Division in an April 1988 report to the PORC Chairman. Based on the discussion at the station review meeting the licensee appears to be reassessing the effectiveness of its action in response to the PAD assessment

3.1.5 Shift Staffing and Overtime Controls

Team members compared the shift staffing with the required complement as described in Technical Specifications. The members also noted that each shift had more than the required number of operator licenses to operate the facility (see section 3.2 for more details).

The overtime controls were reviewed by the team to ascertain licensee compliance with the current NRC guidance concerning operator overtime. The team determined that the overtime policy was being followed and that no operators had exceeded the guidelines. The actual number of work hours in the documents reviewed, was limited to 16 hours in any one 24 hour period, and the most overtime worked on a weekly basis was twelve hours. The station policy for operators is being changed to limit operator overtime to eight hours per week or 400 hours per year.

The team observed shift operations during a continuous period of three days. The team conducted interviews with the operations department managers, licensed and non-licensed operators, and operational staff in order to determine if the necessary procedures, policies and practices are in place in order to operate PBAPS safely.

The team conducted tours of the facility and visited the operating stations throughout the facility, including the control room. The team concluded that the plant was being operated in a professional and safe manner, and that procedural adherence was evident. The team also noted that the plant labelling program has resulted in a positive method for system, component, and valve identification for new operator training and system blocking for maintenance.

During this inspection, six team members were assigned to observe the day, afternoon and night shift operations for a continuous period of three days. The team held discussions with shift managers, shift supervisors, control room licensed operators and non-licensed operators. The team members also accompanied the operators performing their activities including normal operations and system surveillances.

The shift turnovers were orderly, with all pertinent information discussed. The control room was maintained in a professional manner by operators that acted with proper demeanor in accordance with the Operations Manual, Operations Management Manual, and administrative procedures. Logs were kept by all operators in an orderly manner. Log entry detail was sufficient to provide a historical record. Shift meetings were conducted by the Shift Managers, with the non-licensed operators and the control room operators and Shift Supervisors in two separate meetings. At these meetings the plans were described for impending shift plant evolutions, including problem areas and current operating conditions. The Shift Managers also relayed information pertinent to overall plant status that were of interest to all shift personnel. Several events were observed during the course of shift coverage and were handled in accordance with the operating procedures; however, several discrepancies were noted (section 3.1.8). The observed surveillances are discussed in section 3.6.1. Communications between shift members and other departments were performed very well. The inspectors did not observe any conditions that were contrary to good operating practices as established by NRC requirements or Operations Management and Operations Manuals.

During operator interviews, the team members noted that some policy inconsistencies had been present. These include pay for shift turnover time and required reading. However, after discussions with operations management and a sampling of control room operators, the team determined that operators were paid for shift turnover, if they requested it. Payment of overtime while performing required reading was an isolated incident and the practice was stopped by the Shift Managers.

3.1.6 Operating Procedures and Procedural Adherence

The team reviewed operating procedures and operations department procedural adherence and compliance. Included in this review was the status and assessment of the new, system operating (SO) procedures. These new SO procedures replace the previous S procedures. At the time of team inspection, 18 of the 57 SO procedures had been implemented.

The team assessment of the licensee SO procedure rewrite project included a review of the following items (see Appendix C):

- -- Procedure Writers' Guide,
- -- Schedule of SO procedure implementation,
- -- Walkdown of emergency service water (SO 33) emergency cooling water (SO 48), and standby liquid control (SO 11) system procedures,
- -- SO review and verification process, and
- -- Interviews and discussions with operations support personnel, procedure writers and operators personnel.

The team also raised two concerns regarding the new SO procedures: (1) the schedule for completed implementation of all plant systems is late May 1989; and, (2) initial operator training in or knowledge of the procedures.

Two systems that are scheduled for procedure implementation after startup are HPCI and RCIC. The team performed a walkdown of the S procedures for the RCIC. No unacceptable conditions were noted. The team observed implementation of various diesel generator SOs (see Appendix C). Overall, the operators adequately implemented the procedures. However, the operators demonstrated a misunderstanding regarding SO procedural references that either still exist as old S procedures or that do not exist as approved procedures. In discussions with operations personnel, it was noted that although some training had been given, it was not complete or specific. In further discussions with operations management, the team pointed out the need for operators to be kept informed of these upgrades. The management concurred and has agreed to

correct the problem by disseminating a required reading list of changes (see section 3.2.5).

The team concluded that the schedule for SO procedure implementation was a weakness. The licensee agreed to change the schedule to ensure SO procedures are available for system operation prior to restart (see section 2.4.1).

The team observed operating procedure compliance by both non-licensed and control room licensed operators. This included use of both the new SO procedures and the old S procedures. Overall conclusions were that operators effectively use operating procedures. No specific concerns were noted.

There were a few weaknesses noted in one of the Standy Liquid Control SO procedures evaluated. The prerequisites section refers to several SO procedures which do not yet exist because the old S procedures for these systems have not yet been rewritten. Steps 4.7 and 4.14 of SO 11.1.A-2 direct operation of a poison tank temperature controller (HS-2-11-121). The component this apparently refers to is labelled Tank Heater Manual Switch and numbered 11-1-1. Step 4.14 also has the tank temperature gauge incorrectly labelled as 046 vice 048. Step 4.9 directs raising tank temperature to 150 degrees F, but is followed by a note to maintain temperature between 100 and 120 degrees F. The temperature gauge on the tank (TIC-2-11-048) is only graduated to 120 degrees F though apparently someone attempted compliance with the procedure by hand scribing on the gauge face in pencil, additional graduations to 150 degrees F. These discrepancies were discussed with licensee personnel and corrective actions were initiated.

Based on this review, the team concluded that the SO procedures are an improvement over the previous S procedures. The SO procedures are well written and have better human factors elements. Operators appear to be satisfied with SO procedure usability to operate plant systems. Specific concerns with S procedure adequacy were related to system lineup after implementation of the shutdown procedure. Upon system startup, the valve lineup may be incorrect. The concerns are further discussed in section 3.1.8 of this report.

The SO procedures are generally considered to be an improvement over the S procedures. They appear to be more detailed and provide more explicit guidance to the operator. The checkoff list correctly identified all valves as labelled in the plant even though the Piping and Instrument Drawings (P&ID) print showed three valves mislabelled.

Overall, the new SO procedure usability and quality are considered to be a strength.

3.1.7 Tagouts and Operator Aids

As a result of the interviews with the operators, the team determined that the operators were not completely satisfied with the current blocking system at PBAPS. A review of the blocking system determined that the system was cumbersome and there were inconsistencies in its application. The team noted that in several cases "Information Tags" were being used as "Do Not Operate Tags" by writing on the tag "Do Not Use". The inspector also noted that the "Special Condition" tag and "Temporary Clearance" attachment were being used in order to perform operations of components within a blocked system. Use of these tags is permissible by the current system but the time duration of the issuance of these tags is indefinite for the former and seven days for the latter. This practice permits operation of components and does not document, to the operator, the current component position, or the component position at the end of the working day.

During discussions with station management, the team was informed of a company initiative to improve the blocking and tagging system for PECo. The Operations Superintendent of Limerick Station has been named to head the task force. The licensee agreed to provide the plans and schedule for improving the permit and blocking rules. (Section 2.4.2)

Operator aids are used throughout the station. They are in the form of simplified diagrams of the system and are positioned next to the system controls. These diagrams are controlled documents and are kept up to date by the document control group. These diagrams allow the operator to trace out the system being operated prior to its operation and give information for controlling the system.

3.1.8 Event Follow-up

Unit 2 Seal Steam System Startup Problems

During the afternoon shift on February 5, 1989, the licensee determined that the startup of the seal steam system per procedure S.6.3.2.A could not be performed because three valves were out of the positions required by check-off-list (COL) S.6.3.2.A-2. The licensee determined the COL had been performed on January 22, 1989, and condenser vacuum was established. On January 26, 1989, feed pump testing was suspended and the vacuum was broken per S.11.2.Q. When the shift supervisor determined that the system was not correctly aligned, he ordered a complete system COL to be performed.

Further licensee follow-up determined that the COL performed on January 22, 1989 had corrections to valve numbers and other minor errors. These nonconformances were corrected in accordance with procedures and were reviewed by an SRO and a PORC member. Also, the licensee determined that system shutdown per S.11.2Q did not specify which valve to close. When system startup was attempted on February 5, 1989, the system was not aligned as required by COL S.6.3.2.A-2. The licensee initiated procedure changes and held a critique.

The team was on-shift when this problem occurred. The team reviewed the shift's immediate corrective actions to determine system status. The team concluded that these actions were timely and effective. The team also attended the critique on February 6, 1989 and reviewed operations incident report number 2-89-05. Licensee corrective actions included forwarding changes made to "S" procedures to be included in the "SO" procedure rewrite project, providing a description of the event in the operations newsletter and resolving the COL nonconformance issue.

During the review of this event, the team learned of a similar event that occurred in the hydrogen seal oil system on November 30, 1988. The seal oil system was shutdown and subsequently started up. Inconsistencies with the shutdown and startup "S" procedures resulted in three valves out of position. Consequently, damage occurred to one of the system pumps. The licensee revised the "S" procedures and included feedback to the "SO' procedure rewrite group.

The team concluded that the licensee adequately responded to these two events. Review of S procedure adequacy and the SO procedure rewrite project is discussed in section 3.1.6 of this report.

Unit 2 Shutdown Scram on February 7, 1989

At 12:51 p.m., on February 7, 1989, a high pressure scram occurred on Unit 2 while in a cold shutdown condition. Surveillance testing (ST) was in progress on the Unit 2 B high pressure scram instrument PISH-2-2-3-55B per ST procedure SI2P-2-55-RICO (see section 3.6.1.4). An apparent leaking instrument isolation valve combined with an isolated reference leg due to modification work resulted in a trip of the A high pressure scram instrument. This resulted in a full scram signal; however, no control rod motion occurred as all rods were already fully inserted.

The licensee implemented T-100, "Scram" and T-99, "Post Scram Restoration". The licensee reviewed the cause of the full scram condition, made an ENS call at 2:00 p.m., depressurized the reference leg and reset the scram signal at 2:05 p.m. At 3:15 p.m., the oncoming shift supervisor noted that condensate long path valve MO-2-2-38A had dual (open/closed) position indication. Further licensee follow-up noted that the condensate pump minimum flow valve was in manual and did not open when the long path valves closed. In addition, the licensee noted that step 5-2 of T-100 required verification of the Group II isolations. At 4:57 p.m., a second ENS call was made to report this Group II C containment isolation valve's apparent failure to close, as required at an indicated 600 psig reactor pressure.

This event occurred during the team's shift coverage. One team member was observing the ST at the instrument rack (see section 3.6.1.4) and another team member was in the control room. The team observed shift follow-up in determining the cause of the scram. The shift initially was unaware that the associated reference leg was isolated for modification work. Their initial assessment was a leaking excess flow check valve. After about a half an hour, the shift correctly determined that the isolated reference leg combined with a leaking isolation valve caused the scram.

Additional team follow-up included review of the associated procedures, the computer alarm typer, control room logs, instrument recorders, and the draft and final operations incident report number 2-89-06. Members of team also attended portions of the incident critique. The team

reviewed motor operated valve testing for MO-2-2-38A (see section 3.6.2.8). The team identified two concerns: (1) initial slowness of the shift to determine scram cause, and (2) unawareness of the MO-2-2-38A valve failure to close.

Licensee review of these concerns was performed and included in the incident report. Slow shift follow-up as to the cause of the scram was compounded by the fact that the test approval was received three days prior to actual test performance and that modification work that isolated the common instrument reference line was subsequently initiated. Thus, the shift was unaware that the reference leg was isolated. The failure of the crew to detect the failure of MO-2-2-28A to isolate was caused by the lack of an accompanying alarm and an excessive number of people in the control room during the event. In addition, the crew was pursuing another problem involving identification of a broken wire found in the E-22 4KV bus room.

Licensee corrective actions proposed in the incident report included the following:

- -- determine and repair of leaking instrument valve,
- -- review instrument valves' equipment history for preventive maintenance,
- -- re-instruct I&C technicians on operation of instrument valves,
- -- test MOVs of MO-2-2-38A and B, including checking torque switch settings,
- -- revise of the condensate procedure S.7.1.0 for automatic minimum flow operation,
- -- inspect of 2C condensate pump and motor
- -- include this event in operator training and in particular that the shift missed the MO-2-2-38A valve isolation
- -- perform of a HPES evaluation
- -- review for a possible modification for a 60 psig alarm for the condensate long path isolation.

The team concluded that the licensee had performed effective follow-up for this event. Adequate corrective actions were documented in the incident report. The NRC will follow-up on these corrective actions in a future inspection.

3.1.9 Conclusion

The team concluded that the licensee has established a strong site management team which is actively involved in improving the performance of the site staff and the material condition of the facility. The leadership provided by the Shift Managers has been instrumental in improving the communications within the shift crews and between the shift crews and other site groups. The guidance provided to the operating staff about their roles and accountabilities by the Operations Management and Operations Manuals is clear and well understood. Overtime is being minimized and effectively controlled. The new system operating procedures provide for better control of equipment, and the licensee has committed to complete implementation of those required for safe operation to support restart. Through effective event critiques, the operating staff has demonstrated its self assessment capability to identify problems and initiate appropriate corrective action.

3.2 Licensed Operator Resource Development

3.2.1 Scope of Review

The team reviewed the current staffing of licensed operators to determine whether the current assumptions and conclusions made in the SER are still valid. In addition, by conducting interviews with licensed operators and management, the team determined whether alternate career paths and educational opportunities are being made available or planned for the licensed operators. The pipeline for the development of new reactor operators was also reviewed to determine if the commitment to staffing levels could be met and allow operators to pursue alternate careers. To support this goal, the ability of the licensee's training organization to support the commitment to staffing levels was also assessed. The team evaluated the knowledge level of the licensed operators relative to recent modifications, industry events and procedure changes. Through direct observation and interviews determine whether the operators are following procedures and modifying procedures before they are followed if the operator knows that the procedure is not correct.

3.2.2 Recruiting Pipeline for Operators

In order to have personnel available to support a license class for reactor operators, the licensee must have an

adequate supply of experienced non-licensed operators to rely upon. The progression cycle to become a licensed operator is Helper, Auxiliary Operator (AO), Assistant Plant Operator (APO) and Plant Operator (PO). An operator then enters license reactor operator training and becomes an Assistant Control Operator (ACO), qualifies as a Chief Operator (CO) and then enters license senior operator training and becomes a Shift Supervisor. The licensee had hired thirty-five persons with a minimum of two years of post high school technical education, U.S. Navy nuclear training or equivalent education and work experience over the last two years. The licensee is not planning to hire any new personnel until the results of the progression training for the current individuals are available at the end of 1989. After the licensee evaluates the results of the current progression training, the licensee will evaluate the additional number of persons that must enter the pipeline to support staffing levels and career development opportunities.

Based on the number of persons hired and in the pipeline, the team concluded that the licensee does have adequate staff in the pipeline to provide additional reactor operators for the facility and achieve the staffing goal developed. The licensee plans to evaluate the results of the training program to assure that the staffing level can be achieved and maintained.

3.2.3 Staffing

The licensee plans to staff six shifts of licensed operators with each shift consisting of a Shift Manager, two Shift Supervisors and four Reactor Operators (RO). For the six shift rotation plan, 18 Senior Reactor Operators (SRO) and 24 ROs are the desired goals for the shift complement. The actual number of individuals may be less than the above due to unforseen circumstances, but the intent of the licensee is to have 42 licensed operators to support shift operations.

The currently available licensed operators to man the operating shifts are as follows:

-- 6 Shift Managers
-- 12 Shift Supervisors
-- 24 Reactor operators (11 licenses limited to cold conditions). One RO may be added after retaking an examination this spring.

The licensee has no more than two ROs that have limited licenses per shift team. Thus, the Technical Specification requirements for licensed operators will be assured until the operators with limited licenses can satisfy all their license requirements (Number of reactivity manipulations and time on shift at greater than 20% power). The currently available licensed operators will meet the requirements for shift operations. However to meet the other goals that are described below, additional licensed operators must be developed.

The licensee has a goal to achieve 85 license experienced personnel on site as well as to provide career paths for operators. To achieve this goal the licensee requires additional licensed operators. The discussion on career path is found in section 3.2.6. The licensee currently has a senior license operator class ongoing with 7 SRO candidates to be completed in September 1989. These candidates are replacement Shift Manager candidates. In order to make available current ROs to enter an SRO license class, the licensee must first obtain additional ROs. The licensee will start a RO license class in February 1989 with a completion date of December 1989. The number of candidates in the RO class was determined by the availability of senior qualified POs. The licensee determined that in order to safely start up both units, experience available in the POs must be maximized. In addition a PO class will start in February 1989 which will enable another class of RO candidates to begin in September 1989 with a completion date of June 1990. The licensee was also planning to start an SRO class in September 1989 and finish in April 1990, which would allow for the replacement of shift supervisors. In adition the licensee is maintaining classes for additional APOs and POs in the period to support additional licensed operator classes in late 1990.

The team also investigated the availability of instructors to maintain licensee training needs. The training organization is not fully staffed. The licensee does have instructor positions available in the licensed operator training program. In the long term, these positions are planned as positions available for off shift assignments for previously licensed operators, but currently are not filled because available licensed operators are required to support shift operations. In the short term the facility may fill these with contractor personnel. In any event, the currently staffed training organization can support two licensed operator (or shift technical advisor) classes at any one time. The current training schedule may result in portions

of three licensed operator classes (2 RO and 1 SRO) and perhaps an STA training course ongoing at the same time. The facility training staff may not be able to support such a schedule. The licensee may have to delay the start of the SRO class by approximately three months and may have to make adjustments to the STA class, if required, based on the availability of qualified instructors. The team concluded that the modifications to the schedule will have a minimal impact on the ability of the licensee to achieve the goals for licensed operators.

The team concluded that the licensee can meet Technical Specification staffing requirements and has aggressive plans to provide additional licensed operators to achieve their goal of 42 operators for shift activities, 85 license experienced personnel on site and for career development. Licensee plans and analysis assumptions for operator progression assume 100% success rate which may not be realistic. The team assumed 85-90% success rates in independent assessments and still concluded that the licensee's goals are achievable. However, off-shift rotational assignments may be delayed in some instances due to a lower success rate. The team concluded that no additional operators would be available for relief of the current licensed shift supervisors until the SROs were licensed from the class completed in 1990. The current class of SROs are planned for the Shift Manager position not the shift supervisor position. Current shift ROs would not have opportunity for off shift rotation until ROs were graduated from the class to be completed in December 1989. These replacements principally allow on-shift ROs to enter senior licensed operator training, but may allow individual ROs to enter off shift assignments depending on the plans of the two ROs on extended assignment from General Electric. The current shift ROs will not have the opportunity for off shift rotational assignments until mid 1990. The team also concluded that the SRO class currently scheduled to start in September 1989 requires rescheduling to January 1990 to assure that the licensee can maintain the goal of 42 licensed operators on shift and have a training schedule that is compatible with the available training resources.

Based on the above, the licensee has committed to provide semi annual reports of the progress made in the area of licensed operator staffing levels, including the pipeline personnel. This will enable the NRC to confirm licensee plans and commitments relative to licensed operator staffing levels. (see Section 2.4.5)

3.2.4 Alternate Career Paths

The licensee in its submittals to the NRC described many alternate career paths and off shift assignments for operators including blocking coordinator, electrical supervisor, operations support superintendent, training, quality assurance, outage planning, and other site and corporate support functions.

The licensee hired a contractor to design and develop a career path program for shift operations personnel at Peach Bottom. The contractor issued a report on its effort and licensee management is evaluating the recommendations provided.

To date, the licensee plans and policies are not formalized to identify to the shift operations personnel the career paths available to them. The licensee had also indicated that they are committed to supporting the career advancement of licensed operator personnel into positions requiring college degrees and were investigating with a local university to provide this opportunity for operators. To date the licensee has not yet formalized the college programs. The licensee has plans to formalize these plans in the spring. The licensee had verbally informed shift operation personnel of its plans and issued a PBAPS Operations Section Newsletter dated February 10, 1989, indicating that alternate career paths will be available in the future.

The team concluded that the licensee has plans for providing career paths for operations personnel. Because of the limited number of licensed personnel to support operations, the licensee will not be in a position to offer alternate career paths until additional licensed operators become available. This is not expected to occur until mid 1990. In the interim the licensee can make available college programs to enable operators to further enhance their education. The licensee is developing plans in this area.

The licensee's plans for career development assume that operators will progress from helper to shift supervisor. There will be some individuals who will not be able to progress to the shift supervisor level. The contractor study recognized this potential problem and provided recommendations in this regard to also further provide career paths, for these individuals to be able to get off shift work. The team noted that the licensee was still evaluating the contractor report and will address this issue as part of the licensee evaluation process.

Because licensee actions to enhance career development are still in the planning phase, with commitments made to the licensed operating staff only verbally and in newsletters, licensee senior management committed at the exit interview, to provide a semi annual progress report on licensee accomplishments in the area of career enhancement in response to team concerns. (see section 2.4.5).

3.2.5 Required Reading

The inspector reviewed licensee activities in the development of required reading for licensed operators. Required reading was enhanced at Peach Bottom in May 1988. Required reading is controlled by the Operations Manual and is one of the tools available to make operators aware of important job related information. Required reading is the responsibility of the Operations Support Engineer and is planned to be issued once per training cycle. Included as a part of required reading is a signature sheet wherein each person acknowledges that they have read the required reading materials. The licensee is keeping records of the response to the required reading and has set performance standards that 95% of the operators complete the required reading within a specified time and not rely on a notification program to denote those persons who are in arrears on the required reading. The licensee is also currently evaluating whether information contained in the required reading should be included as part of material testable during requalification exams.

The types of information which may be issued as required reading includes new operating procedures or procedure revisions, changes to the Operators Manual, plant modifications, incident reports, industry events, and industrial or radiological safety information. The team discussed with operators how they received information on the LaSalle flow oscillation event, modifications on Alternate Rod Insertion (ARI), and modification 1660 to install a safety grade nitrogen accumulator in the drywell. Based on these discussions, the operators indicated that part of the LaSalle flow oscillation event and modification 1660 were included as part of required reading and the operators were aware of the material. The LaSalle event was also discussed in the simulator and training on the ARI modification has not yet been provided to the operators. The team noted that the new required reading program was a recent iniative and appeared to be functioning adequately.

3.2.6 Operator Training in Modifications

The inspector discussed with operators the training received in plant modifications. The operators indicated that training occurred either in required reading, in discussions with other plant personnel, or during the requalification training program. The modification training is usually performed after the modification is completed in the plant. Training is provided for a few modifications before the modification is installed such as the reactor vessel level modification. This is because the modification impacted operation during the installation. The operators expressed concern that they were involved with modifications at the end of the process. They would like to get more pre-installation knowledge mods being installed before installation so that they can assure that the modification will be properly implemented into operations. As discussed in section 3.7.3.1 the new Mod Team process will get operators involved in the early stage of the modification process. The mechanism for training operators on modifications is principally a Shift Training Bulletin prepared by the System Engineer.

3.2.7 Licensee Activities Associated with the Lasalle Event BWR Power Oscillations (Bulletin 88-07)

The team reviewed the licensee activities associated with responding to NRC Bulletin 88-07 Supplement 1 BWR Power Oscillations. The team reviewed documents listed in Appendix C.

Based on team review of the documents the facility has not yet fully implemented the bulletin requirements in procedure OT-112 in that the procedure does not direct the reactor operator to manually scram the reactor if thermal hydraulic instability occurs while in region A,B or C. Evidence of thermal hydraulic instability consists of APRM peak to peak oscillation of greater than 10%, periodic LPRM upscale or downscale alarms or as indicated in SIL 380, Revision 1. The OT does not address the APRM oscillations or the LPRM alarms. The licensee indicated that the modifications would be made in the revision of the OT which was currently being performed. This inspection was a partial NRC review of the licensee activities to respond to the bulletin and further NRC review is required, especially the facility documents pertaining to single recirculation loop operation. The Bulletin remains open and must be closed prior to any restart. (See Section 2.4.3)

3.2.8 Procedure Changes

Based on interviews with reactor operators and observations in the field, the team determined whether the operators were following procedures and when procedures could not be followed whether the required procedure changes were made before the procedure was used.

The team noted that there was a clear philosophy in the Operations Department to follow procedures. The Superintendent of Operations in his newsletter to the station dated January 27, 1989 reiterated his perspective on procedures and procedure compliance. The operators were observed during the shift work coverage to follow procedures and were not hesitant to make a procedure change when a change was required. Based on the above, the team determined that the station has awareness in the importance of complying with procedures and are applying that policy.

The licensee has recently improved communication between the Operations Department and the Training Department by use of a Operations/Training Management Committee which plans to meet every two weeks. One of the purposes of the committee is to determine the best method of training for a specific issue. The committee would determine whether required reading, night orders, requalification training in the class room or simulator is the best way to conduct the training and also determine if the training needs to be factored into the replacement training program. The committee has on their agenda for the February 27, 1989 meeting, the issue of determining the method to train the operators on the new SO procedures. Thus, the licensee bas plans to address this issue.

3.2.9 Transient Response Implementing Procedures (TRIP)

The team reviewed the status of the licensee efforts to revise the TRIPs to implement revision four of the General Electric Emergency Procedure Guidelines. In addition, the team reviewed the licensee's actions taken in response to the NRC Inspection 277/88-200 and 278/88-200 as documented in licensee letter dated January 26, 1989, concerning the Plant Specific Technical Guidelines (PSTG) and containment pressure control by use of the standby gas treatment system. The licensee is addressing the specific concerns identified in the previous NRC inspection and is revising the T-200 procedures and reverifying these procedures.

The licensee's schedule for implementing revision four of the Emergency Procedure Guidelines may be impacted by several issues or events. These include activities associated with the NRC's Station blackout rule, NRC workshop meetings scheduled for March 1989 on emergency operating procedures, a recent NUREG/CR on flow chart development and a desire to coordinate flow chart format with the Limerick Nuclear Generating Station. As a result, the facility was requested to submit by May 31, 1989, the schedule for implementing revision four of the Emergency Procedure Guidelines. The team encouraged the licensee to be aggressive in implementing revision four of the emergency procedure guidelines. (see Section 2.4.4.)

The licensee is planning to issue a procedure on providing capability to vent containment during a station blackout and has also requested engineering to provide a modification to further enhance this capability. Thus the facility is progressing in response to the previous NRC inspection report in this area.

The inspector discussed the PSTG concept with the licensee and provided clarification on what was an acceptable PSTG. Licensee plans will be modified to assure that a document exists which is in format identical to the emergency procedure guidelines with Peach Bottom specific data included in the document.

The one additional concern that the facility needs to address is having a unit specific TRIP procedure rather than a joint TRIP procedure for Units 2 and 3. The licensee is developing separate unit procedures for SO procedures. The team expressed a concern that unit specific TRIP procedures should also be developed to minimize the potential for operator error. Licensee plans in this area were not firm.

In conclusion, the licensee is aware of issues and progressing on the resolution of the issues in implementing revision four of the emergency procedure guidelines.

3.2.10 Conclusions

The licensee identified in the restart plan that one of the root causes for the shutdown order was that the company failed to initiate timely licensed operator replacement training programs. The team concluded that the licensee is taking steps in this

regard, but the results of these steps will only be seen in the future. The licensee has the number of licensed operators needed to support safe operation but will not see the results of the replacement training program until mid 1990 when the currently licensed operators can begin to come off shift work and pursue alternate career paths in the PECO organization. Licensee policies on alternate career paths are not formally documented but only verbally discussed and contained in newsletters. The team has confidence that the licensee will carry out the plans as stated and that the plans discussed with the licensee are consistent with those formally stated in the restart plan. However, due to changing conditions and depending on the success rate of the training programs, licensee accomplishments in these areas may not achieve current expectations. Therefore, the team concluded that the licensee needed to provide a periodic report of the progress on staffing and career development to the NRC. Licensee senior management agreed to provide such information every six months over a two year period beginning July 1, 1989. Based on the commitment to provide this information, the team concluded that licensee activities in this area are adequate.

3.3 Cultural Change

3.3.1 Scope of Review

The team assessed the changes in station culture since the Shutdown Order and evaluated policies, programs, and processes that have been put in place to effect these changes. To accomplish this, interviews (see Appendix B) were conducted with operations personnel, other station personnel who have key interfaces with operations personnel and organizational development and human resource staff and consultants. These PECo personnel included managers (corporate and site), supervisors, and staff. Members of the team also attended relevant meetings and reviewed pertinent documents.

The observations and interviews of a cross-section of personnel at all levels of the organization provided information on human resource policies, communications processes, teamwork activities, results and effectiveness of organizational development interventions, including specialized training programs, and changes in the attitudes and culture of station personnel.

3.3.2 Teamwork Activities and Specialized Training Programs

The team evaluated the effectiveness of teamwork activities and specialized training programs for enhancing culture change by interviewing both recipients and providers of these initiatives, by observations (see section 3.1), by attending meetings, and by reviewing syllabi and program plans.

Teamwork and specialized training programs are provided to all levels of the organization by the plant and corporate organizational development staffs whose activities include:

- -- team building sessions within and between work groups and with all managerial levels,
- -- assistance with interface meetings between work groups,
- -- assistance and feedback on the structure and conduct of meetings,
- -- individual consulting/coaching,
- -- assistance and feedback at simulator team training,
- -- assistance with the development and implementation of specialized training programs/workshops,
- -- incorporation of an organizational development activity in site management staff meetings, and
- -- assistance to the PB-TEAM (Peach Bottom-Together Employees And Management).

Interviews with a cross section of personnel at all levels of the organization confirmed that team building efforts have been effective in the day-to-day operations of the plant. Building on many of the skills gained from People the Foundation of Excellence (PFE), Managing for Excellence (MFE) and Personal Effectiveness (PE) training programs the shift crews function as cohesive teams for the most part, characterized by a clear understanding of each other's roles and responsibilities, pride in their shift crew team, and confidence that problems can be discussed and resolved. The Shift Manager, as the leader of the team, significantly adds to the smooth functioning of the shift crews as teams, by reinforcing team skills and communications, and through his leadership abilities.

Interviews with non-operations staff indicated that the team concept has extended to their interactions with operations staff. Non-operations personnel who interact with operations, e.g., health physics and security personnel, rotate with the operations shift crew, and this has led to enhanced communications and a greater appreciation of each other's roles and responsibilities. This improved interface with operations staff has also been reported by non-operations personnel who do not rotate with the shift crew but who frequently interact with operations.

Several specialized training programs have been developed and implemented or will be implemented to support culture change. These programs were designed to promote the team concept and enhance communications by requiring that personnel from different work groups participate in the training programs at the same time. This will help ensure that there is consistency in the acquisition of skills, knowledge and in application throughout the nuclear group. For example, on the supervisory level, there are training programs that are being provided across all work groups such as the Management Action Response Checklists (MARC) employee relations training designed to provide consistency in the handling of grievances, in counselling and disciplining employees, and in making selection/promotion recommendations. MARC training also provides an orientation to company policies, procedures and rules. Interaction Management (IM) Training provides supervisory level employees with the needed skills to effectively interact with subordinates and peers in a variety of situations. An Interaction Management Support (IMS) program is designed to provide managers with skills to support and reinforce the newly acquired skills of the participants from IM Training.

On the staff level, specialized training is designed to provide a follow-up to the PFE, PE, and simulator team training to reinforce the positive changes resulting from those training programs and to build on them. The Interaction program will be provided to the non-licensed and licensed operators and will focus on reinforcing interpersonal skills and team cohesiveness. An Interaction-type training program will also be provided to non-operations/non-supervisory staff so that all staff become familiar with the interpersonal skills and communications processes that are indicative of the new culture and the team concept. In addition, Progression Training for non-licensed and licensed operators who have not had PFE or PE training will be supplemented with appropriate parts of PFE and PE training. This program will accommodate new and transferred operators entering the Progression Training cycle and will orient them to the new cultural behaviors.

Another example of promoting a team concept at Peach Bottom is the PB-TEAM program. The purpose of this program has been to make suggestions to management on improving conditions in the plant and on improving employee morale. Members are volunteers and are employees of different station work groups. Activities include charitable efforts such as a food drive and donating income from a T-shirt sale to the Make-A-Wish program, an employee recognition program, writing a visitor's guide, establishing a task force on professionalism, and sponsoring a station-wide picnic. Interviews indicated that, for the most part, staff perceived the PB-TEAM as a positive program. The program helps to improve employee morale as well as providing good public relations in the community.

Teamwork activities and specialized training programs to support culture change have been a focus of PECo attention and resources since the shutdown. PFE, MFE, PE, and simulator team training were the initial training programs and were targeted toward the operations staff in order to promote changes in attitude and for "rehabilitation" purposes. In addition, a variety of actions, activities, and programs in support of culture change were focused on the supervisory/managerial staff across the Nuclear Group. An organizational development staff was hired on a consulting basis to develop and implement the above mentioned programs. Recognition of the importance of this activity continuing over the long term is reflected in the incorporation of a new Organizational Development and Human Resources Department reporting directly to the Executive Vice President-Nuclear. In addition, the consulting organizational development staff is being replaced with permanent PECo organizational development personnel. This is a strength of the new PECo organization.

As mentioned earlier in the report, the major focus of organizational development activities has been on the supervisor/manager level, and specialized training programs have begun to be implemented for them. A similar follow-up has not yet been implemented on the staff level. The team considers the lack of timely follow-up training to the PFE and PE to be a weakness. Although, there have been significant improvements in the attitudes and functioning of the shift crew, interviews indicated follow-up training is needed in order to reinforce these new skills, and to provide similar skills to non-operations staff and to new operators. The Interaction training program and the Progression training program should be implemented as soon as possible. See section 2.4.6.

3.3.3 Communications Processes

The team reviewed communications processes at the Peach Bottom Atomic Power Station and throughout the Nuclear Group of the Philadelphia Electric Company. Documents and schedules provided by the licensee indicated that a number of meetings are regularly scheduled that involve both station personnel and a combination of station personnel and the corporate nuclear group. There are offsite meetings of 100 nuclear group managers and meetings involving the Executive Vice President-Nuclear and the 30 top nuclear group managers. Station personnel are involved in daily station planning meetings, Shift Management meetings, shift crew meetings led by the Shift Manager, and a number of other regularly scheduled meetings. Interviews with both station and corporate personnel indicated that each of these meetings has an important function, that they are effective, and that they are useful. Shift Crew meetings and Shift Management meetings are considered by participants to be especially effective in communicating the details of day-to-day station business and as a focus for discussing special issues and concerns.

The team concluded that most of the meetings that are in place at both the corporate and station level are useful and effective vehicles for communication. In recent months, the need for shift crews to be evaluated at the simulator made it difficult to hold regularly scheduled shift crew meetings and shift management meetings. Those interviewed indicated that this made communication difficult and were very positive about the need to resume these meetings now that the simulator evaluations have been completed. This opinion was expressed by personnel at all station levels and points out the necessity of ensuring that such meetings continue to be held.

Interviews also indicated that, in general, station management is accessible, from Shift Managers up to and including the Vice President, Peach Bottom. Station personnel also believed that they could speak openly with corporate management when opportunities presented themselves, e.g., at all hands meetings. Peach Bottom management has also provided a line of communication that allows station personnel to raise issues and concerns anonymously. This program, "Tell It To The VP", has been used by a number of people and those interviewed generally

believed it to be a good way to air problems and to receive attention at a high management level. Management, both station and corporate, are visible and communicate with station personnel while participating in the Management by Walking Around Program (MBWA). A number of documents were provided by the licensee as examples of reports of observations made while participating in the MBWA program. Station personnel also commented that they appreciated seeing upper management in the plant and having the opportunity to speak to them while at their work stations. Some personnel believed that this program is somewhat responsible for reinforcing the idea of good plant housekeeping.

Personnel involved in station operations stated their willingness to question management or challenge decisions when they were in disagreement with some aspect of the decision. In addition, they stated that management was open to this type of questioning. Interviews with managers at all levels confirmed that this type of exchange was expected and accepted.

The team concluded that the accessibility of management is a positive force for reinforcing the new culture at Peach Bottom, as is the willingness to question and the openness with which the questions are accepted. The MBWA program is viewed in a generally positive way and should be continued as a good practice that will also reinforce the new culture at Peach Bottom.

There are also a number of newsletters distributed at both the station and the corporate level. The Operations Newsletter, for example, provides information that is pertinent to the staff. Other newsletters provide information on daily operations and special issues relevant to station personnel.

All personnel interviewed cited examples of improved working relationships with other groups. This improvement was noted by both those who work in the control room and those who work outside, such as maintenance, health physics, and instrumentation and control. This kind of working relationship had been of particular concern prior to the shutdown of the Peach Bottom plant. The team considers this improved working relationship across station work groups to be one of the best indicators of a new station culture. Every effort should be made to ensure this continued working relationship. Special training programs designed to reinforce this aspect of station culture are addressed in Section 3.3.2.

When station personnel were asked how the new operations culture was communicated and reinforced by the Superintendent of Operations, most cited the Operations Manual/Operations Management Manual. A number of comments were offered about the high quality and usefulness of this document. They also mentioned that the manual is a document that is updated to reflect current station practices and policies. The team concluded that the Operations Manual/ Operations Management Manual is an effective method of communicating expectations to the operations staff and the management's plan to make the manual a living document is appropriate.

The communications processes that are in place at Peach Bottom are valid methods for conveying information. However, the team's conclusion, based on interviews at all levels of personnel at Peach Bottom, is that a lack of trust in management still exists on the part of the operations staff and station personnel. This is due to a number of factors such as station history combined with recent instances, failure to provide decision rationale, lack of timely response on issues and concerns, and the quality and timeliness of communications and feedback loops. Some information has been provided about promised career paths but not enough to satisfy the staff that these commitments will be met. (This particular issue is discussed further in section 3.3.4.) Management needs to explain the decision rationale for policies and programs that affect staff, and update status on resolving issues, concerns, and recommendations that the staff considers important. For example, little or no information has been disseminated on the use of an assessment center for evaluating candidates for potential supervisory positions. This program is described in section 3.3.4. This is an important step in the continued reinforcement of the new station culture because it indicates management's trust in the staff to deal with such information in a reasonable way. Details of the licensee commitment are addressed in section 2.4.5.

3.3.4 Human Resource Policies and Practices

3.3.4.1 Performance Appraisals

The team interviewed corporate and station management and station personnel at all levels and across disciplines, i.e., health physics, quality assurance, maintenance, non-licensed and licensed operators, with respect to performance appraisals. All of those interviewed stated that they had received at least two

performance appraisals since the shutdown. Those in management positions indicated that their appraisals included criteria for appraising them as managers. The consensus was that the performance appraisals were fair and that they were a learning experience because they provided personnel with an understanding of where they could improve performance and how to use their strengths. The majority stated that they understood their role in the performance appraisal process and that they had received the letter from the Vice President of Peach Bottom explaining that role. However, even those who did not recall receiving the letter indicated that they understood that performance appraisals were a two-way process whereby they could both learn from the experience and use the information gained from the appraisals in a constructive way.

Those in management positions stated that the training they had received in conducting performance appraisals was useful. In addition, there was an informal one-day seminar with one of the Organization Development consultants to provide additional information on how this process should be conducted. Two general weaknesses in the performance appraisal system were identified in the interview process. First there was a lack of consistency in performance appraisals between some shift crews. For example, performance that may give an individual a high rating in one shift crew may result in an average rating in another. When questioned further, those interviewed stated that there were performance criteria but no performance standards against which to rate them. Shift Managers indicated that this was an open item on their agenda and they hoped that it could be resolved with the resumption of Shift Management meetings. Once again, this points to the value of this particular type of meeting as a forum for resolving intra-shift crew issues. The Executive Vice President-Nuclear indicated that the lack of performance standards is recognized as a deficiency throughout PECo and that the Human Resources group will be addressing the problem. A second weakness concerned the Shift Managers' appraisals. Several were conducted in a short time so that very limited information was conveyed. In addition, Shift Managers' performance criteria were changed without notification of the change. This was confirmed by the individual who had made that change. It was his belief that the Shift Managers knew what was expected of them.

One of the fundamentals of a good performance appraisal process is that both parties, the appraiser and the recipient of that appraisal, know in advance what the criteria or performance elements are and that there are performance standards that apply to all personnel who perform the same duties or tasks. In addition, little meaningful communication with respect to a persons' job performance can be accomplished in a very short appraisal interview. The licensee's commitments with respect to these issues are addressed in section 2.4.5.

3.3.4.2 Career Paths and Rotational Assignments

One of the root causes of management and personnel problems identified by Organization Development consultants after the Shutdown Order was the lack of career paths for shift personnel. That is, operations personnel who worked shifts were essentially committed to that type of work as long as they remained at Peach Bottom. After the shutdown, the management of PECo and Peach Bottom made commitments to operations personnel with respect to both career paths and rotational assignments. Specifically, when enough operators could be hired and/or licensed as control room operators, those who worked shifts in the control room would have the option of choosing other career paths within the company, such as training instructors, outage planners, and permit writers. Another option that was to be offered was that of rotational off-shift assignments. These assignments could vary from a few months to several years. None of these plans have been implemented as yet. Many of those interviewed understand that they cannot be implemented until there are enough control room operators to replace those who wish to pursue other career paths within the company. Even with this understanding, however, there is a general mistrust on the part of operations personnel that management will ever meet these commitments.

The reasons for the mistrust are twofold. First, the hiring and licensing of new operators is taking longer than anticipated. Second, management has apparently not done an effective job of communicating the status of the issue or its potential resolution. During the inspection, an issue of the Operations Newsletter was distributed. While it stated that there were still plans to implement this program, it did not elaborate on this statement. It merely listed the possible positions that could become available. Not even an estimated schedule was provided. As previously mentioned, the quality of communications, especially as they

appear in written form, needs to be improved. Reasons for decisions and delays need to be communicated when appropriate. Personnel would prefer to see an approximate schedule with a caveat that there could be delays, than to see statements that say nothing is cast in concrete. The issue of alternate career paths is also discussed in section 3.2.6 on Operator Resource Development. The licensee's commitments regarding this issue are addressed in section 2.4.5.

3.3.4.3 Disciplinary Guidelines and Grievance Process

One of the characteristics of the pre-shutdown culture was the lack of clearly defined management guidelines with respect to the implementation of disciplinary guidelines and the grievance process. The licensee undertook a number of actions to respond to this issue including a review and revision of these policies; development of a training program for all supervisors and managers on the effective, consistent, and equitable implementation of these policies and other work rules; and communicating the new policies to the staff in a manner that would help to ensure that they have received the information. The team noted that a review and revision has been completed, that supervisors and managers are being trained (via the MARC Training described in section 3.3.2 of this report) on the implementation of these policies and in carrying them out in a fair, consistent and equitable way. However, interviews indicated that there is some confusion as to whether the guidelines and grievance policies were disseminated. As part of the licensee's commitment to improve communications and feedback loops (see section 2.4.5), it plans to distribute the new policies in a way that helps to ensure that every staff person has received them and has had an opportunity to get clarification, if needed.

3.3.4.4 The Assessment Center

A negative finding in the root cause assessment of the PECo culture was a lack of managerial skill as applied to organizational and people management. Many of the activities and actions implemented since the shutdown described in other sections of this report have been in response to this recognized major weakness. One initiative being developed to help ensure competent, qualified supervisors, is the assessment center-based selection system. As described to the team in interviews and in

descriptive materials, future applicants for supervisory positions in maintenance, health physics, operations, and other departments will be evaluated through an assessment program designed for the target positions that is job-performance based. Candidates for supervisory positions will be selected on the basis of assessment center evaluations and seniority. The team concluded that the assessment center selection system, as described, is a valid method for evaluating personnel for supervisory positions.

3.3.5 Conclusions

The team concludes that there have been significant positive changes in the Peach Bottom culture. This conclusion is based on the evaluation as described above. Improvement in the culture is reflected in the attitude toward safety, quality, and professionalism; by the variety of communications processes; by the cohesiveness of the shift crews; by the acceptance of the team concept both within and across station work groups; and by the continuing commitment to support organizational development efforts and specialized training programs.

However, there are some aspects of the station culture that need to be strengthened. These include the quality and timeliness of communications and feedback loops, consistency among shift crews in carrying out policies, and the implementation of Interaction and Progression Training programs. Licensee commitments in this area are considered to be appropriate and are identified in section 2.4.5.

3.4 Corporate Oversight

3.4.1 Scope of Review

One of the root causes identified by the licensee for the conditions that led to the shutdown of Peach Bottom was that corporate management failed to recognize the severity of the problems and did not take significant corrective actions. The licensee established responsive corrective action objectives to (a) increase the control, accountability, and corporate direction of the Nuclear Organization, (b) strengthen self assessment and problem resolution capabilities, and (c) strengthen the independent assessment process. These program changes, as described in the licensee's restart plan, were reviewed by the staff as reported in its Safety Evaluation

Report dated October 19, 1988. The team assessed the functioning of the licensee's management organization as it relates to providing for the corporate oversight of activities at the Peach Bottom Atomic Power Station. This assessment considered the functions of the Nuclear Performance Management program, the Nuclear Review Board, and Operational Event Assessment Program, the Commitment Tracking Program and Nuclear Quality Assurance, as they relate to the handling of a selected group of issues. The inspection of these issues included adequacy of organizational interface, line organization self assessment and independent oversight assessment. Numerous meetings have been established at all levels of the management organization to communicate, to plan and to execute the work of the organization. Observations of selected meetings were made by team members to augment findings and conclusions regarding effectiveness of the organization, management controls and communications. The Team members interviewed a cross section of management at many of the levels of station and corporate management to determine if the overall attitude and the level of performance with respect to safety has improved.

The scope of the review for Nuclear Quality Assurance was to assess the effectiveness of the organization for Peach Bottom through a performance oriented inspection of the licensee's organization, procedures, staffing, audits and surveillances. Particular focus was given to the licensee's self assessment and evaluation capabilities for the effectiveness of the ISEG and HPES.

This assessment included interviews and meetings with station personnel from supervisors to senior management. Observations were made to assess the general processes for dispositioning issues and the relationship of group actions including interfaces with other involved groups. The team members reviewed documentation defining the mission of selected programs and organizational groups and compared findings with the treatment given to the selected issues to determine consistency. These observations and interviews provided the team with insight into the licensee's staff assessments regarding the adequacy of resources to achieve assigned objectives, clarity of their scope of responsibility and mission definition, and their overall morale and attitude toward safety.

3.4.2 Nuclear Dedicated Organization/Management Authorities and Accountability

The NRC staff noted in the SER that the licensee has revised its organizational structure such that a completely self contained corporate Nuclear Group was created which has responsibility for the Peach Bottom Station and the Limerick Generating Station. This major corporate reorganization was implemented by the licensee in January 1988 in accordance with an NRC Temporary Waiver of Compliance from the organizational structure previously described in the Administrative Controls section of the Technical Specifications. Additional changes in senior management personnel occurred in the spring of 1988 and this organizational structure change was approved by amendment to the Technical Specifications in June 1988. The discussion that follows does not describe in detail the entire organization, focusing instead on that portion that affects the areas being evaluated during this inspection.

The team noted that the licensee has reduced the number of management levels from the first line supervisors to the Executive Vice President-Nuclear (EVP-N) and has established a corporate management position on site, the Vice President-Peach Bottom Atomic Power Station. The EVP-N has the Vice Presidents for Peach Bottom and Limerick, the General Manager-Nuclear Quality Assurance, and the Vice Presidents for Nuclear Engineering and Nuclear Services reporting directly to him. The station Vice Presidents are located on the Peach Bottom and Limerick sites while the Vice President for Nuclear Engineering and Nuclear Services and the General Manager-NQA are located in the corporate offices in Philadelphia.

The corporate offsite safety committee, the Nuclear Review Board, and the Organization and Management Development (OMD) group report directly to the EVP-N. The plant staff on site safety review committee, the Plant Operating Review Committee (PORC), reports directly to the Plant Manager. The reporting relationships are appropriate based upon these organizations' mission and responsibilities. Details on these groups are found in section 3.4.6 of this report for the NRB, section 3.1.3 for PORC and section 3.3 for OMD.

The Vice President Nuclear Engineering has four managers reporting to him through the Manager-Nuclear Engineering. These are the Managers for Engineering, Project Management, Engineering Design, and the Construction Superintendent for Limerick Unit 2. The Vice President-Nuclear Services has four managers reporting to him for Nuclear Maintenance, Nuclear Support, Nuclear Training and Nuclear Administration.

The General Manager-NQA is a member of the senior nuclear management team. He has five managers reporting to him including those for the Peach Bottom and Limerick Station Quality Groups which are located on site, the Independent Safety Engineering Group part of which is currently located on site, and the Performance Assessment and Quality Support groups located in the corporate offices.

The Peach Bottom Station Vice President has three managers reporting to him: the Plant Manager, the Project Manager and the Support Manager. The site Training Superintendent also reports to him. This station organization represents a substantial change from the previous organization. It was instituted to shorten the chain of communication of station concerns to corporate management, to narrow the span of control and responsibility of the Plant Manager by providing managers for other functional areas, to implement the concept of the Shift Manager for improved control of shift activities and to provide additional personnel resources to deal with current needs.

The team concluded that the current overall organizational structure provides for much improved distribution of responsibilities and accountabilities. The evidence for this conclusion is based in part on the team's observation of work conducted in meetings at various levels of the organization dealing with areas as diverse as modifications, the startup Master Open Items List (MOIL), the NRB and PORC, the shift turnover meetings, the Vice President's weekly staff meeting and the monthly EVP-N station review meeting. The basis for this conclusion also includes information provided in the NQA audit and investigation reports, the station status reports and the station performance indicator reports. The licensee plans to make further changes in the organization as needs evolve in the future.

3.4.3 Corporate Management Team and Accountability of On Site Employees

The team also concluded that the improved specification and redistribution of organizational functional responsibilities and increased depth of management greatly improves the licensee's capability to support safe and reliable operation of the facility. The evidence for his conclusion thus far is based on observations of senior management's leadership and effectiveness in creating a much improved climate for more open, straightforward communication, an improved sense of accountability and improved performance in the functional areas described throughout this report.

3.4.4 Nuclear Performance Management Program

The NRC staff noted in its SER that the licensee had committed to establish a program that would define performance goals and standards for each nuclear line organization and develop performance indicators to compare realized performance against the goals.

The team observed that such statements of the vision, mission, objectives and goals have been prepared and are visible in posters distributed throughout the on site offices. The statements are particular to the Nuclear Group and to each of the five Nuclear Group organizations. For example, the Nuclear Group's statement for 1988 expresses its vision and mission as to be recognized and respected as a leader in the nuclear power industry and to generate electricity safely, reliably, economically in the pursuit of excellence. The objectives relate to providing the necessary management direction, staffing and resources, the corporate reorganization, the restart of Peach Bottom, and open candid and cooperative relationship between PECo and outside agencies, the promotion of cultural change and craft training programs. Over a dozen quantitative performance indicators are also included which include operations and radiological safety issues. Similar statements exist for the Peach Bottom Station, NQA and the Nuclear Engineering and Nuclear Services Divisions. The progress in meeting these goals was reported to senior management in quarterly progress reports during 1988.

The licensee's development of performance monitoring has resulted in a comprehensive set of indicators which reflect performance in virtually all station activities. The data for these indicators are prepared by the various levels of management and are reviewed monthly in the EVP-N station review meeting. Team members attended this meeting on February 13, 1989, and observed the licensee's discussion of performance indicator results based on the 125 page document prepared for that meeting. The meeting was conducted in a very professional manner. All attendees were well prepared and responsibility and accountability for the many areas addressed was clearly understood. The information provided by the performance indicator report in connection with the preparation and accountability of attendees facilitated an efficient focus on performance and supported management reinforcement or redirection as needed.

The issues tracked by performance indicators as reported in the monthly station review meeting on February 13, 1989, were

numerous and included the status of maintenance, modifications, surveillance and routine testing, open items for startup and engineering activities. Additional key indicators also included collective radiation exposure, number of personnel contaminations, volume of radwaste, plant contaminated surface area, temporary plant alterations, commitment tracking program items, NQA findings, QC inspection, LERs, station personnel overtime, staffing status and INPO accreditation renewal. A quarterly management summary report is also prepared to communicate performance indicator results.

The team concluded that the Nuclear Performance Management Program, particularly the performance indicator reporting program, is a useful tool for management self assessment. This conclusion is based on the comprehensiveness of the data included in the program and the facilitation of management focus on performance that the data permits, particularly in the monthly station review meeting.

3.4.5 Nuclear Review Board (NRB)

The NRB is an independent advisory group responsible for the review, audit and evaluation of both technical and organizational matters pertaining to the safe operation of the Peach Bottom plant as well as the licensee's other nuclear facility. The NRB reports directly to the Executive Vice President-Nuclear (EVP-N). In addition to its periodic reports to the EVP-N, the NRB Chairman meets with the Nuclear Committee of the Board (NCB) on at least an annual basis. Membership on the NRB is composed of six senior licensee management personnel and three qualified individuals from external organizations.

The team reviewed the NRB Charter (revision 11) and associated procedures, Technical Specification 6.5.2, and meeting minutes from March 3, May 5, July 14, September 1, November 3 and 9, 1988, and January 5, 1989. Several team members had previously attended the majority of these meetings.

The NRB was reconstituted and revitalized early in 1988 by elevating the direct reporting relationship to the EVP-N, by broadening the represented organizational areas and expertise, and by enhancing the meeting processes and scope of review. The current membership is stable and has not been changed in the last year. Only one member holds line

responsibility for operation of the station. The team was provided with biographical information indicating the experience of the current members and concluded that the members meet the Technical Specification requirements and that the NRB collectively possesses a broad based level of experience and competence. The three non-licensee members bring a particularly useful perspective and questioning attitude to NRB deliberations. NRB currently conducts meetings approximately once per month alternating between the Limerick and Peach Bottom sites. The resulting bi-monthly meeting frequency at Peach Bottom in 1988 is well within the Technical Specification requirements.

A strong NRB involvement in station activities is evidenced by the scope and depth of recent meetings, the high level of support provided by all Nuclear Group departments and in scheduled plant tours. Some prominent personnel that attend NRB meetings are Plant Managers, Superintendents, Shift Managers, and Nuclear Engineering Division, Nuclear Support and NQA personnel. Minutes of the meetings are very thorough and well prepared. The NRB relies on NQA for the conduct of the audits and for the review of safety evaluations required by Technical Specifications. Reports on these activities are made by NQA representatives at the NRB meetings.

The NRB systematically categorizes and tracks items of concern as "agenda items", "open items", or "items of continuing interest". Open items are handled in accordance with an established NRB procedure and are tracked until closed. Actions required of other responsible organizations to resolve an open item may be entered into the Commitment Tracking System for follow-up. A summary report of each meeting is submitted to the EVP-N and is distributed to the CEO and to other senior managers.

The team noted that the NRB reviews have been thorough and focused on improving performance in areas important to safety. Several examples of persistent NRB attention over several meetings to particular issues include the residual heat removal system (RHR) and the emergency cooling tower (ECT).

The issue of overall RHR system reliability has evolved from NRB consideration of individual component performances in 1987. At the November 3, 1988, discussion of the RHR pump motor bearing problem, the NRB noted past RHR system problems

such as pump impeller wear ring failure, heat exchanger floating head leakage and motor end turn surge ring clip failure. The NRB requested a further presentation that would address system problems in an integrated manner to provide an indication of overall system reliability. The RHR system engineer reviewed the current status of the individual concerns in the January 1989 meeting and concluded that the RHR system has a proven operability record and that there is a better working knowledge of the system. Although further follow-up on several items is required to respond to questions raised in the meeting, the team concludes that NRB concern has enhanced the overall attention given to the RHR system as an integrated system.

The issue of ECT functional testing has been addressed by the NRB in prior years (see section 3.7.8). The reconstituted NRB addressed the issue in its March and May 1988 meetings. Upon receiving attention by the EVP-N it was suggested that the Unit 2 and Unit 3 emergency cooling water systems should be tested, not just the Unit 3 system as had been previously recommended. At its November 1988 meeting the NRB recommended that a safety evaluation addressing the proposed system test be prepared. In the view of the team, this demonstrated the NRB's sensitivity to ensuring that the requirements of 10 CFR 50.59 and TS 6.5.2 would be met.

In the January 1989 meeting it was reported that the test conducted in December 1988 was not successfully completed because of ESW booster pump problems and the apparent need for modifications to the pump structure. This issue will be resolved prior to restart as discussed in section 3.7.4 of this report. However, the team concludes that the NRB's attention to the concern, in conjunction with that of the EVP-N, NED and the plant staff, has been effective in identifying a discrepancy between the prior performance capability of the ESW system in its ECT mode and its design basis.

Based on meeting attendance, review of recent meeting minutes, NRB reports to the EVP-N and other considerations as noted above, the team concludes that the NRB is functioning effectively to provide an independent assessment of safety related activities.

3.4.6 Nuclear Committee of the Board (NCB)

The NCB has been established to advise and assist the PECo Board of Directors in its responsibilities for oversight of nuclear operations. The NCB consists of non-employee directors from the company's Board of Directors and one or more experienced outside advisors. The NCB's purpose is to strengthen the independent assessment capability so that executive company management and the Board of Directors receive timely information about nuclear operations. As noted in its safety evaluation report the NRC staff recognizes that the NCB goes beyond regulatory requirements.

The team reviewed the NCB mission statement and minutes of recent meetings. The NCB is a standing committee of the board with no more than five non-employee members and meets at least on a quarterly basis. The NCB receives all minutes of the NRB and meets periodically with the chairman and/or members of the NRB. The NCB also receives other information including the monthly plant key indicator report and the monthly letter report from the EVP-N.

A review of the minutes of meetings indicates that the NCB was briefed on a broad scope of issues which are consistent with those discussed in the plan for restart and the NRC staff's safety evaluation report on the plan, the NRC's SALP report, and NRC Inspection Reports and INPO correspondence. These briefings were carried out by the licensee's nuclear group management team down to the superintendent level. Meetings were held one or more days per month through much of 1988.

On this basis, the NCB appears to be well informed regarding the scope and significance of safety related activities at the Peach Bottom Atomic Power Station and the NRC staff reaffirms the finding in the SER that the NCB is a useful adjunct to the Board of Directors.

3.4.7 Commitment Tracking/Operational Experience Assessment Programs (CTP/OEAP)

The licensee has enhanced several management self-assessment tools by consolidating and strengthening its programs to track the status of commitments made to outside organizations and by strengthening its program to capture outside operating experience information and communicate it to the appropriate organization.

The licensee has developed procedural guidance for the commitment tracking program (CTP) as set forth in an Interim Nuclear Group Administrative Procedure (NGAP), which was effective on July 1, 1988. This NGAP establishes the responsibilities, and authorities, process and organizational interfaces for the program. An Administrative Guideline, AG-18, provides further guidance for the detailed administration of the program.

The CTP is designed to track the status of PECo commitments made to or imposed by external organizations such as the NRB, EPA, state and local agencies, ANI, INPO and JUMA and internal organizations such as the NRB, ISEG, NQA and OEAP.

An overall status of commitments is provided to the corporate departments on a monthly basis by the corporate CTP coordinator. A biweekly report is provided by the station CTP coordinator. The program provides for the review of documents, identification of commitments, their assignment to a responsible individual and a schedule for response. This information is communicated periodically to the responsible management including the EVP-N for selected categories of issues in the monthly Station Review Meeting.

The team reviewed CTP records for a selected group of NRC documents which included Bulletins, Information Notices, Generic Letters and correspondence. The computerized data base for the CTP is the company wide Quality Assurance Tracking and Trending System (QATTS). The use of the filing index and cross reference system requires considerable familiarity with the details of the system. Nevertheless, the team found that the selected group of Bulletins, letters, etc., had been tracked as generally intended by the system.

Specifically, it was determined from the CTP file on NRC Bulletin 88-07 that all licensed operating shift personnel had been briefed on the subject power oscillations within the time required by item 1 of the Bulletin. Several instances of delay in the initial entry of data into the system were observed. Several examples were also observed of CTP effectiveness in precipitating revisions to overdue commitment schedule dates; however, this did not always occur in a timely manner. It was noted that neither the NGAP nor the AG includes specific timeliness criteria for updating overdue commitments.

A significant discrepancy in the reported number of open CTP items was noted when the monthly corporate report and the site report data for the end of January 1989 were compared.

The licensee's NQA Performance Assessment Division (PAD) performed an evaluation of the CTP/OEAP in December 1988 which identified a number of similar problem areas in addition to those noted above. Discussions with the Nuclear Services Licensing Section indicated that several working group meetings had been held and that an action plan had been developed to respond to the PAD identified concerns.

The team concluded that the CTP is an enhanced effort to track the status of commitments and that it appears to have the essential basic capabilities and characteristics to function in a useful manner. The timeliness, efficiency and user friendliness of the system can be improved significantly by resolution of the issues discussed above. The team concludes that the licensee should continue its efforts in this regard to further support self assessment.

The licensee has also developed procedural guidance for the Operating Experience Assessment Program (OEAP) as set forth on NGAP which was effective on June 15, 1988, and in AG-35 for further detailed guidance. The OEAP is designed to capture operating experience information applicable to Peach Bottom from external sources such as INPO, NRC Bulletins, Information Notices and Generic Letters, four categories of General Electric letters, other supplier and architect/engineer reports and from internal sources such as Limerick LERs and Network items. Each OEAP item is evaluated and, if applicable, is sent to the site for assignment. When the site evaluation is complete and any needed corrective actions such as procedure changes, training, plant modification have been completed, the evaluation is documented, reviewed by the OEAP coordinator and closed out on the OEAP tracking system. The OEAP and CTP share the same QATTS data base for Peach Bottom. Upon completion of this review any required corrective actions are entered into the data base as CTP items. The status of OEAP items is reported to management in the same report as CTP items.

A review of selected NRC Bulletins, Generic Letters and Limerick LERs revealed that the OEAP assessments were completed and recorded. Several OEAP actions were noted to

either be initiated several months after receipt of the incoming document or confirmed to be complete several months after completion of the original responsive action. As discussed above for the CTP, the PAD assessment found similar instances in its evaluation of CTP/OEAP and the licensing section is pursuing a corrective action plan in response to those concerns.

The team concludes, similarly for CTP, that OEAP appears to function in a useful manner. However, this functioning can be improved significantly by resolution of the issues discussed above and the licensee should continue its efforts in this regard.

3.4.8 Nuclear Quality Assurance (NQA)

The team assessed the nuclear quality assurance (NQA) independence, assessment capability and effectiveness to assure quality for Peach Bottom. Interviews were conducted with corporate NQA managers, site superintendents, auditors, QC inspectors, technical monitors and evaluators. Ongoing work was witnessed, audited areas were assessed to determine audit adequacy, and procedural controls and coverage were assessed. Organization independence, staffing, self-assessment and feedback to management capability were given particular attention during the team assessment.

The team concluded that the overall NQA function, although still developing and in need of several improvements, was adequate to support restart. Specific strengths and weaknesses of NQA are discussed in the paragraphs that follow.

3.4.8.1 Organization

The NQA organization is described in an organization chart dated January 15, 1989, as approved by the company president and Chief Executive Officer. The team found the organization to be structured and staffed as described in the chart with the exception of the manager of the Independent Safety Engineering Division who had transferred out of NQA. The Peach Bottom site group was in place since the site group could receive management support from the general manager or his designee, the team concluded that the vacancy was acceptable for the interim. Discussions with managers indicated that additional minor organizational adjustments, changes (and improvements) were being planned.

However, the team concluded that the basic organization as structured provided an acceptable organization to effectively implement the Peach Bottom quality commitments. The NQA general manager was observed to have ready access to the Executive Vice President-Nuclear. The NQA organization was also observed to have adequate independence to carry out the quality plan for Peach Bottom. The team concluded that the NQA organization was acceptable to support restart.

3.4.8.2 Procedures

The team found that the Nuclear Quality Assurance Procedures Manual, dated December 16, 1988, provided an adequate framework to implement the work of the Peach Bottom Quality Division. Where sampled, the team determined that the procedures were being implemented. However, problems were identified with QC inspection procedures as discussed below.

During the course of the inspection, several samples were taken to check the adequacy of the existing QC inspection procedures. The samples taken noted areas where the QC inspection procedures lacked coverage including acceptance criteria. The NQA Manager had previously recognized in late 1988, that inadequacies existed in the QC inspection procedures and that these procedures needed improvement. Efforts were initiated to upgrade the Peach Bottom inspection procedures by utilizing the Limerick Unit 2 inspection procedures as a base to work from for the upgrading effort. This work is in progress; however, no target completion date was provided to the team for implementing the inspection procedure improvements. Based on apparent inadequacies in the existing QC inspection procedures, the team concluded that additional management attention would be necessary to assure the quality of QC inspections. During a meeting the NQA Manager stated that management attention was being provided to assure the adequacy of QC inspections. The team concluded that although the licensee had introduced compensating measures to assure the adequacy of QC inspections, the existing QC inspection procedures were considered a weakness in the licensee's inspection program. (277/89-81-01; 278/89-81-01).

3.4.8.3 Staffing

The team verified that position descriptions were available for the site NQA staff down through the responsible senior engineer level. Position descriptions were available for levels below the senior engineer for all of the Peach Bottom Quality Division with the exception of the Quality Support Section. The Quality Support Section Superintendent stated that the position descriptions for his section were being prepared. The position descriptions were also available for review by the employees. The Peach Bottom Quality Division Manager stated that performance reviews had been given to all his employees and are scheduled to be given quarterly in the future.

The Quality Division staff included 66 people at the time of the inspection. The Peach Bottom Quality Division Manager stated that the budget is based on 40 people in the steady state condition with an additional 35 people authorized for outage work.

The Quality Control Section had 43 people; however, the Quality Control Section Superintendent stated that the number of inspectors will be reduced at the end of the current outage to approximately 30 people as the outage workload diminishes. The Superintendent stated that 19 QC personnel are permanent PECo employees, the remainder are contractor employees. The Quality Control Section was the largest section in the site Quality Division. Through interviews with members of the QC staff and a check of qualifications, the team concluded that the QC section staffing was adequate to perform its intended mission. The intended reduction in the QC staff after the current outage appeared to be in order based upon the projected reduction in workload.

The Quality Assurance Section (an auditing section) has eleven people. The section is authorized twelve people. The Superintendent stated that he is actively recruiting to fill the vacancy with a person with health physics/radwaste experience. The Quality Assurance Section Superintendent stated that he is a professional engineer with approximately eleven years prior experience; he had been at Peach Bottom for approximately two years. The qualifications and experiences of the auditors was assessed. Seven of the auditors were contractors, two of which were degreed

engineers both of which were stated to be engineers in training to become a professional engineer. One auditor had approximately eighteen years of QA/QC experience, one had approximately thirteen years QA/QC experience and of the remaining, each had less than six years QA/QC experience. One of the auditors was a former licensed reactor operator at another BWR facility. The auditor had not been provided plant specific training on the Peach Bottom simulator.

The team concluded that the Quality Assurance Section audit staff appeared to be qualified and staffed to adequately implement the NQA auditing mission for Peach Bottom.

The Technical Monitoring Section has a staff of five people. The Superintendent is a degreed engineer and has completed his engineer in training examination to become a professional engineer. He has completed training at GE including BWR fundamentals, systems and simulator training. One of the technical monitors was a shift supervisor at another BWR, one received operator training at another BWR, one received Navy reactor training and operator training at a PWR, and one received Navy health physics/chemistry training and had various work experiences including being a pipe fitter.

The team noted that there were no detailed qualification requirements for technical monitors, e.g., requirements for vision. During the course of the inspection the Technical Monitoring Superintendent stated that the vision requirements would be established to be equal to that of the licensed reactor operators. The Peach Bottom Quality Division Manager stated that the technical monitoring qualification requirements would be completed and in place by April 1, 1989.

The team further noted while observing a technical monitor performing control room monitoring that the technical monitor had received no plant specific simulator training to prepare the technical monitor for performing monitoring of Peach Bottom reactor operations. The team viewed the absence of this training as a weakness.

The team concluded that the technical monitoring staff was a positive initiative to develop an NQA real time performance oriented monitoring capability. The organization and staff are new in their function and are developing. The team

concluded that management commitments are needed to provide technical monitors with appropriate plant specific training to assure maximum effectiveness for the technical monitoring function. Overall, the team concluded that for the interim the staffing was adequate. As experience is gained with the technical monitoring mission, the staffing level will need to be reassessed.

The Quality Support Section technical staff included six people. The superintendent stated that two of the technical staff were leaving and that he was posting for an electrical and mechanical engineer. This section provides support for the Peach Bottom Quality Division with staff involvement which includes procedure reviews, procurement reviews, auditing, handling quality concerns and budgeting for the division.

Two of the engineers have 20 years of work experience and another ten years of work experience. The Superintendent stated that the NQA goal was to complete a procedure review within ten days. Based upon a sample audit of the section's performance in completing procedure reviews, the team concluded that the staffing for the Quality Support Section appeared adequate to accomplish its mission.

Overall, the team concluded that the staffing for the Peach Bottom Quality Division was adequate to support restart.

3.4.8.4 Corrective Actions

The team reviewed on the licensee's corrective action tracking, trending and performance indicators. The team found that this information was being routinely provided to managers. The NQA Monthly Status Report for December 1988 showed the average age of open nonconformances to be less than four months and trending downward. Evidence existed that management attention was being routinely focused on assuring corrective action. Based upon this the team concluded that the licensee's corrective action processes were adequate to support restart.

3.4.8.5 Audits

The team was advised that the Nuclear Quality Assurance Internal Master Audit Plan had been approved at the site level but had not been approved at the general manager

level. The Peach Bottom Quality Division Manager stated that audits were being implemented, although the plan had not been formally approved by the General Manager as of the time of the exit meeting. The audit plan is a new initiative for the licensee. The plan integrates the entire NQA audit effort for the company. The team was provided a copy of the plan at an NQA staff meeting held at Chesterbrook, PA, on February 9, 1989. The audit plan was stated to provide for maximizing the use of performance based auditing techniques and provide for a system of comprehensive, in-depth, vertical investigative reviews of entire process areas. The integrated effort was stated to provide also for efficient use of the audit staff to accomplish the NQA mission. The audit plan encompasses Peach Bottom, Limerick and corporate. The Master Audit Schedule is an integrated two year audit schedule. During a review of this schedule, the team identified that one corrective action audit required by Technical Specification 6.5.2.8.C, was missing from the schedule for Peach Bottom. However, discussions with the Peach Bottom superintendent for auditing identified that the required corrective action audit was being planned as audit PB.1-1. He stated the he would initiate a schedule correction. The team concluded that additional review of the schedule appeared to be needed before formal issuance. The team verified that the audit schedule was being implemented.

The audit plan calls for 46 yearly Peach Bottom audits. The plan also specifies 25 corporate audits. The NQA goals specify that 50% of all the audits are to be performance-based and are to include observations of processes in progress. Further, the goals call for 15 technical based audits over the two year cycle. The team concluded that the master audit plan was a positive management initiative to improve both the company's and Peach Bottom's quality. The team, however, also noted a weakness existed in failing to issue the plan and schedule at the beginning of the year.

The team selected several areas and requested to see audits that the licensee had conducted to assess the adequacy of the licensee's audits to provide feedback to management regarding potential problems. Audit No. PA 88-504-IST conducted November 7 to 18, 1988, resulted in two NQA corrective action request (CARs) and two recommendations. The audit appeared to be in-depth and identified technical details requiring corrective action. The audit recognized that the IST program implementing plan was under development

and that the licensee had advised the NRC staff that revised and new procedures will be available by May 1, 1989, thereby allowing full implementation of the revised IST program. The team reviewed the implementing plan work and noted that approximately 29 check valves required disassembly in order to verify their operability. The audit did not identify that these valves either had not been tested or would not be tested until the next refueling outage, approximately 15 to 18 months after restart. The team concluded that the scope of the audit should have identified this issue to management since the operational readiness of these safety related valves may not have been known. The team concluded that the safety perspective of the audit team was somewhat narrowly focused. During discussions with the NQA General Manager regarding auditing perspectives, he indicated his intent to attempt to broaden the focus of the NQA auditors. Regarding the 29 valves the licensee subsequently provided additional rationale for interim acceptability of the operational readiness of the valves.

Another area selected for review was modifications. Audit PA 88-513 conducted from September 19, 1988 to February 2, 1989, was conducted to evaluate the completion status of modifications at PBAPS Unit 2. This audit identified eleven CARs. Unlike the above discussed audits, management initiated the use of root cause analysis methodology in an effort to determine and understand all of the problem root causes, in addition, to assuring that all of the root causes will be identified. The team identified several problem areas with modifications during the inspection. The team noted that the licensee's root cause analysis efforts were identifying similar problems. Based upon this finding, the team concluded that the licensee now has in place the tools to assure that problems are identified by the licensee's self assessment processes for corrective action.

Based upon the overall audit program being implemented and improvements being made the team concluded that the licensee's program is acceptable to support restart. The team further concluded that expanded use of root cause analysis methodology is warranted for selected audits to assure that all the root causes for problems are identified. Management needs to assure that auditors focus broadly on effectiveness and safety in addition to technical detail.

3.4.8.6 Surveillances

The Peach Bottom Quality Division's Technical Monitoring Section provides real time surveillance and monitoring of on-going plant activities. The technical monitoring schedule specifies 22 areas to be covered, for example, shift operations, control room performance and security. The schedule assigns two monitors to the area of shift coverage and specifies a frequency of five real time monitoring observations per week. The team noted that corrective action for identified problems was being developed and tracked. The team also witnessed technical monitoring being performed in the control room. The team concluded that this NQA initiative was a positive quality improvement.

The team noted another NQA improvement initiative was to require at least 50% of the NQA audits to include real time observation of processes in progress. The team concluded that this was a positive improvement for assuring quality at Peach Bottom.

The team concluded that overall improvement in the area of surveillance of ongoing plant activities has been made for Peach Bottom.

3.4.8.7 Independent Safety Engineering Group (ISEG)

The ISEG performs independent examinations of information which may indicate areas for improving facility safety and makes recommendations regarding means of improving safety. The team reviewed the ISEG charter, interviewed the NQA Manager, members of the ISEG staff for Peach Bottom and reviewed the ISEG reports. The current Peach Bottom ISEG staff consists of a supervisor and three engineers. One additional engineer was shown on the organization chart. However, he has not been available for ISEG work for approximately six months since he was in SRO training. The current staff including the site supervisor contains two mechanical engineers, one nuclear engineer and a chemical engineer. The team noted the absence of electrical and instrumentation expertise in the ISEG staff for Peach Bottom. The NQA Manager stated that it was intended to recruit for electrical and instrumentation expertise for the Peach Bottom ISEG. The site ISEG supervisor reports to the corporate ISEG Manager. However, this manager has transferred to another position and the corporate staff is being phased out. Currently the site ISEG supervisor reports to the General Manager, NQA.

An interface agreement signed by the Executive Vice President on August 19, 1988, and issued to Nuclear Group Division Managers, provides ISEG adequate independence and authority to accomplish its mission. ISEG report recommendations are required to be responded to within 30 days. The ISEG recommendations are tracked on QATTS (an NQA computer tracking and trending system). Commitments for future action to be taken are tracked. A computer print out from QATTS was verified to contain ISEG recommendations and close out status. Two corrective action reports (CARs) issued to the station's operating and technical departments were noted to be tracked by corporate NQA. Surveillances performed by ISEG that resulted in recommendations were not being tracked; however, the team was advised that all future surveillances would be tracked.

The team assessed the tracking and trending of ISEG recommendations and concluded that with the inclusion of surveillances, the tracking and trending was adequate to assure input of ISEG findings into the corrective action process.

The ISEG staff at Peach Bottom have been trained to perform root cause analyses on identified problems. The ISEG site staff has also assisted other departments in root cause analysis work. Examples of the use of root cause analysis work were noted by the team during the inspection. The team concluded that the root cause methodology being used and promoted by ISEG was a valuable self assessment tool.

The site ISEG reviews 10 CFR 50.59 safety evaluations for the Nuclear Review Board (NRB) under procedure ISED-I-2, Rev. 1, Implementing Procedure for Review of Safety Evaluations. This review is not a comprehensive technical review. The ISEG is tasked with concluding whether or not a change involved an unreviewed safety concern.

The ISEG supervisor stated that these reviews are performed in offices and none have identified an unreviewed safety concern. The team raised a concern that ISEG made no in plant assessment regarding the changes. The ISEG supervisor stated that future reviews would on a sampling basis include in plant assessment of the 10 CFR 50.59 reviews. The ISEG supervisor stated that the ISEG site staff currently spends about 5% of their time in the plant, primarily in the control room. The team concluded that the ISEG in-plant focus was relatively narrow.

The team concluded that the site ISEG group had adequate independence to accomplish its mission. Improvements in tracking surveillance recommendations are needed and were committed to be made. A weakness exists in the staff due to the absence of electrical and instrumentation and control expertise. This was stated to be a recruiting priority by the NQA Manager. The root cause analysis expertise of the ISEG is a definite strength in the licensee's self assessment capability.

3.4.8.8 Human Performance Evaluation System (HPES)

The HPES is a methodology to identify, evaluate and correct situations that cause human performance problems such as errors, near misses and potential problems. The licensee formalized the current HPES in July 1988 by issuing procedure A-125, "Procedure for the Human Performance Evaluation System", Revision 0. The HPES has a coordinator assigned who has been trained to perform HPES investigations and root cause analysis. The coordinator is both experienced and knowledgeable in station operations. The coordinator was involved in investigating 32 potential problem issues in 1988, published ten reports and stated that an additional five reports are pending issuance. The coordinator reported until recently to the corporate HPES coordinator. However, this person changed jobs and the corporate position is not being refilled. Currently the HPES coordinator reports directly to the General Manager, NQA. The General Manager, NQA stated that it was planned that when the site Independent Safety Engineering Division Manager position is filled, the HPES Coordinator would report to that person.

HPES investigations are conducted by trained HPES evaluators. There exists a pool of 16 trained evaluators, including five in ISEG and four STAs. The coordinator stated that management had removed the four STAs from taking further HPES evaluator assignments. The coordinator stated that more HPES evaluators were needed.

An event report, 88-026, that occurred on June 8, 1988, was reviewed. The event was reviewed in a previous NRC inspection and involved a plant operator installing a safety ground in a load center. While installing the ground, the cable contacted a bus bar causing a large arc. The report identified seven causes and five proposed corrective actions. The report

was submitted to plant management; however, no action has been taken on the recommendations. Neither has management approved the report. The coordinator stated that HPES did not input into one of the formal tracking systems utilized for management tracking and trending of corrective actions. The HPES coordinator stated that he has experienced a lack of management attention to HPES reports in general.

Another example of HPES involvement was a February 7, 1989, scram event associated with a 600 psig interlock and valve MO-38. The HPES coordinator had completed his part of the HPES evaluation; however, stated that he needed HPES evaluator input from instrument and control people. He stated that he had not at the time been effective in getting anyone assigned to perform that portion of the HPES evaluation. Subsequent to discussions with the General Manager of NQA, it was stated that an additional 40 people were scheduled to receive HPES evaluator training in late March of 1989. It was stated that this additional pool of evaluators should aid in resolving the problem of making available trained evaluators.

The HPES coordinator verified that four HPES training sessions (one hour each) had been conducted for the technical staff during the second quarter of 1988. The coordinator verified that there was no general employee training for explaining the HPES system to all employees. There were several posters displayed about HPES. The team interviewed employees including several managers regarding their knowledge of HPES and found in general that either HPES was not known or little was known about HPES by plant employees.

The team concluded that HPES had a large potential for improving safety. However, to make the HPES a viable program for Peach Bottom, management attention was needed to support the program. The program needed publicity, employees needed to be trained regarding use of the HPES system, a larger pool of trained HPES evaluators was needed, the controlling procedure needed updating and improvement, and management controls needed to be implemented to assure that prompt action is taken on HPES findings and proposed corrective actions.

3.4.9 Conclusions

The team concluded that corporate management is actively involved in assessing facility performance through both line and independent oversight channels. Through his presence at numerous station meetings, the Executive Vice President, Nuclear, demonstrated an acute awareness of facility problems. The development of numerous information systems such as the Performance Management Program, the Master Open items List and the Commitment Tracking Program has provided corporate managers with effective tools for keeping abreast of facility status and program developments. Independent review committees have played an active role in resolving long standing technical issues and in assuring effective communications within the new organization.

While the new Nuclear Quality Assurance Department is still developing, consolidation of the previously fragmented quality assurance and quality control groups under a single General Manager has resulted in a strong independent self assessment capability as indicated by comprehensive audits and effective root cause analyses by the Independent Safety Engineering Group. The formation of an operationally oriented technical monitoring group has provided for a real time assessment of in process activities.

Improvements are needed to focus some auditors on safety and quality, to provide adequate quality control inspection procedures, to finalize the 1989 audit plan and schedule, and to assure appropriate technical expertise on the Independent Safety Engineering Group.

3.5 Radiological Controls

3.5.1 Scope of Review

The team evaluated the performance of the licensee's radiological controls program, with emphasis on those functional areas important to startup or with previously identified weaknesses. Team evaluation methods included tours of radiologically controlled areas, observation of ongoing work, interviews of personnel, and review of selected documentation. Functional areas reviewed included organization, management and staffing, training, work/exposure control, ALARA, facilities and equipment.

3.5.2 Organization, Management, and Staffing

The licensee's health physics (HP) organization has been significantly modified since the Shutdown Order. Seven first-line supervisor positions were created and filled in the applied HP section. This represents a significant improvement as compared to the previous organization. Other changes included the complete rewrite and upgrade of station HP procedures and the filling of the applied HP Supervisor, the Senior Health Physicist, and the Superintendent, Plant Services positions with new personnel.

Team inspection effort was directed towards assessing the continuing effectiveness of these changes and the ability of the current organization to support startup. Several licensee strengths were noted. One was "Management by Walking Around" (MBWA) tours of the radiological work areas. These tours are routinely conducted and appear effective in improving radiological housekeeping. Overall posting and labelling of radiological areas and materials was significantly improved.

HP technician staffing levels are adequate to support power operation. The applied HP group includes seven first-line supervisors, 38 fully-qualified PECo technicians, and 16 junior PECo technicians. Contractor staffing levels include approximately 32 fully-qualified technicians and 19 junior technicians. Although contractor technician levels are currently being reduced, the licensee anticipates retaining approximately 16 fully-qualified technicians through startup. The licensee has also recently hired a Certified Health Physicist to work for the support HP group.

Interviews of HP technicians and supervisors indicate that working relationships with other work groups such as maintenance, operations and I&C have improved. HP technicians assigned to operations as the "shift HP technician" now rotate with the operations shift to improve team-building. The level of communications with and support from the corporate Radiation Protection Section shows significant improvement. Continuing improvement in the timeliness of closeout of radiological occurrence reports (ROR) was noted.

There were also areas for further licensee improvement identified. Discussion with the HP staff identified that a

subset of the station's HP technicians have no operating power plant experience. This subset includes certain of the contractor technicians and the current group of PECo "C" technicians that were hired subsequent to the shutdown. Discussion with the licensee identified that although the need for specific training and orientation for this subset had been discussed, no final decision to provide it had been made.

The team noted that changes in radiological conditions subsequent to plant restart would be significant. The licensee agreed to provide an "operational experience orientation," to the subject technicians (see section 2.4.7). This item will be reviewed prior to restart (277 and 278/89-81-02).

Documentation of work area tours by first-line supervision does not always include corrective actions taken for identified deficiencies. The licensee's program for root cause analysis and trending of RORs is still under development. Improvements in this area were noted during the time period of the inspection. There is currently no opportunity for technician rotation among the three HP groups (applied, support, and radiological engineering). HP technicians consequently have a more limited scope of the HP area than technicians at sites that provide the opportunity for rotation or cross-training. The licensee stated that training for certain tasks outside their normal responsibility (whole body counting operation and respirator fit-booth operation) was being added to the progression training for applied HP technicians.

Field observation of Security/HP interface identified the need for improving communication between these two groups. While observing decontamination activities in a vital area, the team noted multiple entries to the room by the security force in response to recurring door alarms. The room was also a posted contamination and airborne activity area and required a full set of protective clothing and a respirator for entry. The team noted the recurring (up to seven in one day) security group entries to the contaminated/airborne activity area represented an ALARA concern. Despite this concern, no action or communication among the HP and security groups had taken place to evaluate the situation and determine potential alternatives to the entries. When interviewed, the cognizant area HP supervisor was not aware of the recurring alarm situation. Once identified, licensee corrective action included moving the contamination control boundary away from the room door to allow the door to

close more quickly. A surveillance test was also performed on the door alarm and identified deficiencies in alarm operation. The licensee also stated that either the Radiation Protection Manager or his assistant will be attending the monthly operations/ security interface meeting to improve communications between the two groups.

3.5.3 Training

The team reviewed the status of licensee training programs for HP technicians and radiation workers by discussion with cognizant training staff personnel, review of selected lesson plans, and review of recent licensee audits of the General Employee Training (GET) and HP technician training programs.

3.5.3.1 HP Technician Training

The licensee has recently taken several corrective actions in response to NRC concerns associated with the HP technician training program. A "diagnostic" test, covering 15 separate HP functional areas, was administered to the HP technicians in June 1988. Those functional areas identified as weaknesses were then added as priority training areas to the HP technician cyclic training program. Training on several of these areas has been completed. The licensee eventually plans to cover all 15 functional areas.

The licensee is also currently revising course outlines and lesson plans for HP technician progression training from "C" to "B" to "A" technician. The revised plans are job-task oriented and are being developed with input from and review by the station HP group.

In an effort to independently evaluate HP technician knowledge level, the team interviewed selected HP technicians and questioned them concerning procedural requirements and radiological definitions and limits. Several significant areas of technician weakness were identified, and included federal exposure limits, technical specification high radiation area control options, and gross alpha and beta MPC values. The licensee stated that all technicians would be briefed on the specific areas of knowledge level weakness identified during this review.

The team concluded that although field weaknesses in technician knowledge level were noted, the licensee is already actively improving the HP technician training program. Licensee performance in this area will continue to be reviewed in future inspections.

3.5.3.2 Radiation Worker Training

Recent NRC inspections have also identified weaknesses in the radiation worker training program. The team reviewed a licensee audit of the General Employee Training (GET) program (Radiological Assessment Report 88-06) performed in July 1988. The audit was comprehensive and identified eight recommendations for improvement of the overall radiation worker training/requalification training program. Discussion with the licensee's training staff indicates the recommendations have either been implemented or are in the process of implementation.

The licensee also stated that effort is underway by the Limerick, Peach Bottom, and corporate training staffs to develop a common, PECo-wide radiation worker training program. The scheduled date for completion of the lesson plans is June 1989. The licensee stated that the common program would incorporate recent improvements and recommendations identified during recent audits. Review of licensee development and implementation of the radiation worker training program will be performed during subsequent inspections.

3.5.4 Control of Work/Exposure Control

The team reviewed the licensee's program for identifying and controlling radiological work hazards by discussions with personnel, observation of field activities, review of selected radiation work permits (RWPs) and associated radiological surveys, and review of locked high radiation area (HRA) key accountability records.

Within the scope of the above review, several areas of improved licensee performance were noted. Locked HRA key issue and accountability controls have improved and the controlling procedure was being complied with. An increased use of engineering controls (tents, catch containments) to limit the spread of contamination was noted. Overall dose accountability (i.e., the ability to correlate station

exposure to specific RWPs) has improved. RWPs and related surveys were adequate to identify and control radiological hazards. A new HP computer information system (the ADEPT system) has been developed which includes significant improvements over the previous dosimetry system. These improvements include tie-in to the work control system for RWP writing and the capability for on-line verification of worker qualifications prior to access. The team identified that the on-line access function of this system is still in the trial implementation stage and additional training is required prior to full implementation.

Several areas for additional licensee improvement were also identified. Review of RORs identified that significant radiation worker procedural deviations, RWP noncompliance, and contamination control concerns continue to occur. Several examples of poor radiological work practices were also noted by the team during the inspection period (section 3.6.1.4). The licensee acknowledged this concern and stated that a module on radiation work practice awareness had been included in recent training that was provided to all plant supervisors. The licensee also stated that HP technicians had been instructed to be observant for poor work practices and correct them in the field, as they occur. Licensee efforts in this area will continue to be reviewed during subsequent inspections.

Counting of selected air samples and smears for gross alpha activity is performed by the Chemistry group in accordance with procedure RT 7.6.7, "Analysis of Routine Samples for Alpha Activity." Review of this procedure identified deficiencies such as the licensee's equation for minimum detectable activity (1.00 x standard deviation of the background counting rate) is less conservative than the equation recommended by the NRC (4.66 x standard deviation of the background counting rate), and no corrections for air sample filter dust-loading or self-absorption are made during alpha counting.

The team also noted that coordination among the principally involved groups was not as effective as it could be. Specifically, the chemistry group received no specific direction from the HP group as to which samples to count for gross alpha activity. Additionally, the radwaste group did not communicate to either HP or chemistry the results of their annual waste stream analyses. These results identify

transuranics present in the waste streams and are typically reviewed by the HP group to identify trends or changes. The licensee stated that the above concerns would be addressed. This area will be reviewed during a subsequent inspection.

The licensee has recently procured several AMS-3s (airborne monitoring system) to provide real-time alarm indication for airborne radioactivity. Tours of the various areas where the AMS-3s are in use identified that although background levels are typically 1000 counts per minute (cpm) alarm setpoints for the AMS-3s are set at 6000 cpm. The licensee stated the alarm setpoints were set at this level in anticipation of the high radon levels that frequently occur in the plant. The team noted that although the current setpoint is adequate, a more aggressive approach typically includes trending of background radon levels with modification to the alarm setpoints only as necessary. The licensee stated this area would be reviewed.

3.5.5 ALARA

Team review of the licensee's ALARA program consisted of discussion with cognizant personnel, review of the 1989 exposure goals, and review of selected pre-job ALARA reviews and post-job history files. Several program improvements were noted. The licensee has set an aggressive station exposure goal of 1000 manrem for 1989, a year which includes a refueling outage for Unit 3. The level of involvement in the goal setting process by the corporate group and support of the goal by station management represents significant improvement over previous performance.

Several ALARA program improvements have been recently instituted by the corporate radiological engineering group. One of these is early involvement of the corporate group in the design modification review process, with representation as required on the modification team. Another is development of a program to institute exposure bonus/penalty clauses in vendor work contracts to improve vendor ALARA performance. This program was used during the Unit 3 local power range monitor and steam dryer work evolutions and resulted in significant exposure savings. Finally, the level of station management attendance at the Station ALARA Committee represents an improvement as compared to previous years. The team observed, however, that attendance by upper-level management in the maintenance group was not as frequent as the other groups.

The team identified the need for improved documentation in ALARA post-job reviews and job history files. Review of selected ALARA post-job reviews identified that the root causes for exposure and man-hour under or overestimating were not clearly identified in the review. The team also noted that job history files did not contain the basic assumptions (manhours and doserates) that went into calculating the initial exposure estimates.

The licensee acknowledged the above concern and stated that additional effort would be directed towards improving ALARA post-job reviews and the level of documentation in ALARA job history files.

3.5.6 Facilities and Equipment

The team reviewed licensee counting facilities and supplies of portable survey instrumentation to support operation. No deficiencies were identified. Adequate counting instrumentation was available in the countroom to provide gross and isotopic identification of radionuclides. Review of portable survey instrument inventories identified the licensee has an adequate supply of calibrated instruments to support operation. All in-use instrumentation observed was within the instrument calibration period.

The licensee has initiated an aggressive program to reduce the extent of plant contaminated areas. In June 1987, approximately 40% of the combined Unit 2 and 3 radiologically controlled area was contaminated to varying levels. Currently, this percentage has been reduced to approximately 10% of the Unit 2 and common areas, and 17% of the Unit 3 areas excluding drywells. The licensee plans to decontaminate Unit 3 areas to approximately 10% after the completion of ongoing modifications and maintenance. The overall licensee goal is to maintain the plant with approximately 10% as contaminated area. Implementation of this program was noted as a licensee strength.

3.5.7 Conclusions

The team determined that significant improvements in the radiological controls program had occurred across all areas reviewed and that the program is adequate to support plant startup and operation. One weakness noted was lack of operational plant experience in a subset of the station HP technicians. The licensee agreed to correct this prior to restart. Several additional minor weaknesses were noted which do not require resolution prior to restart.

3.6 Surveillance/Maintenance

3.6.1 Surveillance

3.6.1.1 Scope of Review

The team assessed the surveillance testing (ST) program to determine the licensee's effectiveness in implementing the program. The organization which implements the ST program was reviewed. Related administrative procedures, the ST tracking system and procedures generation methods were analyzed. Monitoring of actual performance of and review of ST procedures was completed to ensure compliance with procedures and Technical Specifications (TS). Operations, I&C, and system engineering personnel were monitored during field ST performance. The training of these personnel was reviewed to ensure their qualification for the tasks being performed. ST acceptance criteria were reviewed to ensure clarity and compliance with TS requirements. Compliance with procedures and the usability of procedures was also observed. The approach taken when an ST does not meet the acceptance criteria was reviewed. Recent temporary changes to STs were reviewed to ensure that the change system is working effectively.

3.6.1.2 Organization

The ST program is administered on site by the Technical Department. Recently, this department was reorganized into three groups. The Systems Group includes the system, test and reactor engineers. The projects group coordinates the surveillance testing and other programs, such as Inservice Testing (IST). The Regulatory Group implements tracking systems and on site licensing issues. The Systems Group was observed to have good engineering ability, but was lacking in operational experience. These engineers have a good understanding of the plant systems and components. Specialized training has been provided as it becomes available to enhance their knowledge of the systems. The site specific simulator has been used to provide these individuals with overall plant and system operating experience. The Projects Group was observed to be well staffed and able to handle the assigned workload. The regulatory group handles the Operational Event Assessment Program and the Commitment Tracking Program (OEAP/CTP). The OEAP and CTP were also discussed in section 3.4.7. The team noted that the licensee issued action items to different site personnel to ensure that open items are tracked and resolution is obtained.

The site personnel involved in performing STs cross most of the organizational boundaries. The personnel from technical support, operations, and maintenance engineering were observed to function well as a team.

3.6.1.3 Scheduling

A surveillance coordinator tracks and schedules ST requirements. Recently, another scheduler has been hired to assist this coordinator. The tracking system (STARS) is computerized and well controlled. Each ST and the testing interval is logged into the system. The tracking system is divided into four quarters, each having thirteen testing weeks. Each ST is scheduled to be performed during a one week interval. A list is distributed prior to an upcoming week so that departments can plan their activities. A schedule is provided to the operations department for tests to be performed for a given week. The schedule is further subdivided into the three operating shifts and defines ST responsibilities for each shift to complete. The STs that require support from other site organizations are usually completed on day shift.

If the ST coordinator does not receive a completed ST within the required one week interval, the 1.25 times the interval grace period as allowed by TS is entered and the ST goes onto a late list. This list is distributed to the site departments. The ST coordinator tracks these late STs. If they are not performed within three days of the end of the grace period, the coordinator goes directly to the supervisor responsible, and requests test completion. If it does not appear that the ST can be completed, the appropriate documentation is initiated in order for operations to consider system/component inoperability implications. If an ST fails, the shift takes the action required by TS and the failed ST is forwarded to the ST coordinator. The ST is entered into the tracking system as a failed test and is not removed from this list until a satisfactory ST has been completed.

3.6.1.4 Surveillance Test Observations

Selected STs were observed by the team in progress. ST procedure usability and technical acceptability was reviewed. Procedural compliance and qualifications of the personnel conducting the test were also reviewed. When an ST is scheduled to be performed, it is given to the shift

supervisors on a daily list. The personnel performing the test come to the control room in order to get the required permission and signoffs by the affected unit reactor operator and the shift supervisor. The team observed good operations personnel interaction with the systems engineers, test engineers and I&C technicians.

Selected STs were observed by team members and are listed in Appendix C. Specific ST comments are listed below:

-- ST 8.1, Emergency Diesel Generator (DG) Full Load Test. The test was conducted on the E-2 DG and was completed in accordance with the procedure. An engineering deficiency was re-identified during performance of this ST. This was previously identified as NRC unresolved item 277, 278/87-29-03. After the DG is secured, lubricating oil from the upper crankcase migrates down the upper cylinder liner and collects on the upper piston rings. Due to leakage around the piston rings, the oil migrates further down the cylinder wall and into the exhaust ports. The oil then flows to the low point in the exhaust header, which is at the flanged header connection to the turbocharger manifold. The connection is made up using a flexitallic gasket and leaks when the machine is cold. This allows the oil to drip and collect on the motor casing. When the machine starts, the exhaust blowby may cause a short duration fire. This continues until the flange heats up and expands to stop the leak. This has been more prevalent on the E-2 DG and is a recognized problem with Fairbanks-Morse DGs. The licensee is planning on making a modification that has proven successful at the North Anna Station. The machine will be air cranked after shutdown to allow the piston rings to force the accumulated oil back to the upper crankcase and into the sump. Unresolved item 277/87-29-03; 278/87-29-03 is considered closed. Licensee actions for possible modifications will be reviewed in a future inspection.

-- ST 8.2-2A, Station Battery Weekly Inspection. The technician performing this ST appeared knowledgeable of the procedure and performed in a competent manner. The general area around the battery was clean and free of extraneous debris. The battery terminals were also clean and showed no evidence of corrosion. Battery voltages were measured across the battery terminals. This was done

by measuring voltage at fuse panel 2AD019 for battery 2AD001. The technician stated that measuring directly across the terminals was not feasible due to the short length of cord available on the voltmeter. All values tested were found to be within the specifications. Although this panel appears to be a suitable point for measuring, it is not mentioned in the procedure. The licensee indicated its intention to revise the procedure to clarify the voltage measuring point.

-- SI 2D-14-43-A1CQ, Core Spray Sparger D/P Calibration Check. This procedure was performed in a competent manner. One concern was that the technician only wore gloves for the initial hookup of the test equipment into the potentially contaminated CS system. Further adjustments and removal of the equipment were performed using bare hands. This is an example of the weakness discussed in section 3.5.4.

-- SI 2P-2-55-B1CO, Reactor Pressure Loop Calibration Check. A shutdown reactor scram with no control rod motion was observed to occur during performance of this ST (see section 3.1.8). This procedure checks the calibration of each reactor high pressure scram instrument. I&C personnel discussed the ST with the unit 2 operator and the shift supervisor, and were given permission to perform it on the "B" pressure transmitter. Step 6.1 of the procedure was ambiguous because it referred to special procedure (SP) 360 in a manner that did not clearly indicate whether SP 360 was in effect for Unit 3 as well as Unit 2. The RO originally interpreted it one way, then after further review, decided that SP 360 applied to Unit 3 and did not affect this procedure on Unit 2. The team concurred with this determination.

The isolation of the detector, tie in of the test instrumentation, and controlled pressurization of the instrument was in compliance with the procedure. The trip set point of the instrument was within specification as was the trip function of the B reactor protection scram logic, which produced a half scram condition. The pressure detector isolation valve leaked by its seat as the detector was pressurized. The configuration of the sensing lines leading back to the reactor vessel was not reviewed by the operations staff prior to allowing the ST to be performed. The

manual sensing line isolation valve upstream of the excess flow check valve was shut and tagged due to system modifications. This caused the entire sensing line to pressurize because the closed isolation valve prevented venting to the reactor vessel.

The operators were expecting the "B" half scram condition when it occurred. Within a minute the operator received the high reactor pressure alarm and then the full scram condition caused by the unexpected pressurization of the "A" high pressure reactor scram detector. The event surprised the operators who initially thought that the instrument line excess flow check valve must have caused the blockage of the sensing line. It was not until approximately one half hour after the scram that it was realized that the sensing line blocking valve was tagged shut. This scram would not have occurred if the instrument line blocking valve had been open. Additionally, a backup valve to the detector isolation valve is not required to be shut during this surveillance and consequently was not used to prevent the leakage.

-- ST 7.1.1-2, Standby Liquid Control (SLC) Solution Analysis. Parts of this procedure contain relatively broad instructions, but their intent appears to be well understood and the conditions were met. The procedure did not address any precautions to be taken with regard to handling of boron. The SLC tank contained a warning label which specified that gloves, safety glasses and an apron be worn. The technician only wore safety glasses. During sampling, some of the sample solution spilled on his hands. The team brought up the discrepancy between the tank warning label requirements and sampling practices. The licensee stated that the new boron solution was less hazardous and required only gloves and glasses. The licensee responded by correctly relabelling the tank. In addition, the procedure is being revised by the licensee to include a precaution statement consistent with the tank warning label calling for the use of safety glasses and gloves.

The inspector noted that the chemistry lab was clean and orderly. All prepared reagents were found to be in date. The chemistry technicians conducted themselves in a professional manner at all times.

The ST contains a note cautioning against the use of glassware during sampling and analysis due to the potential effect of boron contamination of the sample from glass. Plasticware was used throughout the procedure except in step 2.2.1 where a glass pipette was use to transfer the sample being analyzed. The procedure requires titrating in 0.01 ml increments when in the 6-7 pH range. The technician performed the entire titration in drop by drop (approx 0.04 ml) increments through the endpoint. Data sheet 7.1.1-2-1 contained no acceptance criteria for determining the maximum allowable dispersion of two identical analyses. When questioned, the technician stated that if the dispersion were large enough he would doubt the validity of the analysis. However, he wasn't sure what "large enough" was. The licensee indicated its intention to revise the ST to include acceptance criteria as well as address the use of a glass pipette. The 0.01 ml increment was correct and technicians will be trained on this method of adding reagents.

-- ST 6.18.2, Operational Test of AO-3502B. AO-3502B is the torus to reactor building vacuum breaker isolation valve. It is an energized-to-shut, normally shut, fail open valve. The licensee encountered several difficulties during the ST. The reactor operator was unaware that unlike most valves, the control switch must be continuously held in the open position to open the valve (releasing the control switch immediately causes the valve to shut). Neither the procedure nor the valve controller makes this fact known to the operator. Consequently, the operator attempted to cycle the solenoid several times without fully opening the valve. He eventually sought help and was informed of the problem. The valve was then successfully cycled. The licensee stated that the procedure would be revised to include a note advising the operator of the valve's operating characteristics.

The inspector noticed that the seismic nitrogen bottle was being depleted during valve cycling even though the normal air supply to the valve operator was on line. The licensee was questioned about this phenomena and conducted an investigation. Their preliminary results indicate that this condition is acceptable because the

design criteria only require cycling the valve a small number of times and the nitrogen is mostly intended for maintaining the valve shut, for which negligible air is consumed. Additionally, the bottle pressure is checked on a daily basis and the bottle is replaced at 500 psi. The licensee is conducting an in-depth engineering evaluation of this issue (primarily in response to Generic Letter 88-14) to determine all applicable requirements and the system's ability to satisfy them. This issue was already being tracked as NRC unresolved item 277, 278/89-01-01.

-- ST 21.8, Core Spray (CS) Pump Capacity for IST. This test is performed after an outage or system maintenance to obtain new IST pump curves. The procedure takes pressure and flow readings at various points, including pump shut off head, 2/3 of rated, rated and runout flows. The data collection was observed to be well coordinated and properly completed. The inspector observed systems engineers lifting leads to bypass the opening function of the minimum flow recirculation valves to allow closure of the valve to get shutoff head information. The proper use of double and independent verifications was observed.

-- ST 21.5-2, Emergency Service Water (ESW) Flow Test Through ECCS Coolers. This ST was performed over two shifts by a team of five test engineers. Pre-planning discussions among the test engineers was observed and the responsibilities of the engineers involved were evident. A temporary change (TC) was required and was completed properly and in a timely fashion. While performing the test a RCIC room cooler ESW isolation valve did not open as required and a troubleshooting request was prepared. The troubleshooting was successful. The inspector witnessed portions of and discussed the test with the test engineers. The test engineers were knowledgeable of all areas questioned.

In addition, the team reviewed the following STs for acceptability with respect to Technical Specification (TS) and administrative procedures:

-- ST 4.13 A&B, Core Spray (CS) Vent Line. This ST verifies the operability of the CS line accumulator

limit switch. This switch provides a control room alarm if water drains from the system. A solenoid valve is also actuated which allows the condensate system to refill the pump discharge piping. The ST includes a section to be completed if the alarm does not function. The ST states how to vent and drain the accumulator but did not give any specific instructions for the performance of this operation. Failure to properly vent and fill the accumulator could lead to malfunctioning of the keep fill systems and damage to the CS piping during automatic initiation due to water hammer effects. The licensee committed to changing the procedure to incorporate these instructions. The team also noted that the alarms for low accumulator level are referred to by the licensee's former panel numbering method. The licensee presently is using an alpha-numeric row/column designation for annunciated alarms. Procedure changes are needed to ensure that the currently accepted identification systems for annunciators is reflected in ST and operating procedures. The licensee stated that this will be included in the ST rewrite project.

-- ST 6.6, Monthly CS Pump and Valve Operability. The team determined that the licensee had weak acceptance criteria for determining pump operability on a monthly basis. This conclusion was based on the fact that no performance data, such as discharge pressure, flow or motor current, were specifically taken on the pump to ensure that it would be able to perform its designed safety function. Data are needed so that they can be compared to a known acceptable range. Instead, the licensee monitored the position of the minimum flow recirculation valve as an indication of flow. The licensee indicated that they would change their monthly pump operability procedures to better define acceptance criteria that ensure the operability of the pumps.

-- ST 6.6F, Quarterly CS Pump Full Flow Test. The procedure development was discussed with the licensee's IST engineer and found to be satisfactory. TS require that each pump supply 3125 gpm at a vessel pressure of 105 psig. The licensee uses the full flow test line to increase pump flow to the maximum (greater than 3125 gpm), takes flow and pressure data, and plots the point on a pump curve included in the procedure. The pump curve was found to be generated by data collected from an IST ST run after pump or system work has been conducted.

-- ST 6.8 and 6.9, Monthly RHR Pump Operability Test. For the 2A RHR pump, data to verify operability were taken at the TS required flow rate of 10,900 gpm. There were no specific data for the other three RHR pumps, or the four Unit 3 RHR pumps. The licensee is evaluating this situation and will develop a resolution prior to startup.

-- ST 6.8F and 6.9F, Quarterly RHR Full Flow Test. In this instance the pumps are run with the test valve open and data are collected. The data are specific for 11,000 gpm. The differential pressure acceptance criteria are given in a bar chart format. The inspector asked why this presentation of acceptance criteria for RHR pumps was different than the curve format used in the core spray tests. It was explained that the core spray system test valve is a gate valve and the RHR system valve is a globe valve. Because of this the RHR valve can be throttled to achieve a given flow. The CS valve when throttled causes excessive vibrations and is therefore opened fully during full flow testing. The team had no further questions.

-- ST 4.10-4, Reactor Vessel Level Instrument Functional Check. This ST is performed as a functional check of the reactor vessel instruments, which cause a low level scram. The team reviewed the completed ST and questioned the acceptance criteria. In this test, water level is lowered 3 inches and data is taken on the level instruments. Level is then raised six inches and another set of data are taken. The TS requires that a corresponding level change be observed. The procedure is written to verify that the level indicator decreased on the lowering of level and increased on the raising of level. The low level instruments that are required to be checked do not feed an indicator in the control room. The TS bases for this check are to ensure that the instruments have not failed as is. The team found the ST acceptable to verify the TS requirements.

-- ST 13.9, Secondary Containment Capability Test. It was noted during the review that the procedure did not have clear acceptance criteria for air flow through the standby gas treatment system (10,500 CFM) as specified in TS. The team discussed this with the systems engineer and found that he had identified the same issue and had a procedure change ready for presentation to PORC.

-- Simulated Automatic Initiation Testing. The licensee uses overlap testing to meet the TS requirement to simulate an automatic primary containment isolation and ECCS initiation for which this type of testing specified. Testing for a satisfactory isolation/function from the actuation signal detector to completion of the isolation/ initiation is not completed in one test. Several overlapping tests are used to complete the total test. The licensee has established individual STs for each of these TS requirements. These STs listed the other ST which together meet the functional test requirements. The acceptance criteria for completion of these STs is not listed, and should be the satisfactory completion of each separate ST. The licensee indicated these procedures would be changed to include a complete list of all STs required and a sign off that each has been completed.

-- ECCS and DG surveillance testing required when components are declared inoperable. The inspector reviewed several STs dealing with the CS subsystem, LPCI pump and subsystem, and DG inoperability. The STs that meet the required testing are not specified in a form that is useable to operations shift management. Further, shift management does not have a clear method of documenting the testing that is necessary when a TS Limiting Condition for Operation (LCO) is entered or the time requirements for conducting the STs. The licensee is considering providing shift management with a list of surveillances that meet the required testing. In addition, operations is pursuing the development of an LCO required ST tracking system. The team found no instance where the licensee failed to meet a TS LCO requirement.

It was noted that the TS for ECCS and DGs are outdated in that they require testing of systems when one component/subsystem is declared inoperable. For example if one DG is inoperable, all low pressure ECCS pumps at both units are run to demonstrate operability as are the other three DGs. This type of testing is undesirable since it is excessive. The alternative is to verify that all components in other systems or subsystems are operable by reviewing the ST records. This was a previous NRC open item and the licensee has initiated actions to request a TS change.

3.6.1.5 Administrative Procedures

The administrative procedure for the generation of STs was reviewed. A weakness noted was in the area of development of acceptance criteria. There was no clear and concise method for determining what the criteria should be and then no method for having this determination reviewed for adequacy. The licensee is considering an upgrade to this procedure to give better instructions and specify a supervisory check of new criteria.

3.6.1.6 ST Program Adequacy and Root Cause Analysis

The team reviewed a contractor's report to the licensee and an internal licensee root cause analysis of ST problems. The licensee contracted Advanced Science and Technology Associates (ASTA) to perform a review of their ST program. ASTA provided a report on their review on September 21, 1988. The criteria used for the review included verification that the ST referenced the proper TS, and accomplished the intent of and had acceptance criteria to support the TS. The results indicated 54 STs did not meet the agreed upon criteria specified above. For 140 STs it was questionable if they met the criteria. The team reviewed the documentation provided to the licensee on these items. Generally the deficiencies were minor in scope and included incorrect TS references and typographical errors. Other deficiencies show that specific TS acceptance criteria were not noted in the body of the ST. These items are tracked by the licensee.

An additional 11 specific TS were found not to be covered in any ST. These include missed daily and shift checks, two monthly instrument checks and several other TS requirements. These were previously reported to the NRC.

ASTA made recommendations to correct these deficiencies. One specific recommendation was to better identify the complex relationship of overlapping STs which meet requirements such as logic system functional tests. This deficiency was also discovered during this inspection. The licensee is correcting these problems.

Based on the LERs and the ASTA findings, the licensee's ISEG performed a root cause analysis of the ST program. This analysis turned up two main root causes and one contributing factor. Controls on procedure generation are less than adequate, controls on procedure revisions are less than adequate, and review of the ST program is less than adequate.

The licensee bases these root causes on the following: 1) TS changes have been made without the corresponding ST being generated; 2) modifications have been made without regard to their effect on STs; and, 3) there has not been a review process to ensure adequacy of STs in compliance with TS.

The ISEG recommended the following: 1) ensure that each ST has a sponsor who is responsible for the technical adequacy of the procedure; 2) new TS shall be reviewed for ST conflicts; 3) a formalized TS/ST cross reference should be established; 4) the flags used on steps to identify TS (*) and IST (I) requirements may be confusing and need to be clarified; and, 5) a detailed review of STs and TS.

The inspector discussed the following methods to implement these recommendations with the licensee: 1) make the system engineers responsible for the STs on their systems; 2) incorporate a review of any needed TS changes into the process of submitting a TS amendment; 3) complete the current effort to compile a TS/ST cross reference; 4) review the method of incorporating acceptance criteria into STs; and, 5) complete a long term detailed review of STs for human factors concerns by 1991. The licensee will be formally presenting their corrective actions in a revision to LER 2-88-24.

The licensee completed walkdowns of 18 STs on October 14, 1988. Several procedural deficiencies were noted, which were minor in nature. One instance was that the flow from the diesel fire pump was not being measured during an ST which appears to be an acceptance criteria deficiency. These deficiencies were corrected.

3.6.1.7 Conclusions

The licensee's ST program adequately implements the TS. Adequate personnel with technical knowledge are available to support plant operations. The procedures are suitable to complete the TS requirements. The system engineers and operations department personnel must continue to question the acceptance criteria for STs to ensure that all TS requirements are met. The

licensee has agreed to increase the sensitivity to the acceptance criteria with these personnel. NRC unresolved items (277/88-34-04; 278/88-34-04, 277/88-35-01; 278/88-35-01, 277/88-28-02; 278/88-28-02) that are related to the ST program are closed.

3.6.2 Maintenance

3.6.2.1 Scope of Review

This portion of the inspection focused on the ability of the licensee to conduct safety related maintenance. In-process work was evaluated to make this determination. The qualification of maintenance personnel to perform assigned tasks was assessed. Administrative procedures, management policies and goals were reviewed to ensure that adequate controls are in place. Several recent equipment failures were reviewed to ensure that adequate root cause analysis was performed. The method of generating procedures and the qualifications of the writers were assessed. The planning and tracking method for and backlog of items was reviewed.

3.6.2.2 Organization and Staffing

Team discussions were held with various people in the maintenance organization. These people were informative and well versed in their duties, goals and reporting chain in the organization. Presently, the Maintenance Superintendent reports directly to the Plant Manager. The persons reporting to him are in the electrical/mechanical maintenance and I&C areas. The staffing levels appear to be adequate to achieve the goals of the department.

The licensee has removed two supervisory positions from the chain of command, between the Plant Manager and craft personnel. The positions eliminated are an assistant maintenance superintendent and an assistant craft foremen. The licensee stated that this allows for better definition of responsibility at all levels. The assistant foremen have been temporarily upgraded to foremen. This was done to increase the ratio of supervision to craft personnel. The development of a general mechanic training program is in the planning process. This would give all mechanics the basic knowledge in required trades, including electrical areas. The licensee will still maintain personnel qualified to perform specialized electrical tasks, welding and machining.

The planning and scheduling branch of the department has been recently created. These people schedule, track and prepare all the Maintenance Request Forms (MRF) needed on site. The MRF group consists of personnel on a one year rotational assignment from Quality Assurance and Health Physics so that planning for a job in these areas can be done simultaneously.

3.6.2.3 Goals and Policies

The department has numerous indicators that are used to track the performance of maintenance. These include the number of overdue preventive maintenance (PM) items, the percentage of corrective maintenance (CM) items that are older than three months, and the ratio of PM to total maintenance. The team observed that these indicators are provided to the maintenance superintendent, station management and corporate management. Other goals that are tracked include radiation exposure, personnel contamination and maintenance caused occurrences.

The licensee published their 1989 maintenance strategy in February 1989. The purpose of this document is to outline the goals and to improve the maintenance process in nine areas, most notably work process control and package production, and productivity measurements and work standards. The definition of what is to be accomplished for each of these items is clearly identified.

3.6.2.4 Interfaces

Various interfaces within the department and with other station and corporate offices were observed during the inspection. Actual MRFs were observed during processing, and the coordination with the operations and health physics departments was observed to be satisfactory. Adequate coordination of items that could potentially affect equipment was observed between maintenance and the technical department using the OEAP/CTP. It was observed that maintenance also provides input to the technical department on items that should be placed on NPRDS. QC involvement in procedure development and ongoing work items was observed. Commendable interdepartmental interfaces were observed in the areas of failure tracking and

analysis, preventive maintenance and planning sections. Involvement of corporate and station engineering with the MOVATS maintenance engineers was observed to be effective during actual testing. The team verified that Engineering Work Requests are being generated on site to ask for corporate engineering support.

An "all hands" meeting of the maintenance engineering staff was attended. A presentation was made covering the proper method of presenting material to PORC. The department goals and performance indicators were discussed. Items that would require support prior to taking the mode switch to startup were discussed, including the emergency cooling tower and loss of off site power test. Issues raised by the NRC electrical team inspection (277, 278/89-07) were also discussed.

3.6.2.5 Control of Work

Corrective MRFs are generated in one of two ways. A component failure is identified by operations or an Equipment Trouble Tag is initiated by anyone who sees a problem. The identification of potential work items by the operations staff is documented in the systems status turnover sheet. The shift manager is responsible for determining which items are of the most importance to plant operation and for placing these items on a "Hot List". This list is reviewed during the morning meeting in the control room, which is attended by most departments on site. Once it is decided that the work is in fact on the priority list, it is scheduled by maintenance personnel during their morning meeting. The licensee has instituted a new integrated tracking schedule (TRIPOD) which will take the inputs from each group, and through a meeting verify or change the priority of work items. Individual shop foremen get a daily working list and were observed to be using and following them in the field.

A weakness was identified in the maintenance team inspection report (NRC Inspection 277, 278/88-17) dealing with the identification of Technical Specification (TS) Limiting Condition for Operation (LCO) time restraints. The operations department is currently keeping an LCO log for each unit and common systems. Use of this list is outlined in the Operations Management Manual and was found to be adequate to document the entry into an LCO. The use of the "Hot List" combined with the morning and TRIPOD meetings was found to be adequate to identify and track work which could be related to an LCO.

The MRFs are generated by maintenance planning using the computerized history and maintenance planning system (CHAMPS) system. A MRF is divided into seven sections. Section 1 is the initiation portion, which discusses the component/system in question. Section 2 is the investigation section which lists specifics about the component/system as to the QA category, ASME class, electrical class, environmental qualification class and the need for a specific procedure. Section 3 lists the planned activities to correct a problem, which could include simple instructions to correct a leak, instructions to perform an attached, more complicated procedure called a work instruction, or instructions to perform a PORC reviewed and approved maintenance procedure. Section 4 lists the blocking permits used to isolate a component/system to allow work including a signature by shift management that the blocking permit has been set and that work can commence. Section 5 describes the defect, cause of failure, corrective actions taken and the work performed, including comments and signatures of craft and supervisory personnel verifying completion of work and inspection by QC. Section 6 provides the turnover after maintenance is complete including verification of required operation and acceptance by shift management. Section 7 documents staff review including any possible trending or updating that might be required.

The inspector attended several planning meetings dealing with outstanding work items and operational verifications. These meetings were specific to restart items for a specific system. The operations department was represented and gave input for prioritizing these items.

3.6.2.6 Post Maintenance Testing

Post maintenance testing is taken into account on the MRF which is generated by maintenance planning prior to the job. The testing that the planner considers adequate is documented in section 3. This section could contain cycling and/or performance of actuator testing or local leakrate testing on a valve. The team verified that if as-found local leakrate testing is required this is specified in section 3 as well.

When the MRF is returned to the control room after work is complete, shift management decides if additional testing is required to verify operability. If none is required, shift management signs the MRF completing acceptance of the component/system. If additional

testing is required, it is documented on an operational verification form (OVF). The OVF is performed if at all possible. If the OVF can not be completed at that time, it is sent along with the MRF to the group that is responsible for the testing. When the OVF is completed, shift management signs off the OVF and MRF, and both are forwarded for closure to maintenance planning.

3.6.2.7 Maintenance Backlog

The team reviewed the tracking systems used to monitor status of outstanding MRFs for corrective and preventive maintenance items. The licensee uses a quarterly rolling schedule to track corrective maintenance that is not required to support restart. The quarter is broken down into weekly increments and work is scheduled into these increments. Each week allows work to be completed on systems or subsystems so that the work will not affect other systems. The licensee uses a five day look ahead schedule to track the items that must be completed prior to restart. For Unit 2, there are approximately 400 MRFs that still require work and approximately 1000 outstanding OVFs.

Preventive maintenance items that are required to be completed during an upcoming quarter are provided to maintenance planning by maintenance engineering. These items are then scheduled into the rolling window schedule. At present there are no outstanding PMs to be completed prior to Unit 2 startup.

The maintenance team inspection raised questions about deferred CM and PM items. The CM currently listed to be completed prior to Unit 2 restart has been compiled by maintenance and operations. Operations decided what maintenance has to be completed prior to startup. PM that is deferred is reviewed by the maintenance engineer prior to deferral.

3.6.2.8 Work Reviewed

The team reviewed ongoing work items and associated MRF packages. A complete list is presented in Appendix C. In several cases the team monitored the performance in the plant. Work items with specific comments follow:

-- MRF 8811954, Replace spectrum breaker for unit 2 torus to drywell vacuum breaker air operated valve. The operations procedure which removes and reinstalls the breaker was specified and attached. Maintenance Procedure M-56.1 which performs maintenance on 480 V breakers was specified. The inspector reviewed this procedure and the attached breaker overload calibration sheets. No deficiencies were noted and the personnel involved were extremely helpful.

-- MRF 8863872, Watertight doors. A firewatch was posted on both sides of the watertight door as required. The lead man appeared to be knowledgeable of the work involved including all RWP requirements.

-- MRF 8461272, DC MCC Breaker Inspection. Procedure M-57.8 was being followed to perform the inspection. One step of the procedure directed the workers to examine relay 49, but no relay was so marked in the breaker. In reply, the supervisor produced a Cutler-Hammer drawing of the breaker which correctly identified this relay.

-- MRF 8901104, 8901244, Motor Operated Valve Analysis and Testing System (MOVATS) testing of Condensate Long Path Recirculation Valves MO-38A and 38B. An isolation signal received while in long path recirculation caused valves MO-38A and 38B to go shut (see section 3.1.8). Having a shorter stroke time, MO-38B shut first. MO-38A did not subsequently fully seat. An investigation by the licensee determined that after MO-38B shut, MO-38A was forced to shut against the full differential pressure of the 2C condensate pump and failed to shut. Due to a problem in long path recirculation procedure S.7.1.O, this event also caused the condensate pump flow to drop 1900 gpm, below its 3000 gpm min flow specification. The procedure has since been changed to require placing short path recirculation flow controller CV-2110 in automatic. The condensate pump was monitored for possible degradation and none was found.

The licensee remeasured the MO-38A and 38B thrust settings using MOVATS and a new system called Valve Operator Test and Evaluation System (VOTES). Where MOVATS uses spring pack deflection as an indication of valve thrust and is calibrated with a load cell while stroking the valve in the open direction, VOTES measures valve yoke tension by means of a directly attached strain guage which is calibrated by measuring valve stem compression during valve closure.

MO-38A and 38B are specified to be set at 21,000 pounds force (lbf) which is what MOVATS measurements yielded. VOTES data however, indicated the thrust as 13,000 lbf. A full differential pressure test was conducted on MO-38A with the torque setting adjusted to produce a thrust of 21,000 lbf as measured by VOTES. At this new setting, the valve seated correctly. The test was rerun on MO-38B (with 38A fully shut) with essentially identical results. Raising torque setting to yield the specified thrust as measured by VOTES again produced proper valve operation against full differential pressure.

The licensee then brought in MOVATS representatives and reperformed the tests. This time, the MOVATS sensors on the valves were first recalibrated. The calibration showed that the conversion factor between motor torque and valve thrust had changed significantly. This was apparently an unexpected effect. Test results using the new conversion factor yielded close correlation between MOVATS and VOTES data.

The licensee performed static (without flow/differential pressure) testing on motor operated valves after the extensive rebuilding effort. These results showed that on some valves the actual MOVATS results were better than the vendor data. Because of this the licensee reduced the torque setting on some valves to below the vendor required ranges. This was done to reduce the wear on the valves. The effects of lowering these settings on the valve operability under a differential pressure condition were not considered. Due to the failure described above the licensee is reviewing any valve whose torque switch setting is below the vendor data, and is performing flow/ differential pressure calculations to determine their

acceptability. The licensee suspects that torque switch settings will have to be changed on some valves. This item is unresolved pending licensee and NRC review prior to restart (277/89-81-03; 278/89-81-03). (see Section 2.4.8)

3.6.2.9 Maintenance Engineering

The team discussed several different topics with the maintenance engineer and other people in his organization. The maintenance engineer has been in his current position for approximately one month and is still getting familiar with the persons who work for him. Recently the component engineer position was created. These people will act as specialists for components on site. They are intended to reduce the use of corporate maintenance personnel, under normal conditions. If a need to have extensive specialist help arises, these engineers will coordinate this with corporate and vendor personnel.

The maintenance planners will specify if an engineer should be directly involved in a specific MRF by using a code. The MRFs that require engineer support are taken off the computer daily. Presently there are approximately twenty of these outstanding.

The failure tracking system was described to the team. These persons review each MRF and determine if a failure has occurred and if a failure analysis report (FAR) need be completed. This decision is reviewed by the supervisory engineer. The inspector reviewed two of these FARs:

-- FAR F88008M054, failure of GE magne blaste circuit breaker prop spring, completed on June 13, 1988.
-- FAR F88011M009, failure of standby gas treatment 24 inch butterfly valve.

In both cases the root cause analysis was proper and the recommendations provided to correct these problems were well defined and should correct the deficiencies.

This group also reviews old MRFs and NPRDS items to check for recurring problems or applicability to Peach Bottom. This is done by running a search on the MRF computer to see what type of maintenance has been performed on a specific component. If a recurring problem is noted the Maintenance Engineer is notified using a form which requires that a resolution be provided. Several of these forms were reviewed and the resolutions seemed to be technically adequate.

The method by which the preventive maintenance program was developed and implemented was discussed. The program appears to be adequate to schedule and track the required items. The Maintenance Engineer is presently trying to bring all preventive and diagnostic maintenance programs such as ISI, IST, vibration and oil analysis, and infrared inspection under his control. This would centralize the tracking and evaluation processes needed.

3.6.2.10 Conclusion

The licensee's staff can function to schedule, perform and control maintenance activities. The maintenance department appears to interface well with other organizations and understands their goals and performance indicators. The backlog of corrective and preventive maintenance items has been significantly reduced and the control now in place should not allow a large backlog in the future. The observations conducted for ongoing MRFs demonstrate that the maintenance crafts are well trained and understand their functions. Management commitment to the maintenance effort is evident.

3.7 Engineering/Technical Support

3.7.1 Scope of Review

The team assessed the effectiveness of engineering support activities regarding the ability to enable safe operation of the facility. The team placed primary emphasis on the evaluation of ongoing activities at the site concerning design, review, planning, installation, and testing of design modifications. The team selected a sample of the in progress and recently completed modifications, and reviewed the modification packages to assess the quality of the work and its review, walked down the installed hardware, and

interviewed the involved personnel. In addition to modifications, the team evaluated engineering support activities regarding the day-to-day design issues at the site, e.g., temporary modifications and setpoint change control. Finally, the team evaluated the working relationships between the various organizational elements involved in engineering support activities.

3.7.2 Site Organizational Approach to Engineering Support

3.7.2.1 Modification (Mod) Team

Since November 1988, Peach Bottom has applied a team approach to the modification process, which is described in plant administrative procedure, A-14, Plant Modifications. Each Mod Team is led by a site engineer, either a modification group engineer or a system engineer, and has representation from applicable site organizations, i.e., Operations, Maintenance, I&C, etc., and from the engineering organization, normally the Nuclear Engineering Department (NED). Each modification has a Mod Team, and the members of the team vary according to the nature of the modification. Although the responsible organizations retain their functional responsibilities, the Mod Team enables site perspectives on the design approach, operating methods, alarms, maintenance, and testing to be addressed throughout the modification process and enables the site to benefit from the design engineer's understanding of the design basis and design constraints.

The team attended Mod Team meetings, reviewed minutes of Mod Team meetings, and discussed the results of these meetings with Mod Team members. For example, when the team attended the third Mod Team meeting for Modification 5095, its purpose was to review and discuss information associated with the upgrade to the electrical power supply for the ECT level control system. Representatives from design, operations, construction, and systems engineering participated. The discussions appeared productive, with a wide range of expertise presented. The team discussed the modification with the systems engineer and observed that the systems engineer actively participated in the Mod Team Meeting. The team noted that the lack of a clearly defined interface between NED and Peach Bottom procedures caused confusion at times during the meeting. In addition, the discussions were abnormally involved in trying to fit modification activities into a tight schedule.

The team noted design changes resulting from the Mod Team approach, including revised alarm annunciators to resolve operator concerns, revised piping layouts to resolve maintenance accessibility concerns, and revised logic circuits to resolve testing concerns. Unfortunately, due to the recent adoption of the Mod Team approach, these design changes occurred during the installation phase and required rework, but such changes will likely be part of the initial design in subsequent modifications. The team concluded that the Mod Team approach and the synergy that results represented a strength that has resulted and should continue to result in better designed modifications, more able to support safe plant operation.

3.7.2.2 System Engineers

The system engineers play a pivotal role in modifications and the engineering support of plant activities. Regarding modifications, the system engineers have the primary responsibility for writing and performing the Modification Acceptance Tests (MATs), the testing done by the plant staff following completion of installation activities. In addition, the system engineers are involved in the initiation of modifications, the review of modification safety evaluations prior to PORC approval, and the Mod Team (frequently as the leader).

Regarding routine engineering support activities, each system engineer is responsible for several plant systems. For these systems the system engineer is the focus for operational, design, testing, and maintenance problems. The system engineer initiates modifications and writes Temporary Plant Alterations, setpoint changes, and special test procedures to resolve the problems. The system engineers review system performance trends and expected operating modes, review procedure changes, walk down the equipment, and perform some routine testing associated with their continuing overview of their assigned systems. Significant training resources have been allotted for extensive system engineer training, which will include system design and operation, simulator review, and engineering skills; completion will take six months.

The team reviewed MATs associated with the above modifications, Temporary Plant Alterations, and Setpoint Change Requests. The team had concerns in the MAT area, which are discussed below. Generally, the team concluded that some of the system engineers were enthusiastic and

generally knowledgeable about their system. The technical quality of their work was good, and there were numerous examples of positive impact that the system engineers had on the condition and capability of their systems. However, the team noted that the system engineers were somewhat inexperienced as more than half of the degreed engineers have less than two years experience. Also, within the Technical Department the three supervisors of system engineers each have at least ten system engineers to supervise, in addition to collateral duties such as maintaining a staff SRO license and being a PORC member. The team concluded that there were no imminent problems with this organizational structure and that plant management should continue to review the ability of the supervisors to oversee and train the system engineers.

Based on the team's review of MATs and the observation of an in progress MAT on Modification 2590 (revised Cardox controls for diesel generators), the team noted commendable test controls regarding the lifting of electrical leads and fuses and the installation of jumpers. Specifically, the system engineers consistently applied the concepts of double verification (DV), i.e., both test personnel jointly confirm the correctness of an action prior to its initiation, and independent verification (IV), i.e., two test personnel separately and independently confirm the proper equipment condition following an action. Also, the MATs had second signatures noted for DV and IV, and all questioned personnel understood the intended actions correctly and performed the actions accordingly.

3.7.2.3 Modification Group

The Modifications Group performs the field engineering, installation, and electrical testing of the modifications. Although the group is currently an organizational part of the Peach Bottom station, plans are underway to have the Modification Group become part of NED. The team reviewed the group's interaction with other parts of the station organization and concluded that this interaction was good. The team interviewed the section supervisors regarding their functions, walked down portions of completed modification work, reviewed modification packages, and attended group meetings. A problem with the safety related tubing installed during Modification 1316 is described below.

The team concluded that the emphasis placed on updating control room copies of piping and instrument drawings

(P&IDs) following completion of installation work but prior to testing represented a strength. Such expedited recognition of changes on control room drawing copies should better enable operators to respond to activities in the plant. Specifically, when field work is completed, the as-built configuration is shown on a P&ID revision marked as a red line drawing and placed in the control room drawing files within two days. Two drafting personnel are employed onsite to expedite this process, and verifications and checks are incorporated into the change process. The team noted the numerous red line drawings in the control room and the operators' reliance on them. The team confirmed that modifications walked down had been recorded in red line drawings.

The team attended two modification status meetings within the Modifications Group and found the meetings to be effective. During the meetings the applicable working groups were represented, the status information was current and well organized, and the interaction between groups was productive.

The team noted that document control of work packages, including inspection records, was thorough and provided for daily returns of work packages being utilized in the field, frequent audits by document control personnel, segmentation of the work packages into color coded parts, and review by quality control and installation personnel of the completed documentation prior to closeout of the work package. It appeared that some of these actions had been recent corrective actions to previous document control problems.

3.7.3 Modifications (MOD) Reviewed

The team reviewed the safety evaluations of all the following modifications and reviewed the field installations of these modifications, except modification 1505, which was inaccessible. A sample of the drawings and supporting documentation was reviewed.

MOD 865 Alternate Rod Insertion (ARI)
MOD 1316 Safety grade instrument gas supply for valve operation*
MOD 1497 New reactor vessel level instrumentation*
MOD 1505 Flow switch in the Standby Gas Treatment System (SGTS) fan discharge
MOD 1660 Safety grade nitrogen accumulators in drywell*
MOD 5095 Pump and transmitter vents, safety grade power supply, and level control system for Emergency Cooling Tower

Those modifications identified by an asterisk were covered by QA Audit PA 88-513, of modifications between November 1, 1988 and February 2, 1989. The audit had findings in eleven areas, and a Root Cause Task Force has been established to ensure a programmatic review of the finding resolutions. Each of the findings has been entered into the PECo Master Open Item List to ensure proper closeout prior to restart.

It should be noted that due to the extended duration of the modification process (design work on modification 865 began in 1984), the design and review processes used varied depending on the programs applicable at that time. Most installation and testing work occurred during the past two years.

3.7.3.1 The team identified problems regarding the tubing supports installed as part of modification 1316, which will provide a safety grade supply of instrument gas to 17 air operated is lation valves associated with purge and exhaust lines into the primary containment. When completed, the instrument gas will come from the bulk nitrogen facility outside the reactor building and be supplied via piping and tubing to the valves. This will permit removal of the bottled gas in safety grade moorings at each valve location. During the current outage on Unit 2, the v. connections and the bulk connection through the reactor building wall were completed.

Specifically, the team found that the tubing to the torus supply valve (AO-2521B) was installed in an inadequate support, such that its ability to withstand seismic forces was questionable. The tubing was installed inside new Unistrut, U-shaped metal pieces, that had been attached to a previous nonsafety grade Unistrut support fastened into an approximately 3 ft. by 6 ft. right angle attached to the floor and the wall. There appeared to be a lack of rigidity in the plane parallel to the wall. PECo agreed with the team's concern and initiated Non-Conformance Report (NCR) P89-115 to evaluate and correct the problem. Additional PECo and NRC review of the tubing installations identified additional problems, including missing tubing clamps, loose tubing clamps, and tubing bent onto sharp edges of Unistrut, which were added to the NCR.

The team reviewed specification M-2828, which addressed the tubing support installation, and found it lacking sufficient detail to adequately control the tubing installation. For example, M-2828 specified tubing clamp spacing but not torquing requirements, and M-2828 limited Unistrut spans to five feet but left the acceptability of a 4 ft. by 4 ft. right angle unclear.

PECo attempted to retrieve the quality control inspection records associated with the 17 valves, but could find records for only 13 valves, not including the torus supply valve. The retrieved records showed that inspections had been performed between April 1987 and November 1987, but the inspection records did not clearly address the specifications or acceptance standards used for inspection of the tubing supports.

The Manager, Nuclear Quality Assurance (NQA) stated that to resolve concerns with tubing supports, all Unit 2 tubing installed under modifications back to initial construction would be reinspected prior to Unit 2 restart to verify acceptable installation (see section 2.4.9). This item is unresolved pending completion of the licensee review (277/89-81-01; 278/89-81-01). The Manager, NQA stated that PECo had previously found problems with missing inspections and missing documentation, that PECo had initiated corrective actions, and that a major upgrading of quality control activities was in progress. Specifically, QA Audit PA-88-513 had a finding concerning the adequacy of quality control, which is listed on the Master Open Item List (MOIL) for closeout prior to restart. Along with the possible addition of tubing supports, the Manager, NQA noted that following significant auditing and reinspection efforts, only one area (flexible hoses in the drywell) was found in which programmatic shortcomings had permitted a safety significant problem to go undetected.

The Manager, NQA stated that based on the corrective actions to date the quality control inspections currently being performed have acceptable levels of quality assurance and that continuation of quality control activities was acceptable. The team noted the improvements in document control to ensure quality control inspections are performed and documented prior to turnover of the modification to the plant for testing.

3.7.3.2 The team concluded that the design basis was not being properly applied to all modifications and that this problem was evident at the site in the MATs. To some extent PECo had previously noted this weakness and taken corrective action. For example, in September 1988 NED administrative procedures were revised to require that modification output documents from NED, e.g., Engineering Work Letters (EWLs), include the expected acceptance testing and the acceptance criteria. The team noted examples of recent EWLs with testing acceptance criteria. Further, the Mod Team approach described above enables better interaction between NED and Peach Bottom regarding the acceptance testing and its acceptance criteria. Notwithstanding the above, the team noted continuing problems as evidenced by the following:

-- Modification 1505 revised the design of the Standby Gas Treatment System (SGTS) to provide a flow switch to start the backup fan if the discharge damper failed closed on the primary fan. The existing differential pressure sensor had been found unable to determine closure of the damper and could have resulted in the SGTS becoming inoperable. Prior to installation, the flow switch had been calibrated electrically in the I&C lab.

The MAT specified that the damper be slowly closed to verify that the backup fan started. The MAT specified that the fan discharge flow at which the flow switch initiated the backup fan be measured; however, it specified that this was "(for info only)". During the actual test the flow switch was unable to detect a fully closed damper, and the modification was determined to be unacceptable. A revision to the modification was in progress to start both fans during an automatic SGTS initiation.

When questioned about the flow measurement, the system engineer and his supervisor stated that the MAT was intended to confirm that the flow switch functioned properly in starting the backup fan and that the I&C calibration of the flow setpoint had properly determined the flow actuation setpoint. The team disagreed and stated that the flow measurement represented the primary acceptance criteria for the test. PECo noted that all MATs are summarized in a MAT Report and approved by PORC, and that the flow measurement actuation point would have been reviewed at this point had the flow switch actuated.

When questioned about the design basis for the flow switch actuation setpoint, the design engineer stated that there had been no specific basis for the setpoint and that the flow switch had been designed simply to detect a closed damper. The team disagreed with this approach and stated that there should have been a specific design basis for the flow switch such that operability of the SGTS would have been assured at flows as low as the backup fan initiation setpoint. The EWL on this modification had been issued prior to September 1988 and had not addressed the testing or acceptance criteria.

-- Modification 865 installed a means of alternate control rod insertion in accordance with 10 CFR 50.62 by means of solenoid operated valves in the scram air header to block the air supply and vent the air header to the control rod drive hydraulic control units. During the

MAT testing the system engineer noted that although the control rods inserted acceptably, the air operated vent and drain valves for the scram discharge volume (SDV) did not close as would have been expected when the scram air header was vented. The MAT did not specifically address the vent and drain valves, and there were no acceptance criteria for them. PECo review found that the solenoid valves had been installed downstream of the line to the SDV vent and drain valves, such that the air pressure to the vent and drain valves was maintained.

The NED design engineers stated that the regulation did not address the vent and drain valves, and the valves were overlooked during the design work for the modification. Although the modification had been initiated in 1984, the EWL had been revised recently and included proposed testing and acceptance criteria without mention of the SDV valves. This oversight had not been found by PORC during its approval of the safety evaluation and the MAT. The team concluded that discovery of the problem during the MAT but outside of the prescribed test represented good inquisitiveness and evaluation by the system engineer, but it also represented a design engineering error that was not found by the licensee during the review and approval process.

To ensure that other potential problems in modifications were adequately tested in the MATs during the Unit 2 shutdown, the system engineers reviewed the applicable modifications and evaluated each MAT to ensure that the testing approach had been correct and that the acceptance test would have properly detected any design errors. The evaluation found some instances where the test results should have been better documented and corrective actions were taken, but found no technical inadequacies. The team reviewed the evaluation on a modification by modification basis with system engineering supervision and concluded that the MATs represented an adequate level of assurance that the modifications were designed and installed acceptably.

The team concluded that PECo should continue its efforts to upgrade the assurance that the design basis of Peach Bottom is applied to the design, installation, and testing of modifications. The team noted that the PECo Configuration Control Management Program was underway and that PECo had made a presentation to the NRC regarding the program in November 1988.

3.7.3.3 The team concluded that the format of MATs did not clearly identify the acceptance criteria of the MAT. Plant administrative procedure A-89, Modification Acceptance Tests specified that acceptance criteria be included in each MAT, but the format for such acceptance criteria was not addressed. Accordingly, the acceptance criteria were not specifically identified as such and were included in the MAT along with the detailed steps of the test procedure. The reviewed MATs were frequently comprised of thirty to forty pages of testing steps. Accordingly, the team concluded that this lack of identification and emphasis on acceptance criteria could have enabled the acceptance criteria problems noted above to have been overlooked during the review process.

PECo agreed to revise the MAT format such that acceptance criteria are specifically identified in a separate section in each MAT. Procedure A-89 was being revised and the team reviewed a draft of the A-89 revision and concluded that the revision addressed the above issue.

3.7.4 Emergency Service Water (ESW) System

The ESW system provides a reliable supply of cooling water to selected safety equipment. The system is designed to meet Seismic Class I criteria and operate under flood conditions with a loss of offsite power. Two, one hundred percent capacity pumps provide cooling water to the diesel generators and to safeguard equipment room coolers upon loss of normal service water. Pump suction is normally from Conowingo Pond, with ESW discharge back to the pond. During flood or dam failure, the Emergency Cooling Water (ECW) system functions as the ultimate heat sink.

The ECW system, in conjunction with the high pressure service water (HPSW) and ESW pumps, provides an on-site heat sink so that the reactors can be safely shut down in the unlikely event that Conowingo Pond is unavailable. The ECW system is also designed to meet Seismic Class I criteria and operate with loss of offsite power.

The system has a three cell (50% capacity each) emergency cooling tower (ECT), a reservoir, an ECW pump, and two ESW booster pumps. Return water from HPSW is pumped directly to the emergency cooling tower, and water from ESW is directed to the tower via an ESW booster pump. The HPSW/ESW pump structure bay level is controlled by gravity drain from the reservoir. ESW pumps are backed up by the ECW pump.

However, to consider the ECW pump operable as an equivalent ESW pump, the Technical Specifications require at least one ESW booster pump and two emergency cooling tower fans to be operable.

The team compared a sample of components, equipment, and instrumentation and controls on COL 48.1.A ECW (Units 2 and 3) with the P&ID, M-330. Similarly, COL 33.1.A-3 ESW (Unit 2 and common) was compared with P&ID M-315. No discrepancies were found.

During a field walkdown, the ESW/ECW systems engineer discussed problems that had occurred with pipe movement and supports on the ECW system. This was reviewed in a previous NRC Inspection. Instrumentation has been installed to measure pipe movement during system operation. The pipe and supports appeared to be in good condition. The Systems Engineer indicated that he walked these systems down on a weekly basis. This was considered a good practice by the team.

The team noted that housekeeping appeared to be a priority item. No trash, fire hazards, or other materials were observed in the areas. Pumps and valves appeared to be maintained with no packing leakage observed. Labelling on pipes and other components was clear.

During the walkdown, the team noted the following ESW/ECW equipment to be either out of service or tagged:

-- Unit 3 Bay Level A, LI-3804A&B
-- Sluice gate MO-3233A
-- Sluice gate MO-2213
-- Sluice gate MO-3213
-- Discharge to cooling tower, MO-3803
-- Bay inlet MO-3804A & B
-- Unit 3 ESW isolation MO-3972
-- ECT fan out of service due to high vibration

As part of the walkdown, the team reviewed system operating (SO) procedures. The S procedures had been completely rewritten for both the ESW and the ECW systems. The new procedures had not been formally issued. A modification on Unit 3 impacted a check-off-list and the licensee is waiting until the check-off-list can be revised before issuing the new procedures. The team reviewed both the new (not issued) and current procedures and noted improvements in the new procedures. Procedures reviewed are listed in Appendix C. Several comments were provided to the procedure group based upon this review. No problems were identified.

The team compared Technical Specification surveillance requirements with the licensee's surveillance tests. It was noted that Technical Specifications may not adequately address the ECW system operability. This conclusion was based upon a recent test (SP-630) and studies performed by the licensee. The licensee is aware of this problem. A Technical Specification amendment request has been made which should provide for better surveillance testing.

Because of problems reported by the licensee, the team reviewed the operability status of the ESW and ECW systems. Emergency Cooling Tower fans B and C are out of service awaiting maintenance to correct a vibration problem. The A fan was recently repaired. Technical Specification 3.9.C(3) states that to consider the ECW pump operable as an equivalent ESW pump, at least one ESW booster pump and two ECT fans must be operable. Both the Technical Specifications and the FSAR indicate that two fans are required.

An engineering evaluation concluded that the ESW booster pumps will operate if only one ECT return valve MO-501 is open. With two valves open the pumps trip on low pressure. The FSAR and Technical Specifications indicate that two cells (fans) are available. The problem of the ESW booster pumps tripping on low pressure has been recognized for a long time by the licensee.

The licensee initiated modifications (MOD 5095) to the ECW system during the week of January 16, 1989. Vents will be installed to vent the ESW/HPSW pump structures and level instrumentation. These vents are required for proper ECW safety operation. A second modification involves replacing the non-seismically qualified power supply to the level control system with a seismically qualified power supply. The third modification, which can be completed after startup is to replace the level controllers.

Another modification (MOD 2106) was initiated on Unit 3 to replace the ESW system piping with a more corrosive resistant pipe material has been completed, except for testing. A similar modification for the ESW piping in the ECCS rooms (MOD 2371) on Unit 2 was completed during a past outage. The remainder of ESW large bore piping on Unit 2 is planned for replacement next outage. The ESW piping on Unit 2 is tested monthly to ensure flow to the coolers.

As part of the system status review the team examined a draft NED engineering analysis of the ECW system which formed the basis for a four hour ENS call to the NRC on February 2, 1989. The study concluded that the ECW system could not perform its design function. With respect to the ESW booster pump the study recommended ESW flow to the ECT through one cell rather than two, with HPSW flow through two cells. Procedure A-131 was used to document the possible inoperability of the ECW system as a reportable event on January 5, 1989. Based upon the licensee actions to correct the design and operability problems the team questioned the delays in making the four hour ENS call. Further evaluation of the timeliness of reporting will be made after the LER is received. The team also examined a draft ISEG report PB-88-10, Supplement 1, which arrived at the same conclusions as NED. The ISEG report noted several long standing problems with the ECW system including the ESW booster pump problem.

The team reviewed LER 3-88-11 dated December 21, 1988, which discussed a one inch diameter hole discovered in the HPSW pump bay structure. An error was noted by the team in the event analysis. The LER stated that when the water level reached about 109 feet (four feet below the hole) the pump bay would be isolated as described in Special Event Procedure SE-4 "Flood". The team noted that SE-4 calls for pump bay isolation at 116 feet which is three feet above the hole. The licensee initiated actions to correct the LER. A revised LER 3-88-11, revision 1, February 17, 1989, was reviewed by the team. Final actions taken to correct the licensee identified problems with the ECW system will be evaluated by the NRC when they are completed. A test to demonstrate system operability is to be completed before restart. The team believes the licensee is giving these problems priority attention at the present time and must continue in this effort. The ECT/ECW system's capability to function as designed is unresolved and must be demonstrated prior to restart. (277/89-81-04; 278/89-81-04). (see Section 2.4.10)

3.7.5 Conclusions

The team concluded that PECo engineering activities had acceptably supported the shutdown and are capable of supporting safe reactor operation. A problem regarding the seismic design adequacy of a tubing support will be resolved prior to restart by PECo reinspection of all Unit 2 tubing supports installed

under modifications and by subsequent repairs. In addition, the licensee committed to show that their root cause analysis work on the modification audit adequately encompasses this problem. PECo resolved a team concern on modification acceptance testing by reviewing the planned and completed testing to verify that the testing was adequate. The team concluded that the recently instituted Mod Team approach was a strength that had resulted in and should continue to result in better designed modifications. The establishment of system engineers within the plant's Technical Department has provided a coordinated, focused method for overseeing the engineering support activities by system, and the system engineers have already had positive impacts on their systems. Overall, the team concluded that engineering activities have been acceptable and that improvements in progress within the engineering programs should enhance PECo's ability to support safe reactor operation.

3.8 Security/Safeguards

3.8.1 Scope of Review

Security/safeguards was assessed: 1) by observing security force personnel during team member ingress to the protected area; 2) during plant tours; and 3) while observing operations, maintenance, I&C, and health physics activities. The third area was used to determine the effectiveness of interaction between security and other on site organizations. A programmatic inspection of security was not performed because an in-depth security team inspection was conducted from January 23-27, 1989 (see NRC Inspection 50-277/89-80; 50-278/89-80).

3.8.2 Protected Area Search Observations

During team member entries into the protected area, the quality of searches performed on personnel and hand carried items was assessed. One morning during the inspection, a long line into the protected areas was encountered. Several inoperable explosive detectors caused the delay. The Nuclear Security Specialist (NSS) explained that surveillance tests (STs) on security equipment is now being performed around the clock due to the recent addition of nine additional ST qualified personnel. The ST for the explosive detector was performed at about 4:00 a.m., and several explosive detectors were declared inoperable. Since there were only several I&C personnel on site at that time who were performing more critical work, the explosive detectors could not be repaired before the 7:00 a.m. rush. To prevent a recurrence of this problem, the ST is now being performed on day shift, as opposed to night shift.

During entry into the protected area, an individual alarmed the explosive detector. A search of the individual and his hand carried items was performed in accordance with security procedures. However, the search did not include a physical search of the individual's briefcase other than by X-ray. This weakness was pointed out to the NSS and he agreed. The post orders were changed to add that a hands-on search, in addition to an X-ray search, will be conducted on all hand carried items if an explosive alarm is generated. The governing security procedure will be changed when the procedure is restructured.

During a pat-down search of a team member, the guard stated that he was aware of the new NRC rule that prohibits licensee personnel from providing advance warning of an NRC inspector's presence on site. The guard force has apparently been briefed on this rule. In addition, the NRC rule will become a nuclear plant rule.

Overall, personnel and hand-carried items were well searched in a professional manner. Guard force personnel were knowledgeable. In most cases, security search equipment and security force manpower were adequate to preclude substantive delays. The only negative observation was a weakness to physically search a hand carried item after alarming an explosive detector.

3.8.3 Plant Tour Observations

During plant tours by various team members, several observations were noted. The first day of the inspection an individual that previously had vital area access was denied entry into a vital area. In January 1989, any person that had access to certain vital areas was denied access to those areas. This action was in response to a Plant Manager concern that too many people had access to these vital areas when they did not need to enter. All personnel who believed they required entry to these vital areas submitted a written request that was reviewed and approved if necessary. Since the individual was not on site in January 1989, he was not aware of the change. However, after a call to security was made, he was quickly re-granted access to these vital areas.

On two separate occasions early in the inspection, the security computer was out of service, causing access to vital areas to be impeded. The NSS explained that the computer outages were planned. In response to an NRC Information Notice, the

power supply switch to the security computer was being relocated into a vital area. In order to complete the modification, power had to be shut off several times. The licensee provided coverage at various areas in accordance with their security procedures. The modification was completed and no further computer problems were noted.

During a tour of the reactor building, a team member noted an alternate path into a vital area (VA) that may not have been monitored by security. An individual potentially could pass through two doors and gain access to the VA without checking in with, or being noticed by the posted security guard. The NSS agreed with the observation. To correct the situation, the post orders were changed to have the guard monitor the alternate access point. In addition, the inner door is now normally kept locked and posted with a sign to notify security prior to unlocking.

Through discussions with guards posted in the power block, team members agreed that guards were enthusiastic and diligent about their jobs. The guards were aware of conditions in their posted areas and were familiar with their post orders.

Overall, guard force attitude has shown improvement during the past year. Guards are knowledgeable and familiar with their post orders. One minor weakness was observed concerning a possible unmonitored alternate path into the drywell.

3.8.4 Security Interface

During observation of health physics practices, a team member noted an interface problem between security and health physics. See section 3.5.2 for a description of the problem.

More effective communication between HP, radwaste and security could have prevented guard force members from making numerous (seven) unnecessary entries into a contaminated and airborne area. The door was alarming spuriously, and therefore, security guards needed to enter the room to conduct a search. The numerous alarms were caused by door hardware problems, holding the door open, proximity of the step-off pad to the door and a problem with the area multiplexer circuit. This door problem was identified in early February 1989 by security, but they failed to recognize the problem involved in getting a guard into the room. In addition, HP or the guards could have elevated the problem to management so a better way of responding to the door could have been implemented.

The inspector attended a security, HP, and operations interface meeting at which the above topic was discussed. Until the multiplexer circuit is fixed, short term corrective actions discussed at the meeting were: 1) I&C performed maintenance on the door; 2) the step-off pad was relocated; and, 3) a letter was issued to all site personnel reminding them of security door practices. The interface meeting also discussed other important topics and was attended by the Shift Manager, Assistant Superintendent of Operations, NSS, Shift Security Assistant, Security Contractor Regional VP, and an HP first line supervisor. The inspector noted that higher level HP management was not present. The NSS stated that higher level HP management has committed to attend future meetings. However, the meeting was effective and useful.

Overall, interface between security and other on site groups was good, except for one observation concerning a door. The interface meeting was effective, but higher level HP management needs to attend.

3.8.5 Conclusions

Although the scope of the inspection in this area was limited to observations during facility tours and security interfaces with other groups in the organization, the team concluded that the security group has been effectively integrated into the shift organization. The new Nuclear Security Specialist is providing aggressive leadership for the group and he is actively involved in site interface meetings. Guards were enthusiastic and knowledgeable particularly with respect to new NRC access notification requirements. Identified problems with access search requirements and health physics department interfaces were thoroughly investigated and corrected.

4.0 UNRESOLVED ITEMS

Unresolved items are discussed in sections 3.5.2, 3.6.2.8, 3.7.3.1 and 3.7.4 of this report.

5.0 MANAGEMENT MEETINGS

The entrance interview was conducted on February 3, 1989. Attendees are listed in Appendix A.

The team leader held meetings with senior facility management daily during the inspection to discuss the inspection scope and preliminary findings. Licensee managers contacted during the course of the inspection are listed in Appendices A, B, and D. Many other persons at all levels of the organization were also contacted or interviewed. Those persons subject to formal team interviews by protocols are listed in Appendix B.

The scope and findings of this inspection were discussed with licensee representatives during the exit interview at the conclusion of the inspection on February 17, 1989. Exit interview attendees are listed in Appendix D. No written inspection material was provided to the licensee during the inspection. The licensee indicated that no proprietary material was presented for review during this inspection.

APPENDIX A

Entrance Interview Attendees

February 3, 1989

Name	Title
NRC	
J. Linville	Projects Section Chief, Team Leader
D. Florek	Senior Operations Engineer
T. Weadock	Radiation Specialist
I. Schoenfeld	Human Factors Analyst, NRC Research
T. Kenny	Senior Resident Inspector, Limerick Generating Station
D. Caphton	Senior Technical Reviewer, Division of Reactor Safety
G. Meyer	Senior Resident Inspector, Hope Creek
W. Schmidt	Senior Resident Inspector, FitzPatrick
R. Martin	Project Manager, NRR
T. Johnson	Senior Resident Inspector, PBAPS
W. Kane	Director, Division of Reactor Projects
J. Williams	Project Engineer
J. Gadzala	Reactor Engineer
R. Urban	Resident Inspector, Peach Bottom
L. Myers	Resident Inspector, Peach Bottom
PECo	
J. Austin	Modifications Superintendent, PBAPS
D. Meyers	Support Manager, PBAPS
G. Daebeler	Technical Superintendent, PBAPS
J. Franz	Plant Manager, Peach Bottom
F. Polaski	Assistant Superintendent, Operations, PBAPS
D. Smith	Vice President, PBAPS
C. McNeill	Executive Vice President
G. Rainey	Superintendent Maintenance I&C, PBAPS
D. LeQuia	Superintendent Plant Services, PBAPS
A. Wyatt	Security, PBAPS
G. Bird	Nuclear Security Specialist, PBAPS
C. Anderson	Staff Engineer, PBAPS
P. Wright	Technical Group, PBAPS
T. Cribbe	Regulatory Engineer, PBAPS
D. Foss	Licensing Supervisor, PBAPS
M. Ryan	Senior Engineer Technical Support, PBAPS
D. Wheeler	Results Engineer, PBAPS
T. Mitchell	Engineer, Operations Support, PBAPS

D. McRoberts	Shift Supervisor, PBAPS
R. Sheetz	Shift Supervisor, PBAPS
T. Niessen	Shift Manager, PBAPS
B. Clark	Superintendent Administration, PBAPS
J. Rogenmussen	Maintenance, Special Projects, PBAPS
S. Grosh	Personnel Administrator, PBAPS
E. Till	Training Superintendent, PBAPS
W. Thomas	Organization Development, PBAPS
R. Krieger	Fire Protection, PBAPS
J. McGrath	Nuclear Information Management Project
S. Lamb	Organization Development Staff (MAC), PBAPS
K. Cook	Director, Management & Professional Development, PECo
J. Forish	Manager, Human Resources & Organization Development, PBAPS
G. Lengyel	Maintenance Engineering, PBAPS
D. McGarrigan	Superintendent QC, PBAPS
H. Lamb	Organization Development
H. Watson	Chemistry, PBAPS
A. Diederich	Nuclear Engineering, PBAPS
E. Fogarty	Manager Nuclear Support, PBAPS
G. Phail	Restart Support, PBAPS
M. Miller	Restart Support, PBAPS
J. Basilio	PBAPS Licensing - PECo Team Leader
R. Kankus	VP Staff Engineer, PBAPS
R. Cochran	Configuration Management
G. Burdsall	Configuration Management
J. Kernaghan	Maintenance Engineering/PM's
V. Nilekan	Maintenance Staff Support
J. McElwain	Maintenance/I&C, PBAPS
J. Davenport	Maintenance/I&C, PBAPS
J. Hesler	Radwaste Supervisor, PBAPS
M. Hammond	Senior Engineer/Maintenance, PBAPS
D. Potocik	Senior Health Physicist, PBAPS
B. Lees	Manager Electrical Engineering

Others

S. Maingi	Nuclear Engineer, State of Pennsylvania
R. Reichuel	Engineer, Delmarva Power
M. Phillips	Senior Engineer, Public Service Electric and Gas
H. Abendroth	Senior Engineer, Atlantic Electric
T. Magette	Manager, Nuclear Programs, State of Maryland

APPENDIX B

Persons Interviewed

Corporate and Site Management

C. McNeil
D. Smith
J. Franz
J. Cotton
F. Polaski

Organizational Development

S. Lamb
W. Thomas
J. Fontaine
K. Cook
J. Forish
B. Bilanich

Shift Managers

G. Gellrich
T. Niessen
S. Mannix
T. Wasong
J. Clupp
D. Warfel

Shift Supervisors

A. Clark
B. Stambaugh
D. Woodrow
D. MacRoberts

Reactor Operators

J. Deni
B. Saxman
M. Sheridan
R. Maldonado
J. Ballantyne
D. Mayberry
L. MacEntee
G. Angle
W. Eagles
T. Winters
S. Hart
D. Hommel

Non-Licensed Operators

S. Cohn
D. Howard
M. Erdman

Others

E. Martin (QA)
K. Cepull (Maint)
T. Kirkpatrick (HP)
A. Donell (QA)
H. Hoffman (Maint)

APPENDIX C

Activities Observed/Documents Reviewed

Surveillance Test Observations

- ST 8.1, Diesel Generator (DG) Full Load Test for the E-2 DG
- ST 8.2-2A, Station Battery Weekly Inspection
- SI 2D-14-43-A1CQ, Core Spray Sparger D/P Calibration Check
- TL-11-00701T, Calibration of Barton Indicating Switches
- SI 2P-2-55-B1CO, Reactor Loop Calibration Check
- ST 7.1.1-2, SLC Solution Analysis
- ST 6.18-2, Operational Test of AO-2502B
- ST 21.8, Core Spray Pump Capacity Test
- ST 21.5-2, ESW Flow Test Through ECCS Coolers for ISI
- ST 4.11-3, LPCI Line Vent Accumulator Level Switch Functional
- ST 8.7, Emergency Transformer Daily Surveillance, Rev. 3
- ST 13.21, Emergency Cooling Water Pump, Emergency Cooling Tower Fans, ESW Booster Pump Operability, Rev. 12
- ST 13.23, ECW Pump, MO Valve Functional (ISI), Rev. 7
- ST 13.24 ISI ESW Check Valve Functional 33-2-513, 514, 516, Rev. 4
- ST 13.25-3, ISI Exercise of ESW Air Operated Valves - Unit 3, Rev. 6
- ST 7.5.2.G, Emergency Service Water Monitor Quarterly Testing, Rev. 4
- ST 7.5.2.H, Emergency Service Water Monitor Calibration, Rev. 4
- ST 13.16.2, Functional Test of HPSW Pump Bay Level Controllers LC-2804 A&B, Rev. 0, dated 10/17/88
- ST 13.16-3, Functional Test of HPSW Pump Bay Level Controllers LC-3804 A&B, Rev. 0, dated 10/17/88
- ST 21.5-2, ESW Flow Test Through ECCS Room Coolers, RHR Seal Coolers, and Core Spray Motor Oil Coolers - Unit 2, Rev. 1

Maintenance Observations

- M-56.1 and MRF 8811954, Spectrum Breakers
- MRF 8811927, Pump Discharge Valve
- MRF 8812082, Unit 2A CS Check Valve
- MRF 8812717, Unit 2 A RHR Testable Check Valve Solenoid Valve Air Supply
- MRF 8863872, Watertight Doors
- MRF 841271, DC Breaker Inspection
- MRF 8901104, MOVATS MO-38A
- MRF 8901244, MOVATS MO-38B

Operations Procedures and Activities Observed/Reviewed

- Operations Management Manual
- Operations Manual
- Three months of Incident and Upset Reports
- Six months of Management By Walking Around (MBWA) Reports
- Various Logs and Shift Turnover Sheets
- Administrative Procedures

- Technical Specifications (Units 2 and 3)
- S.6.3.2.A, Normal Seal Steam Startup on Unit 2 on 2/5/89
- S.6.3.2.A, COL, Steam Sealing System on Unit 2 on 2/5/89
- S.11.2.C, Mechanical Vacuum Pump and Steam Packing Exhaust Startup on Unit on 2/5/89
- S.7.6.L, Reactor Feed Pump Turbine Overspeed Test on Unit 2B on 2/5/89
- S.6.3.3.B, Makeup to Reactor Feed Pump Turbine Lube Oil Reservoirs, on Unit 2 on 2/5/89
- PO and AO Walkaround on 2/6/89 and 2/7/89
- Shift Manager, RO, SRO and CO Turnovers on 2/5/89
- Overtime Records
- APO Walkdown of New SO COLs for RCIC System on 2/9/89
- SO 11.7.A-2, Standby Liquid Control System Chemical Addition on 2/13/89
- SO 52.A-1.A, DG Manual Startup from the Control Room for E-4 DG on 2/10/89
- SO 52.B.2.A, DG Shutdown for E-2 DG on 2/10/89
- Plant Operator Round Sheets - Cooling Tower, for 2/2/89
- S.9.4.2.A Startup of the Emergency Service Water System, Rev. 3
- COL S.9.4.2.A.3, Rev. 2, Normal Operation of Emergency Service Water System
- S.9.4.2.B Shutdown of the Emergency Service Water System, Rev. 2
- S.9.4.2.C Set-Up for Auto-Start ESW System, Rev. 1
- S.9.4.2.D High Radiation In ESW Effluent, Rev. 1
- S.9.4.2.E, Operation of the ESW Chemical Treatment System, Rev. 1
- S.9.10.A, Set-Up for Normal Standby Operation of the Emergency Cooling System, Rev. 1
- S.9.10.B, Startup of the ECW System, Rev. 7
- S.9.10.C, Shutdown of the ECW System, Rev. 5
- S.9.10.D, Make Up to the ECW System Reservoir, Rev. 2
- S.9.10.E, Routine Inspection of the ECW System While in the Standby Condition, Rev. 2
- S.9.10.F, Routine Inspection of the ECW System While the System is in Operation, Rev. 2
- S.9.10.G, Decreasing Water Level in the ECT Reservoir, Rev. 2
- S.9.10.H, Using ECW Pump as an Alternate ESW Pump, Rev. 0, dated 7/15/88
- SO 33.1.A, ESW Set Up for Automatic Operation, Rev. 0
- COL 33.1.A-2 ESW Normal Operation
- SO 33.2.A ESW System Shutdown
- SO 33.7.A-2 ESW System Effluent High Radiation (Unit 2), Rev. 0
- SO 33.7.A-3 ESW System Effluent High Radiation (Unit 3), Rev. 0
- SO 33.7.B-2, ESW System Backup to RBCCW Heat Exchangers (U/2), Rev. 0
- SO 33.7.B-3, ESW System Backup to RBCCW Heat Exchangers (U/3), Rev. 0
- SO 33.8.A, ESW System Routine Inspection, Rev. 0
- SO 33.8.B, ESW System Routine Inspection, Rev. 0
- AO 33.1, A ESW Pump Remote Operation from Alternate Control, Rev. 0
- AO 33.2, Startup and Normal Operation of the ESW System, Rev. 0
- SO 48.1.A ECW System Alignment for Normal Standby Operation, Rev. 0
- SO 48.1.B ECW System Startup, Rev. 0

- SO 48.2.A, ECW System Shutdown, Rev. 0
- SO 48.7.A, ECW System Makeup to Tower Using a HPSW Pump, Rev. 0
- SO 48.7.B, Decreasing the Water Level in the ECT Reservoir, Rev. 0
- SO 48.8.A, ECW System Routine Inspection During Standby, Rev. 0
- SO 48.8.B, ECW System Routine Inspection During Operation, Rev. 0
- AO 48.1, ECW System Makeup to Tower Using the ESW System, Rev. 0
- AO 48.2, Using the ECW Pump As An ESW Pump, Rev. 0
- SE-3, Loss of Conowingo Pond, Rev. 4
- SE-4, Flood, Rev. 8
- Deep Backshift Inspection:
  - Sunday, 2/5/89 - 2:00 p.m. to Midnite
  - Monday, 2/6/89 - Midnite to 5:00 a.m.
  - Tuesday, 2/7/89 - Midnite to 5:00 a.m.
  - Wednesday, 2/8/89 - Midnite to 5:00 a.m.
  - Sunday, 2/12/89 - 10:00 a.m. to 6:00 p.m.
- GP-2, Normal Plant Startup Rev. 49, PORC 2/2/89
- GP-3, Normal Plant Shutdown Rev. 40, PORC on 2/2/89
- GP-9-2, Fast Reactor Power Reduction Rev. 4, PORC 2/2/89
- GP-9-3, Fast Reactor Power Reduction Rev. 4, PORC 2/2/89
- ST-3.10.B, Core Stability Monitoring, Rev 0, PORC 2/2/89
- OT-112, Recirculation Pump Trip, Rev. 5, 1/27/89

Meetings Attended

- Incident Critique on Unit 2 Seal Steam System Problems on 2/6/89
- Shift Turnover Meetings on all shifts and on various days
- Incident Critique on MO-38A Problems on 2/9/89
- Daily Plant Status Meetings in the Control Room on various days
- Unit 2 Outage Meeting on various days
- PORC Meetings on 2/7 and 14/89
- Station Review Meeting on 2/13/89
- Master Open Items List Meeting 2/8/89
- Vice President Staff Meeting on 2/8/89
- Shift Crew Team Meeting on 2/8/89
- NQA Staff Meeting on 2/9/89
- Maintenance Staff Meetings on various days
- Station ALARA Council Meeting 2/8/89
- Radiation Protection Staff Meetings on various days

MOD Packages/Engineering Documents/Drawings

- MOD 865 - ARI
- MOD 1316 - Safety Grade Instrument Gas Supply
- MOD 1457 - Reactor Water Level Instrumentation
- MOD 1505 - SGTS Flow Switch
- MOD 1660 - MSIV/SRV Nitrogen Accumulators
- MOD 5095 - Package, Safety Evaluation and Design Input Document
- Draft Engineering Report, Integrated Cooling Water Test Special Procedure - 630 Event Analysis and Operability Determination Peach Bottom Atomic Power Station, dated February 10, 1989
- A-131, Reportability Evaluation Form, dated 1/5/89, associated with inoperable pump bay level control system

- ISEG Report, PB-88-10, Supp. 1, Review of PBAPS Integrated Test of the Emergency Cooling System, dated 2/3/89
- Engineering Report, PBAPS Independent Assessment of ESW Pump and Service Water Structure Wetwell Concerns Identified While Performing SP-630, dated 1/9/89
- Licensee Event Report, 3-88-11, dated 12/21/88, A Hole of Unknown Origin in the HPSW Pump Room Floor Resulted In the Plant Being Outside of its Flood Protection Design Basis
- FSAR Section 10.9, Emergency Service Water System
- FSAR Questions and Answers: 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, and 2.10
- Technical Specification Amendment Application dated 1/4/88 for the ESW and ECW Systems
- Technical Specification 3.9.C/4.9.C, 3.11.B/4.11.B and 3.12/4.12 with Bases
- P&ID M-330, Emergency Cooling System
- P&ID M-315, Sheets 1-4, Emergency Service Water and High Pressure Service Water Systems
- P&ID M-3801, C. W. Pump Structure Vents
- P&ID M-541, Plumbing & Drainage Circ Water Pump Structure Plan and Details
- NRB Meeting #236 - Minutes and Notes on SP-630 Test
- Safety Evaluation for Special Procedure, SP-630, Rev. 0, dated 12/7/88
- SP 630, Integrated Test of the Emergency Cooling Water System, Rev. 1

Nuclear Quality Assurance

- Nuclear Quality Assurance Charters, Accountabilities, Functional Organizational Charts (Note: Manual contains individual charters with various dates)
- Nuclear Quality Assurance Procedures (Manual index is dated 12/16/88)

Corporate Oversight

- Minutes of NRB meetings held on 3/3, 5/5, 7/14, 9/1, 11/3 and 9, 1988 and 1/5/89
- Summaries of NRB meetings to the EVP-N for the 7/14, 9/1, 11/3, 1988 and 1/5/89 meetings
- NRB Charter and Procedures, Rev. II
- NQA Audit Report AP 88 - 29 PR on PORC
- PAD Report PAP 88-02 on PORC
- Mission Statement of NCB, through 11/28/88
- Minutes of NCB meetings held on 4/7, 8, 11, 5/3, 20, 6/14, 7/14, 15, 19, 8/26, 9/20, 10,12, 24
- OEAP/CTP Bi-weekly status report, 2/2/89
- CTP monthly status report, 1/31/89
- NGAP - 002.X on CTP
- AG-18 on CTP
- OEAP/CTP report of 12/30/88
- PAD recommendation on QUATTS/CTP, 1/18/89
- NGAP NGS-0XX.Y on OEAP
  AG-35 on OEAP

- Quarterly Management Report - Performance Indicator Summary for fourth quarter 1988
- Station Review Meeting handouts from 2/13/89

APPENDIX D

Exit Interview Attendees

February 17, 1989

Name	Title
NRC	
G. Meyer	Senior Resident Inspector, Hope Creek
D. Caphton	Senior Technical Reviewer, DRS
R. Martin	Project Manager, NRR
T. Johnson	SRI, PBAPS
B. Boger	Assistant Director, NRR
W. Kane	Director, Division of Reactor Projects (DRP)
J. Linville	Section Chief, DRP
E. Wenzinger, Sr.	Branch Chief, DRP
T. Kenny	Senior Resident Inspector, Limerick Generating Station
H. Williams	Project Engineer, DRP
D. Florek	Senior Operations Engineer
A. Weadock	Radiation Specialist
I. Schoenfeld	Human Factors Analyst
W. Schmidt	SRI, FitzPatrick
R. Urban	Resident Inspector, PBAPS
L. Myers	Resident Inspector, PBAPS
J. Gadzala	Reactor Engineer, DRP
PECo	
D. LeQuia	Superintendent, Plant Services, PBAPS
G. Rainey	Superintendent, Maintenance, PBAPS
D. Meyers	Support Manager, PBAPS
K. Powers	Project Manager, PBAPS
D. Smith	Vice President, PBAPS
C. McNeil	Executive Vice President-Nuclear
J. Franz	Plant Manager, PBAPS
J. Cotton	Superintendent, Operations, PBAPS
G. Daebeler	Superintendent, Technical, PBAPS
D. Helwig	General Manager, NQA
G. Hunger, Jr.	Director, Licensing
J. Basilio	Licensing, PBAPS
J. Cockroft	Superintendent, Quality Assurance, PBAPS
J. Austin	Superintendent, Modifications, PBAPS
G. Bird	Nuclear Security Specialist, PBAPS

PECo (continued)

T. Cribbe	Regulatory Engineer, PBAPS
T. Niessen, Jr.	Shift Manager, PBAPS
J. Clupp, Jr.	Shift Manager, PBAPS
J. Diederich	Manager, Peach Bottom Projects, Nuclear Engineering
N. McDermott	Manager, Public Information
R. Kankus	Staff Engineer, PBAPS
K. Cook	Director, Management Professional Development

Others

S. Maingi	Nuclear Engineer, Pennsylvania
T. Magette	Maryland Department of Natural Resources
R. Reichel	Delmarva Power
B. Gorman	Public Service Electric and Gas
H. Abendroth	Atlantic Electric

APPENDIX E

IATI Team Composition

Senior Manager:	W. Kane, Director, Division of Reactor Projects
Team Leader:	J. Linville, Chief, Reactor Projects Section 2A
Assistant Team Leader:	T. Johnson, Peach Bottom Senior Resident Inspector
Specialist Inspectors:	
Site Management:	T. Kenny, Limerick Senior Resident Inspector
Licensed Operator Resources:	D. Florek, Senior Operations Engineer
Station Culture:	I. Schoenfeld, Human Factors Analyst
	D. Morriseau, Human Factors Analyst
Corporate Oversight	R. Martin, Peach Bottom Project Manager
Nuclear QA:	D. Caphton, Senior Technical Reviewer
Radiological Control:	A. Weadock, Radiation Specialist
	L. Myers, Resident Inspector, Peach Bottom
Maintenance/ Surveillance:	W. Schmidt, Fitzpatrick Senior Resident Inspector
	J. Gadzala, Reactor Engineer
Engineering/Technical Support:	G. Meyer, Hope Creek Senior Resident Inspector
	H. Williams, Project Engineer
Security:	R. Urban, Resident Inspector, Peach Bottom
Administrative Assistant:	B. Miller, Peach Bottom Clerical Aide