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REGION I

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Licensee: Philadelphia Electric Company
Peach Bottom Atomic Power Station
P. O. Box 195
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Facility: Peach Bottom Atomic Power Station Units 2 and 3

Dates: September 17 - October 3, 1990

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Areas Inspected: The inspection assessed the adequacy of licensee corrective actions implemented or initiated in response to NRC Safety System Function Inspection (SSFI) 90-200. In addition to evaluation of licensee response to the specific SSFI findings, the team evaluated the effectiveness of several licensee programs.

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During early 1990 the NRC conducted a SSFI at the Peach Bottom facility to evaluate the operational readiness of the emergency service water (ESW) and high pressure coolant injection (HPCI) systems. The SSFI identified significant weaknesses with the licensee's approach to analysis, maintenance and testing of the ESW system. The cumulative effect of these weaknesses caused the NRC to question the system's ability to perform its function. Subsequent testing by the licensee confirmed that, for Unit 2, the system could not provide adequate cooling water flow in all cases. Two issues identified by the team were later treated as a Severity Level III violation.

The objective of this team was to assess the adequacy of the licensee's response to the findings of the SSFI team, and to evaluate the extent to which the findings were indicative of programmatic weaknesses. The team found that in general the licensee had identified and implemented effective corrective actions in response to the SSFI. Issues had been clearly identified, corrective action plans established and implementation of the corrective actions was progressing. Licensee senior management has been involved in assessing and monitoring the staff's response.

The licensee's follow-up analyses, maintenance and testing of the ESW was adequate to establish system operability. The ongoing surveillance program implemented by the licensee provides information which will ensure identification of any additional ring header or cooler degradation, and maintenance of system operability. The team was concerned that the licensee had not implemented or scheduled any inspection of the large bore supply piping associated with the system. The licensee evaluated this concern and committed to complete a series of inspections of this piping before startup from the Unit 2 refueling outage scheduled to begin in January, 1991. A clear understanding of piping condition is important given the little margin available for the Unit 2 portion of the system. In the long-term planned licensee modifications will resolve this problem.

Several program areas were evaluated by the team including the corrective action process, control of design analyses and calculations, program for performance of 10 CFR 50.59 evaluations and control of safety-related fasteners were evaluated and found to be functioning adequately. The review indicated that program weaknesses had existed, but licensee efforts during the past two years have corrected many. A steady improving trend in these areas was noted by the team.

Several weaknesses were identified by the team which warrant further licensee evaluation. These include the potential use of Nonconformance Reports to effect design changes, inadequate implementation of the Equipment Trouble Tag program, questions regarding the independent verification program and the need to further assess the practices employed for installation of safety-related fasteners.

DETAILS

1.0 INTRODUCTION

Safety System Functional Inspection (SSFI) 90-200 conducted at Peach Bottom in early 1990 evaluated the operational readiness of the emergency service water (ESW) and high pressure coolant injection systems (HPCI). The team identified fourteen open items, including two which were subsequently processed as Severity Level III violations. The report also included discussion of many other issues that were not assigned numbers. These un-numbered concerns, however, required appropriate licensee response.

A SSFI Corrective Action Review Team Inspection was conducted from September 17 to October 3, 1990, to address the significant issues raised in Inspection Report 90-200. The team was tasked with inspection of the 14 numbered items, other issues discussed in the report, and programmatic areas implicated as weak by the SSFI findings. The issues targeted for review were discussed with the licensee prior to the inspection. The licensee prepared information packages for evaluation by the team during the preparation week. Following preparation the team conducted inspections in the licensee's corporate engineering offices and at the Peach Bottom facility.

2.0 INSPECTION SCOPE AND OBJECTIVES

The inspection objective was to evaluate the effectiveness of licensee corrective actions implemented in response to the SSFI, and to assess aspects of certain licensee overall programs. The team included three contract inspectors, one inspector from the NRR Special Inspection Branch and a Team Leader. Five days of preparation, six days of direct inspection and four days of in-office close-out and documentation were performed. The team reviewed licensee corrective actions in response to the 14 numbered items in the SSFI report, and other issues discussed in the SSFI report but not assigned unique numbers. The team focused on evaluation of the general ESW technical problems described in Section 7 of this report, and the effectiveness of the licensee programs described in Sections 5 through 6, and 8.

3.0 INSPECTION METHODOLOGY

The inspection team consisted of mechanical and instrument & controls discipline engineers, and several general operations oriented engineers. The team began the effort by reviewing the licensee's analyses and corrective actions in response to the SSFI team findings. The team developed inspection plans to evaluate several program areas that exhibited weakness, as determined by the SSFI team. The team selected inspection samples which allowed evaluation of areas reviewed by the SSFI, and issues of a similar nature not within the scope of the SSFI. Based on these reviews the team reached conclusions regarding the adequacy of the licensee's response to the SSFI and the degree to which the issues are indicative of program strengths or weaknesses.

4.0 LICENSEE CORRECTIVE ACTION PROCESS REVIEW

Following the SSFI, the NRC issued a Notice of Violation (NOV) and Civil Penalty that included a violation for failure to implement adequate corrective actions in response to known deficiencies in the ESW system. The technical resolution of the ESW operability concerns is discussed in Section 7 of this report. However the focus of the violation was the licensee's failure to act promptly to resolve what had been identified internally as an indeterminant system design, analysis and test status. In the written response to the enforcement action the licensee described a series of program procedures which had been implemented just before or following the SSFI. The implementation of these procedures is viewed by the licensee as representing a significant improvement in their ability to identify potential safety issues, raise them to the appropriate level of management attention and implement effective corrective action. The response also referred to the licensee's self-assessment program and implementation of improved engineering department communication and turnover processes as long-term corrective actions which will prevent recurrence.

During the current inspection the team reviewed the licensee's program procedures and discussed their implementation with a cross-section of licensee staff and management. A sample of recently closed corrective action documents was selected to assess the technical adequacy and management approval of closure. The backlog and a sample of issues were reviewed to ensure that appropriate priorities had been assigned and that the backlog was being effectively managed. The documents selected for review were generated within the past year. In this way the team evaluated the current performance of the licensee's corrective action process.

4.1 Program Procedure Review

The team conducted a review of the licensee's corrective action process as it was applied to the Peach Bottom plant to determine if the process was capable of properly evaluating and dispositioning significant concerns. Program documents which control non-conformance and corrective action programs are:

- NQA-25, "Corrective Action," Revision 2;
- Nuclear Generation Administrative Procedure (NGAP) NA-02R001, "Identification and Evaluation of Potentially Reportable Items and Events of Potential Public Interest," Revision 0;
- NGAP NA-02A002, "Investigation of In-house Events," Revision 0;
- NGAP NA-03N001, "Control of Nonconformances," Revision 1;
- NQA-16, "Open Items," Revision 1,
- NEDP 3.11, "Procedure for Processing Engineering Work Requests," Revision 1.

These program procedures appear to provide adequate guidance to the staff. The team centered its implementation review on activities carried out in accordance with Procedures NQA-25, Corrective Action Requests (CARs), NA-03N001, Nonconformance Reports (NCRs) and NEDP 3.11, Engineering Work Requests (EWRs). Approximately 70 documents of the three types which were prepared and evaluated since September 1989, were selected for detailed review.

4.2 Review of Corrective Action Document Backlog and Disposition

4.2.1 Nonconformance Reports

The licensee formed a NCR Quality Review Task Force in early 1990 in response to an NRC concern on the quality of the licensee's Engineering Division NCRs. The team reviewed the results of this effort. The NCR Task Force performed several reviews of NCRs from both the Peach Bottom and Limerick stations. An initial scoping study of 19 randomly selected documents revealed 5 that were determined to not have adequate justification of the disposition. Generic weaknesses were found in instructions contained in NGAP NA-03N001, failure to follow procedure instructions by personnel, and communication and enforcement of management standards and policies. An expanded study of 125 NCRs from a total population of 1206 dispositioned between October 1988, and July 1990, revealed 11 that were judged to have insufficient justification and required a 10 CFR 50.59 safety evaluation. The root causes for these deficiencies were similar to those determined in the first review. No unreviewed safety question was identified during either of the reviews performed by the licensee. Corrective action was implemented, consisting of a one-day workshop on management and quality expectations for NCRs involving Engineering Division branch heads, and the formation of a multi-disciplined Design Review Board to review modification packages, NCRs, EWRs and other engineering design activities. Changes to Procedure NA-03N001 were also initiated.

The team's review of NCRs confirmed the weaknesses defined by the task force, especially for those documents dispositioned in late 1989 and early 1990. For later documents, the team noted that the quality of engineering justifications and the depth of review were markedly improved. Although no direct causative factor was evident, the team believed that the improvement may be a result of the improved 10 CFR 50.59 review program discussed in Section 6.

The NCR process is coordinated by the NQA organization, either at the site or at the engineering offices. The coordination and handling of the identified nonconforming conditions, including operability determinations, appeared to be satisfactory. It was observed that formal involvement of site management in reviewing significant NCRs at the time they are initiated and at the time they are returned as dispositioned by the responsible organization, was not part of the corrective action program. Informal discussions between plant and engineering personnel usually occurred during the disposition process. The licensee's process is adequate, but early management involvement with significant NCRs may strengthen the process.

The team found indications that the NCR process has been improperly used to perform plant design changes and design document changes. The team found two NCRs which described

problems with system performance but in neither case did a nonconformance with design documents exist. The dispositions of the NCRs, P90118 (relocation of an instrument pressure tap) and P90451 (upgrading pressure control valves on containment purge and vent valve backup nitrogen supply) implemented modifications to plant equipment to achieve proper performance. Both of the NCRs were dispositioned as "repair". Three additional NCRs, also dispositioned "repair," corrected nonconforming conditions but also specified changes to plant design such as replacing spring supports with rigid supports, changing the size of spring supports, or reducing fuse size in equipment to ensure breaker coordination. The NCRs involved were P90407, P89784-312 and P90085. Nine other NCRs, some dispositioned "repair" and some dispositioned "use-as-is," required changes to design documents resulting from the disposition, but the NCR package did not appear to provide complete information to constitute a design change package. These nine NCRs were P90437, P90438, P90443, P90538, P90232, P90369, P90433, P90275 and P90171. The team noted that adequate safety reviews were conducted for the identified NCRs and that independent design review was accomplished.

Appendix B to 10 CFR 50, Section III, Design Control, states "Design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design ..." The team was concerned that the performance of design changes and design document changes under the NCR program in the manner described was not consistent with the above-referenced regulations and industry standards. Additionally, formal design review requirements such as design checklists, management and safety committee reviews, post-implementation testing and modification turnover, and proper configuration control measures did not appear to be applied to these NCRs. This item remains unresolved pending NRC review of the licensee's follow-up evaluation of this concern (UNR 90-80-01).

4.2.2 Corrective Action Requests

The licensee uses the CAR process as described in NQA Procedure 25, to document and track to resolution significant non-hardware related issues. Generally problems identified by QA, or by other licensee groups, which reflect management performance or program weakness are documented for review and follow-up using a CAR. CARs receive a heightened level of management involvement and require independent assessment of corrective action adequacy by the QA organization prior to closure. Additionally, the process imposes time constraints on proposal and implementation of the corrective actions. The inspectors reviewed the associated program procedure, the number and subject of CARs present in the licensee's backlog, and the technical adequacy and timeliness of resolution of a sample of CARs. Generally the process ensured timely and effective corrective action. CARs clearly focused management attention and elicited action. The inspector was concerned, however, about the status and resolution of CAR PA 89-34-09, which questioned the adequacy of daily channel checks for certain safety-related instrumentation.

The licensee's QA organization issued a CAR dated March 14, 1990, documenting problems with the licensee's approach to instrument channel checks. The primary issue in the CAR is that as a result of recent modifications there is no longer an analog indicator associated with the reactor

pressure sensors which provide wide range pressure compensation and the low pressure permissive for core spray and low pressure coolant injection. TS require a daily channel check of these instruments, but no discrete check is being performed. The response from the licensee's engineering department was that a 100 psig drift in indicated pressure would result in a three inch offset in wide range level (due to the pressure compensation of the wide range), which would not be significant and would be identified by reactor water level channel checks. Based on recent experience this is not credible. The licensee's QA and Operations departments were not satisfied with this response and are evaluating alternatives.

During late August and early September the licensee experienced reactor water level instrumentation calibration problems which resulted in exceeding certain TS instrument setpoints. The adequacy of the licensee's channel check procedures was thought to be a contributor to the duration of the problems. The team questioned if this CAR was an early opportunity to identify the channel check program weaknesses. The team also questioned the adequacy of the analyses associated with the modification to remove the reactor pressure analog indicators in that it changed the system design without adequate consideration of the ability to continue to implement the TS channel check requirement. This issue and the licensee's resolution of the CAR will be reviewed in conjunction with existing item NV 90-17-03.

4.2.3 Engineering Work Requests

The Engineering Work Request (EWR) process is used to document, track and resolve questions or problems identified by the station that require substantial input by the corporate engineering organization. Issues which would result in initiation of an EWR include known problems for which engineering evaluation beyond the capability of the plant staff is needed, or assessment of an indeterminate condition or discrepancy for which the significance or resolution are not clear. In the broad sense the EWR is an important element in the licensee's corrective action process. The inspector reviewed the licensee's governing administrative procedure for EWRs and assessed implementation of the provisions contained by reviewing a sample of completed EWRs. The inspector also evaluated the technical adequacy of the completed EWR responses, and the significance and schedule for evaluation of EWRs currently being carried in the backlog.

The licensee's administrative procedure for processing, review and closure of EWRs was reviewed by the team and appeared adequate. The licensee maintains the EWR backlog at a small and easily manageable level. EWRs are assigned to a group and an individual within the engineering organization. An effective administrative tracking system is in place.

The team reviewed a sample of EWRs initiated or dispositioned during the past two years. Technical resolutions of the identified issues were adequate, but the level of detail of review and documentation was not consistent. In some cases the EWR response addressed only the specific questioned asked, when additional review or guidance would have been appropriate. For example, EWR P50097, initiated in 1989, was a request by the station to evaluate the need to track and evaluate certain reactor pressure vessel thermal cycles. One of the questions asked was if all thermal cycles listed in the analysis needed to be tracked. The EWR reply simply said yes,

with no additional amplification or recommendations. Following closure of this EWR, it appears that the issue was not pursued by engineering or the plant staff. The same issue was raised during a NRC inspection in July 1990 and is the subject of unresolved item 90-14-02. Better communication and clearer definition of the division of responsibility between the station and engineering may have resulted in more prompt resolution of the question. In general the quality of engineering response to EWRs has improved during the last year as evidenced by the sample reviewed by the team.

The prioritization of EWRs and timeliness of review and closure appeared adequate. One exception was noted. The team was concerned with the schedule for review associated with EWR P51292. This EWR was initiated by the station to request engineering review of NRC Information Notice 89-55, "Degradation of Containment Isolation Capability by a High Energy Line Break," in July, 1989. An interim engineering response was not issued until June, 1990, and indicated that the problem described in the Notice could exist at Peach Bottom, but that physical walkdowns in the primary containment were needed to make a final determination. The Unit 3 restart and Unit 2 mid-cycle outage were completed following initiation of the EWR. However, no inspection had been completed during these outages. The Unit 3 mid-cycle and Unit 2 refueling outages are planned for the near future, but it did not appear that the inspections would be accomplished. The Notice still remained open in the licensee's tracking system. The licensee informed the team that the inspections were planned for implementation during the next unit refueling outages. Although the team felt that evaluation of this Notice had not been timely, performance during the next outage on each unit is the next reasonable opportunity. The team reviewed the status of licensee responses to other NRC Information Notices. Recently the licensee initiated a review of the adequacy of closure for all Notices at the request of the Nuclear Review Board. This effort is progressing and will ensure proper closure.

4.3 Review of Long-Term Actions Taken to Prevent Recurrence

The primary focus of the Severity Level III NOV issued following completion of the SSFI was failure of the licensee staff and management to ensure that effective corrective actions were taken in response to weaknesses and uncertainties identified with the design, operation and testing of the ESW system. The licensee had a number of opportunities during the life of the plant to address the issues, and failed to act effectively. Many of these opportunities predate the extended shutdown and extensive performance improvement program completed in 1989. During that period the licensee generated or revised many of the corrective action process program procedures discussed in the preceding sections. Their written response to the violation references these previously implemented procedures as the basis for concluding that the root causes of the failure to correct the ESW deficiencies have been corrected. Based on the team's review of these procedures and of a large sample of specific corrective action documents it appears that the process is functioning adequately. The thoroughness, timeliness and documentation has clearly improved, and contemporary issues appear to be evaluated and communicated well.

Following the SSFI, the licensee established a matrix of all issues identified and the corrective actions planned or implemented. This matrix was reviewed by senior licensee management to

verify that it adequately addressed the findings. The team requested to review the licensee's root cause analysis of the ESW findings. The licensee responded that a root cause analysis had been done by the Independent Safety Engineering Group (ISEG). The team reviewed the ISEG report dated July 24, 1990. The recommendations included in the report had been input to the licensee's tracking system, but at the time of the inspection no responsible individuals had been assigned. The licensee stated that ownership for each recommendation would be assigned. The matrix and ISEG report appear to outline a comprehensive corrective action plan to address the ESW issues.

Two ongoing actions to prevent recurrence were discussed in the licensee's response. The first was that a program would be implemented to formalize and enhance the turnover process as it relates to transfer of responsibilities between technical personnel at the station, within the engineering organization and between the station and engineering. The licensee, after additional consideration, has concluded that a formal turnover process beyond the general guidance already available on transfer of responsibilities, is not needed. The licensee stated that management is sensitive to the need for control of information and issue transfer. The licensee cited the effectiveness of the turnover associated with the recent engineering reorganization as evidence of this. The licensee is also implementing the Plant Information Management System (PIMS) which will provide for better tracking of identified issues. The inspector concluded that development of a formal turnover process may not be needed if implementation of PIMS is completed and management sensitivity to this issue is maintained.

The second factor discussed in the licensee's response was that ongoing self-assessments would monitor the effectiveness of the cited corrective actions. The licensee stated that no specific self-assessment activity or audit was planned, but that the overall self-assessment and QA program would perform this function.

5.0 LICENSEE PROGRAM FOR REVIEW AND APPROVAL OF ENGINEERING ANALYSES AND CALCULATIONS

The SSFI inspection identified an apparent weakness in the licensee's program for review, approval and control of engineering analyses and calculations. The identified weakness was based on problems with retrieving several ESW system design calculations and deficiencies found in basic assumptions, references, methodology, review and approval, and documentation control of calculations. In addition, design information was found to lack proper basis or calculations and analyses were non-existent.

The team performed a detailed review of the licensee's overall program and practices pertaining to control of analyses and calculations. Historical documentation concerning the licensee's past practices was compared to recent methods of control via administrative procedures.

The team noted that in the past the majority of calculations and analyses were performed, maintained and controlled by the vendors contracted for their performance. The licensee did not receive the documentation as a "turnover package" at completion of the task. However, the

vendor was required to maintain document or design control measures. The deficient calculations identified by the SSFI were vendor developed and maintained.

The team discussed the problems associated with vendor-supplied analysis and calculations with the licensee and reviewed Procedure NE-041, "Interface Specification," Revision 0. This procedure was recently implemented and establishes the standards that vendor analyses must meet for licensee acceptance. The procedure appeared adequate to control the activities of vendors providing engineering services. As previously performed calculations are revised to support modifications, the licensee will upgrade them and transfer control from the vendor. Additionally, a long-term program to transfer all calculations and analyses to licensee control is under development.

For those tasks performed by the licensee's staff, direction and control is provided via administrative and technical procedures. The licensee provided copies of current Nuclear Engineering Department Procedures, NEDP 3.4, "Procedure for Design Control," Revision 19, and NEDP 3.9, "Procedure for Preparation and Control of Design Calculations," Revision 12, for the team's review. The team found that the procedures were adequate to govern the development, review and approval of analyses and calculations prepared by the licensee.

In order to evaluate the licensee's performance in adhering to the requirements of the procedures, the team reviewed a population of 10 new or revised calculations. No technical errors or omissions were found, however, two of the safety-related calculations were found to have administrative deficiencies:

- Calculation ME-64, Revision 1, was deficient in two areas. The list of attributes verified during the independent review was not included as required by Procedure NEDP 3.9, Paragraph 6.3.4, and the revised areas of the calculation were not clearly identified as required by Procedure NEDP 3.9, Paragraph 6.4.1.1.

- Calculation EE-33, Revision 3, was deficient in that the revision number was not indicated as required by Procedure NEDP 3.9, Paragraph 6.4.1.1. This procedure requires a revision bar and a triangle containing the applicable revision.

Both calculations were prepared, reviewed and approved under the referenced governing procedures. The minor deficiencies appeared to result from a lack of attention to detail and strict adherence to procedure requirements. The team concluded that the current licensee program for development and control of calculations and analyses is adequate. Implementation of the program was found to be generally good.

6.0 LICENSEE 10 CFR 50.59 EVALUATION PROGRAM

The SSFI identified two instances where the licensee failed to prepare adequate written safety evaluations to provide a basis for a determination that design changes to the ESW and ECW systems did not involve an unreviewed safety question. In view of the violation the team

performed a review and assessment of the licensee's process for development, review and approval of 10 CFR 50.59 evaluations.

The process is controlled by NGAP NA-02R002, "10 CFR 50.59 Reviews," Revision 0. [illegible] procedure was effective 12/1/89 and constitutes an improved program designed to be used for facility design changes, tests and experiments. In addition, the use of the procedure was expanded to apply to certain NCR dispositions, UFSAR changes, Q-list revisions and procedure revisions. The guidance contained in NSAC-125, "Guidelines for 10 CFR 50.59 Safety Evaluations," June 1989, was incorporated in the procedure to ensure that the process was consistent with industry practice. This new procedure resulted in requirements to provide increased documentation of the justifications and rationale used to support conclusions reached in evaluations, increased requirements for interfacing group review and approval, and the opportunity for additional management review and approval of evaluations.

The team reviewed the procedure as well as training provided to evaluators and reviewers on application of the procedure. Discussions were held with engineering and plant management personnel charged with implementing the improved program, and with Quality Assurance and Independent Safety Engineering Group (ISEG) staff members responsible for assessment of program effectiveness. The following observations resulted from the review:

- The procedure increased the scope of information considered during review of the licensing basis for the plant over that contained in NSAC-125 to include other commitments either imposed by or made to the NRC. This is considered a strength.

- The training program for engineering and plant personnel was comprehensive and provided good reference material for use in preparing or reviewing 10 CFR 50.59 evaluations. It was noted that over 400 personnel were afforded the training and that the training was designed to be given once as opposed to being repeated on a periodic basis. The licensee believed that continuing supervisory reviews of work products, including safety evaluations, was sufficient to ensure a high quality level of evaluations without the need for periodic retraining.

- The commitment tracking program was in the process of being upgraded and expanded to provide a comprehensive data base of commitments and make it more easily usable by researchers. Commitments made since licensing of both Peach Bottom and Limerick will be available onscreen using the PIMS when the system is complete. The licensee is planning to have the database prepared and training and familiarization completed by early 1991. This appears to be a useful tool for ensuring adequate knowledge of commitments for conducting 10 CFR 50.59 reviews and other plant activities.

- Plant activities (Temporary Plant Alterations [TPAs], procedure changes, new procedures, test procedures, etc.) that result in the performance of safety evaluations are routed to the Nuclear Review Board (NRB) for review. At Peach Bottom, this review is performed by the ISEG with summary reports to the NRB. It was noted that only activities that

resulted in a safety evaluation after a safety determination was performed were subject to the ISEG review. The team observed that only one or two of the safety evaluations reviewed by ISEG over the past six months (approximately 50 reviews) required follow-up for clarification or were deemed to be insufficiently performed. The individuals interviewed in the ISEG stated that they had observed increased quality of safety reviews since the issuance of NGAP NA-02R002. This observation was echoed by several members of plant management.

The team reviewed safety determinations and safety evaluations associated with selected TPAs, procedure changes, NCRs, CARs, plant modifications and Technical Specification submittals prepared between September 1989, and August 1990. Approximately 50 documents were selected. The team found that more recent safety evaluations (since December 1989) performed by both the engineering and site organizations had the increased formality and rigorous justification of determinations expected from the newly applied process. It appeared that the 10 CFR 50.59 evaluation process was being adequately applied and that review and assessment of the process was active and capable of determining weaknesses.

7.0 RESOLUTION OF ESW/ECW OPERABILITY CONCERNS

The SSFI identified that the licensee had not performed adequate calculations and analyses to support the operability of the ESW system. The closed loop cooling modes associated with the ECW and emergency cooling tower (ECT) had not been evaluated to ensure sufficient coolant flow, calculations had not been performed to determine acceptable net positive suction head for the booster pumps and to correlate the throttling of the pump discharge valve with system flow. Additionally, the licensee failed to perform and document adequate safety evaluations as required by 10 CFR 50.59 for modifications made to system equipment.

The licensee acknowledged these inconsistencies and deficiencies and indicated that testing would be conducted to verify operability. Where needed calculations would be performed to provide necessary assurance and baseline information. The approach implemented by the licensee following completion of the SSFI included: 1) performance of several safety evaluations and needed analyses; 2) conduct of a baseline testing program to establish ESW operability for Unit 3, Unit 2 and in the dual unit mode; 3) performance of maintenance and modifications to the system in support of establishing operability, and 4) development of an ongoing surveillance testing program. Each of these elements is discussed in detail below.

7.1 ESW/ECW Analyses and Calculations

The SSFI identified that the fluid system calculations and analyses performed during the design and construction of the ESW and ECW systems included several significant nonconservative assumptions, inaccuracies, and they were not validated against the as-built system configuration. Analyses establishing the design heat loads, heat exchanger heat transfer capabilities and predicting room peak temperatures were also deficient. Additional analyses completed since construction indicated that deficiencies existed but were not followed up.

The licensee, with contractor assistance, performed the analyses needed to establish the maximum heat load in each ECCS and RCIC pump room during design basis accident conditions. This information was combined with heat exchanger heat transfer estimates and the maximum allowable room temperatures dictated by equipment qualification limits. The end result was the determination of the minimum acceptable ESW flow rate through each cooler. The inspector reviewed the HPCI and RCIC analysis. This analysis was selected because the present condition of the ESW system makes it limiting for Unit 2. The inspector evaluated the data, assumptions, methodology and results. No concerns were identified.

The SSFI also identified that the ECW/ECT system had not been appropriately modeled. Operational experience shows that the booster pump associated with this mode of operation trips on low suction pressure if manual throttling of the discharge valve is not implemented. The affect of this action on cooling water flows had not been adequately analyzed. Also during 1979 the licensee isolated the reactor building closed cooling water (RBCCW) system from ESW. Although this isolation eliminates a large flow path to the booster pump suction, its impact was adequately analyzed. The licensee evaluated these concerns and revised the Safety Evaluation, "10 CFR 50.59 for MOD 5095 Emergency Cooling Water System Upgrade PBAPS, Units 2 & 3," Revision 7. This safety evaluation addresses the impact on ESW of isolating the RBCCW crosstie. The licensee is performing an evaluation of the impact of this isolation on the RBCCW system and the loads cooled by it. The licensee stated that this evaluation would be complete by early November, 1990.

Calculation PM-106 was prepared to support and document the acceptable range of booster pump suction pressures. The calculation confirmed the need to throttle the ESW booster pump discharge valves in order to ensure sufficient back pressure, and established a range of suction pressure values that if maintained would ensure adequate flow through the component heat exchangers. The team found the calculations and the safety evaluation acceptable. However, the use of a gate valve for long-term throttling is not a recommended practice due to the difficulty of controlling flows and excessive valve wear. The licensee is aware of the problem and implemented acoustic monitoring of the valve during system operation. But the team observed that no provision for continued monitoring or modification was identified.

7.2 ESW/ECW Baseline Testing Program

The SSFI identified that the licensee failed to conduct adequate design basis performance testing of the ESW system after construction. Additionally they had not implemented a technically adequate surveillance testing program to assure continued system operability in all modes. Further, operating history indicated problems with system blockage due to corrosion and silt, and with ESW booster pump operation.

Following the SSFI the licensee shutdown Unit 2 for a mid-cycle outage. The ESW system was aligned to support Unit 3 and the minimum required Unit 2 cooling loads. The remaining Unit 2 loads were isolated. The licensee implemented a performance test in this alignment and verified that the system was adequate to support continued Unit 3 operation.

In order to assess the condition of the Unit 2 piping the licensee performed several diagnostic tests. Safety Evaluation, "10 CFR 50.59 Review for Opening of Cross Tie Valves 0-3?-51? A & B on the Common Cross Tie Line Between Discharges of ESW Pumps OAP-57 and OBP-57 PBAPS, Units 2 & 3," Revision 0, was performed to support the crosstie of ESW to Unit 2 while Unit 3 was in operation. The safety evaluation verified that the ESW system would continue to provide balanced and adequate flow to Unit 3 following the crosstie. The team reviewed the evaluation and the precautions required during testing and concluded that they were adequate.

Prior to Unit 2 restart Surveillance Test ST 21.5-1, "Dual Unit ESW Test of ESW to ECCS Ring Headers and Emergency Diesel Generator Coolers," was performed to demonstrate the ability of ESW to supply adequate flow to both units, under design basis conditions. The final conduct of the test followed throttling of the ESW flow to the emergency diesel generators (EDG) and valving out of one of two room coolers in each emergency core cooling system (ECCS) and reactor core isolation cooling (RCIC) system pump room. These modifications to the system flow path were needed to divert additional flow to the in service coolers to meet the minimum flow required by the analysis. The steps provided in this surveillance procedure adequately determine the driving pressure available at the emergency diesel generators and the supply and return ring headers for later use in verification of minimum ESW system flow rates.

Surveillance tests ST 21.5-2 & 3, "ESW Flow Through ECCS Room Coolers and RHR Pump-Seal Coolers," Units 2 & 3, were subsequently performed to demonstrate the ability of the ECCS room coolers and seal water coolers to pass the required design flow. The team reviewed the test results and no outstanding concerns were noted. It is clear that while adequate flows are being supplied, very little margin exists.

The licensee also performed Special Procedure SP-1353, "ESW Booster Pump Discharge Valve Throttling Limit Determination," to verify the ability to throttle the ESW booster pump discharge valves. The team reviewed the results of the testing and noted an apparent deficiency with respect to the pressure instrumentation used during the test. Pressure transmitter PT-0550, "ESW Booster Pump Discharge Pressure," had a calibration sticker dated September 27, 1988, affixed at the time of test performance, April 14, 1990. The team concluded that this calibration cycle was excessive and requested further information. The licensee provided a more recent calibration record dated February 14, 1990. The licensee stated that they intend to delete the use of calibration stickers. Deletion of the calibration sticker program provides increased opportunity for use of out of calibration test instrumentation and will require sensitivity to this area by individual test performers. It also reduces the effectiveness of management and QA/QC routine field observations.

The team concluded that the licensee had conducted adequate baseline testing to establish the ability of the ESW system to support operation of both units. Testing performed on the ECW/ECT system was also adequate.

7.3 ESW/ECW Maintenance and Modification of Piping and Components

The SSFI identified weaknesses in the licensee's approach to maintenance and modification of the ESW system. The licensee repaired equipment failures and flow blockage without taking adequate action to assess the system condition and to permanently correct the problem.

As discussed above the licensee implemented an extensive baseline and ongoing ESW test program. The results of this testing identified that the Unit 2 portion of the system had degraded to the point where minimum flows could not be obtained with the system in its normal configuration. The licensee implemented a piping inspection and cleaning program in an attempt to remove the blockage. This program was not successful in increasing flow to the required value. The licensee implemented two system alignment modifications which serve to divert flow to the weak parts of the network.

It was determined that the EDG coolers were passing significantly more flow than required. The licensee implemented a modification to throttle the cooler inlet valves to obtain a lower flow rate. Safety Evaluation, "10 CFR 50.59 Review for Throttling of ESW Flow to the Emergency Diesel Generators PBAPS 6280-Equip 1-18-2 (Diesel Generators)," Revision 2, was performed to assess this modification. The safety evaluation provided necessary information and analysis to support throttling ESW flow to the EDGs. Adequate precautions and considerations were included to ensure sufficient design margins for continuous diesel operation and testing was identified to preclude damage to the valves being used for throttling.

The licensee also implemented a modification to isolate flow to one of the two redundant coolers in each Unit 2 ECCS and RCIC pump room, thereby diverting additional flow through the remaining cooler. Safety Evaluation, "10 CFR 50.59 Review for the Temporary Isolation of the Standby ECCS and RCIC Unit Coolers," Revision 1, was reviewed by the inspector. This safety evaluation provided the basis for the realignment. This is identified as a temporary adjustment until modification 5110 to replace the degraded ring headers is completed on Unit 2 during the next refueling outage. The safety evaluation addresses isolation of the standby coolers, and the practice of "failing open" the inlet valves on the primary coolers. While this modification reduces the level of redundancy in the cooling system design, it does not introduce a limiting single failure and is permissable by the facility TS. These modifications in conjunction with the ongoing test program ensure short-term ESW operability.

The team reviewed the overall testing, inspection, cleaning and modification program applied by the licensee. Also historical maintenance and testing histories for the system were reviewed. As a result of various piping leaks on Unit 2 the licensee initiated a laboratory analysis of deposits and material found in the 3" ESW pipe. The report, "Metallurgical Laboratory Note No. 84-822," dated August 23, 1984, indicated that the maximum thickness of deposits was 1-1/4 inches and the maximum pit depth equaled a wall reduction of approximately 52%. The report stated that the deposits were typically a result of low flow rates and intermittent use.

Long-term resolution of this problem includes the already completed replacement of the Unit 3 ring header with six inch piping, and a planned similar modification to Unit 2 in the next refueling outage. The licensee has a chemical injection system installed to aid in inhibiting biofouling and corrosion, but the system had not been operable. The licensee is taking steps to place the system in operation.

These actions focus on the ESW ring headers and the individual coolers. The team was concerned that no inspection, cleaning or testing was in place to assess the condition of the large bore ESW piping which delivers coolant flow to the ring headers on both units. Given that the larger pipe is similar in characteristics to the ring headers, the team questioned if similar corrosion and silt buildup was present. The Unit 3 ESW system and ECCS coolers have experience three test failures since the new piping was installed. These failures were due to flow blockage by loose materials. Since the ring headers and coolers represent the limiting components of system resistance, the in-place flow testing program would not indicate the condition of the large pipe until the potential degradation had progressed to an advanced stage. The team expressed concern that although a limiting flow restriction may not be evident, the potential may exist for system upset or a seismic event to dislodge some of the material and plug the smaller ring headers or coolers. Additionally, pipe wall thinning may be a concern. The team's concern regarding this possibility was heightened because of the very small flow margins available to the Unit 2 cooling loads and the isolation of the redundant coolers.

In response to the teams concerns the licensee committed to perform a series of visual, ultrasonic, camera and radiograph inspections of the large bore piping. These inspections will be completed by the conclusion of the next Unit 2 refueling outage, scheduled to begin in January, 1991. The licensee also stated that material samples will be taken for corrosion analysis and testing for microbiological induced corrosion. The inspections will help to determine the actual condition of the pipe, and the need for any corrective action.

The team considered licensee actions to establish interim operability of the system, in conjunction with the commitment to implement the piping replacement modifications and large bore piping inspections adequate to resolve this issue.

7.4 ESW/ECW Periodic System Performance Testing Adequacy

The SSFI identified significant weaknesses with respect to the ongoing surveillance test program applied to the ESW system. The testing did not demonstrate the ability of ESW to perform its function nor provide meaningful data for trending system performance. The licensee acknowledged the deficiencies and following completion of the baseline testing program described in Section 7.2, established new or revised test procedures. Procedures reviewed by the team included:

- ST 21.5-1, "Dual unit ESW test of ESW to ECCS ring headers and diesel generator coolers," performed quarterly or after maintenance that may affect ESW system flow rates;

- o ST 21.5-2, "ESW flow test through ECCS room coolers and RHR pump seal coolers - Unit 2," performed monthly,

- o ST 21.5-3, "ESW flow test through ECCS room coolers and RHR pump seal coolers - Unit 3," performed quarterly.

The SSFI team reviewed the surveillance test procedures for purpose, scope, technical adequacy and frequency of testing. Test results obtained since implementation were reviewed. ST 21.5-1 aligns the ESW system and its cooling loads in the design basis configuration. Each of the two ESW pumps is run, one at a time, and the cooler inlet and outlet header pressures are measured. The lowest of the two measured differential pressures (dp) is then used as the baseline for performance of the periodic individual cooler flow rate tests. Performance of ST 21.5-1 quarterly assures that any additional degradation in the supply and return piping or pump performance will be detected. ST 21.5-2 and ST 21.5-3 measure individual cooler flow rates at the previously established dp. The Unit 3 test is performed quarterly because the supply and outlet ring headers were replaced with an improved design during the last outage. The Unit 2 headers are scheduled for replacement during the January 1991 outage. Monthly Unit 2 testing will continue until the replacement is complete.

ST 21.5-2 had been performed six times with one cooler failure identified. HPCI cooler 2AE56 failed to provide acceptable flow rates due to foreign material obstructing the flow path. After required maintenance and flushing activities were complete adequate flow capability was restored. ST 21.5-3 had been performed three times with three system failures identified. HPCI room cooler 3BE56 failed the flow tests in June 1990 and again in September 1990. RCIC room cooler 3BE55 also failed the September 1990 flow test. This appears to be the result of silt input and loose corrosion product transport. The piping configuration in the area of these coolers makes them susceptible to blockage. The licensee is evaluating possible solutions.

The team concluded that the testing approach and procedures implemented by the licensee adequately demonstrate continued ESW system operability. Test results indicate that some flow blockages are occurring in susceptible sections of the piping. However, the percentage of tests performed that have failed is not excessive.

7.5 ESW/ECW Operating Procedures

The SSFI inspection identified deficiencies in Procedure SO 48.1.B, "Emergency Cooling Water System Startup," that could adversely affect system heat removal capability and prevent it from meeting its function during accident conditions. These deficiencies were carried as an unresolved item (90-200-10) pending NRC review of the licensee's corrective action.

The team reviewed Revision 6 of the subject procedure to determine the adequacy of corrective actions, and found that the procedure no longer referenced the lineup of the RBCCW system as part of the procedure requirements. Procedure SO 33.7.B, "ESW System Backup to RBCCW Heat Exchangers," was deleted as well. Direction was also provided for maintaining the ESW

Booster pumps within a suction pressure range of 0-8" Hg (as specified by calculation PM-106) to ensure that excessive flow restriction would not be experienced by the RCCS room and equipment coolers. The booster pump discharge valves were throttled to a position determined by testing performed during the March-April outage to maintain the suction pressure range. Additional guidance was developed and provided to the operator to adjust the throttled position in case the suction pressure range was not met or the running booster pump tripped. Instructions were provided to monitor flow for cavitation if throttling was required beyond the limits established by the referenced testing. The procedure changes made by the licensee appeared adequate to resolve the concerns identified by the SSFI inspection team.

In comparing Procedure SO 48.1.B with calculation PM-106, the safety evaluation and the test results, additional deficiencies were found that had not been addressed by the licensee when resolving the specific SSFI issues. The deficiencies were:

- Page 5 of the revised safety evaluation provided justification for maintaining ESW return flow to one ECT cell instead of two. This minimizes the need to throttle the ESW Booster pump discharge gate valves while still ensuring the required heat removal capability. The team noted that Procedure SO 48.1.B specified instructions in the note on Page 4 and steps 4.3, 4.9 and 4.10 to line up a second cell. The team was concerned that these steps could result in tripping of the ESW Booster pumps by lowering the discharge pressure and were not consistent with the safety evaluation. The licensee concurred and initiated corrective action to revise the procedure and remove the directions.

- Step 4.11 of Procedure SO 48.1.B specified compensatory steps to restart an ESW Booster pump following a low suction pressure trip during flooding conditions such that access to the pump structure was not achievable. Since the suction pressure gage reads out locally, no information is available to the control room operator to ensure that the required suction pressure range is maintained. The licensee reviewed the conditions under which access to the pump structure would be restricted due to the postulated flooding condition, and determined that such conditions were unrealistic. The licensee committed to revise the procedure and eliminate the actions specified in Step 4.11 if supported by a 10 CFR 50.59 determination, or develop guidance based on control room indication for operator action to ensure proper cooling flow.

The team concluded that following implementation of the procedure changes discussed above, the SSFI concerns regarding the operating procedure for the ECW/ECT would be resolved.

8.0 LICENSEE PROGRAM FOR CONTROL OF SAFETY-RELATED FASTENERS

The SSFI identified several discrepancies with the installation of safety-related fasteners in the HPCI system. The specific examples were relayed to the licensee for evaluation. The team also expressed concerns regarding possible program weaknesses which led to their installation. The

licensee documented each of the discrepancies identified by the team on a NCR. Each NCR was reviewed by the licensee's technical staff and dispositioned "use as is." No fastener replacement was required.

During this inspection the team reviewed the licensee procedures addressing control of the installation of fasteners. These included:

- o Specification NE-004, "Torquing of Flange Bolts," Revision 0, August 10, 1990;
- o Maintenance Guideline MG-4.2-7, "Bolting/Torquing Guideline," Revision 0, September 19, 1990;
- o Administrative Guideline AG-26.5, "Defects Found and Work Performed," Revision 0, August 2, 1990;
- o Specification M-300, "Piping Materials, Instrument Piping Standards and Valve Classifications," Revision 12 with Addendum 2, September 18, 1990;
- o Installation Procedure IP 5.2, "Procedure for Installation of Piping/Tubing Systems," Revision 7, May 31, 1990,
- o Installation Procedure IP 5.6, "Procedure for Installation of Supports and Structural Steel," Revision 8, May 31, 1990.

These procedures were in place prior to the SSFI, but some were revised by the licensee to enhance the level of detail and clarity in response to the inspection findings. The licensee also revised the following training procedures and modules to provide better instruction for safe bolting and torquing:

- o General Training GM4-08-401, "Torquing," Revision 1, April 19, 1990,
- o Training Module 90-02B, "Bolts and Bolting," Revision 1, June 5, 1990.

The team reviewed these documents and found that NE-004 provided torquing requirements for ASME Classes 2 and 3 and ANSI B31.1 Piping. MG-4.2-7 defines the responsibility and requirements for the inspection, installation, and torquing of bolted connections except for electrical and structural connections. MG-4.2-7 also requires inspection activities to ensure that proper markings are present or transferred to studs or bolts. Addendum 2 to Revision 12 of M-300 provides a list of all piping classes currently in use at PBAPS. Installation Guidelines IP 5.2 and IP 5.6 provide the requirements for bolted connections not covered in MG-4.2-7. The training outlined above has not yet been fully implemented. The licensee stated that formal training will be provided to site and mobile maintenance personnel and MG-4.2-7 will be added to general training.

It appears that the licensee has established procedures and guidance addressing the specification and installation of safety-related fasteners. The problems noted by the SSFI are likely implementation and not procedural weaknesses. While the changes made to these procedures were not substantial, the licensee improvement in the training program and commitment to implement it should improve worker practices. None of the deficient conditions identified by the SSFI impacted system operability. The licensee did not perform any in-field walkdowns of other installed fasteners to determine the scope of the weakness. However, the licensee pointed out that the heighten awareness of the system engineers and maintenance supervisors should detect improper fasteners in the field. The team concluded that this area should receive inspector review, including inspection of a larger sample of installed bolted connections, prior to closure (see UNR 90-200-14, Section 9.0 of this report).

9.0 ASSESSMENT OF LICENSEE RESPONSE TO SSFI OPEN ITEMS

The team reviewed the licensee's actions in response to the 14 open items identified by the SSFI. In addition, the team selected for review 17 additional issues discussed in the report which required some corrective action by the licensee. The status and disposition of each open item and issue is addressed separately below. The 14 open items are either closed or updated. The updated items will received additional review in the future. The subset of the 17 other issues which will require additional follow-up review are assigned open item numbers within the text.

Item 90-200-01 (Closed)

The SSFI identified a violation of 10 CFR 50, Appendix B, Criterion XVI. This violation addressed the licensee's failure to identify ESW flow deficiencies from initial plant start-up until 1983, and the failure to initiate corrective action once the ESW system deficiencies were identified. This item is closed based on the review of the licensee's corrective action process and the technical resolution of the ESW operability concerns. These areas are discussed in Sections 4.0 and 7.0 respectively.

Item 90-200-02 (Closed)

The SSFI identified a violation of 10 CFR 50.59 requirements. Written safety evaluations were not performed, documented or maintained assessing the effect of throttling the ESW Booster pump discharge valve on the system flow nor the effect of isolating the RBCCW system from the ESW system. The licensee provided the following new or revised safety evaluations to the team for their review:

- o 10 CFR 50.59 for Mod 5095, Emergency Cooling Water System Upgrade, Revision 7;
- o 10 CFR 50.59 Review for the Temporary Isolation of the Standby ECCS and RCIC Unit Coolers, Revision 1;

- o 10 CFR 50.59 Review for Throttling of ESW Flow to the Emergency Diesel Generators 6280-EQUIP 1-18-2 (Diesel Generators), Revision 1,

- o 10 CFR 50.59 Review for ESW Operability During Unit 3 Operation/Unit 2 Testing, Revision 1.

The safety evaluations satisfactorily address the specific concerns identified in the violation and provide adequate assurance that current ESW system operations are consistent with safety requirements for the system. An evaluation of the effect of RBCCW isolation on safe operation of the plant considering those components cooled by RBCCW was not complete at the close of this inspection, but was expected to be complete by November 1, 1990. Review of these evaluations in conjunction with the programmatic review described in Section 6.0 support closure of this item.

Item 90-200-03 (Closed)

The SSFI identified a cross-wiring situation between the Train A and Train B ESW pump logic circuitry networks in which the wiring was terminated on adjacent control switch terminals. This configuration did not appear to meet industry electrical separation or single failure criteria.

The licensee provided the team with an evaluation and analysis to justify that this configuration provided adequate train separation and satisfactory independence to meet their committed design criteria. The separation criteria appeared to be adequately justified with reference to industry standards and licensing requirements in effect at the time of initial licensing of the Peach Bottom plant. Further, the analysis of the four failure modes of the control switch appeared to demonstrate that the configuration would not result in a common failure of the two trains of ESW pumps.

Item 90-200-04 (Closed)

The SSFI identified that adequate documentation did not exist to show that the ECT fan controls and associated cables could withstand a seismic event.

The licensee provided the team with ECT equipment specifications. Based on a review of the specifications, the team concluded that the ECT equipment is seismically qualified.

With regard to the seismic adequacy of the ECT cable raceways, the licensee provided the team with the current status of the issue and future plans for verification of the raceway seismic qualification. The team was informed that the ECT conduits and conduit supports were installed to the same criteria as the conduits and conduit supports in the rest of the plant. The licensee also stated that a consulting engineering firm conducted a walkdown of conduits and cable trays in November 1988 and concluded that a safety concern did not exist at Peach Bottom regarding seismic adequacy of raceways and supports. The licensee is developing plans to verify this conclusion as part of their commitment to the NRC to confirm the seismic adequacy of plant

equipment in response to Unresolved Safety Issue USI A-46, "Seismic Qualification of Equipment in Operating Plants." The team concluded that the licensee's actions were adequate to resolve the SSFI concerns.

Item 90-200-05 (Closed)

The SSFI identified that an incorrect value had been used in Station Blackout Procedure, SE-11, for the HPCI system suction transfer temperature setpoint. The 200 °F value in SE-11 was above the maximum temperature for adequate net positive suction head (NPSH) for the HPCI pump. The licensee agreed that the 200 °F transfer point for the HPCI pump was unsatisfactory and committed to revise procedure SE-11 to indicate 190° F.

The team reviewed procedure SE-11, Revision 3, dated March 16, 1990, and found that paragraph 16.b was revised to read "when torus temperature reaches 190 °F, then transfer suction to the CST." Since the maximum temperature of the torus without causing cavitation to the HPCI pump was calculated by Bechtel to be 196 °F, the team considered the revised procedure acceptable.

Item 90-200-06 (Closed)

The SSFI identified inadequacies in the HPCI system control logic fusing configuration, in that fuse design for certain support components did not provide needed selectivity. The team also found that the HPCI alternate shutdown logic circuit may not be provided with adequate fuse protection.

The licensee issued and dispositioned NCR P90107, which provided justification for continued operation with the current fusing arrangement and required future modification for final closure. The team's review determined that the problem was adequately described and that sufficient detail was provided to ensure proper understanding of the problem and corrective action. The justification for continued operation covered the period until the fuses can be replaced by Modification 5243, which is scheduled to be implemented during the upcoming refueling outage and completed by April 1991. The approved disposition of the nonconforming condition contained in the NCR appears to be adequate pending implementation of the referenced modification.

Item 90-200-07 (Closed)

The SSFI found that licensee maintenance personnel were using uncontrolled documents in the field. The team observed uncontrolled copies of electrical drawings placed at one breaker cubicle to facilitate maintenance and testing activities.

The licensee issued a memorandum to all supervisors prohibiting the use of uncontrolled documents in the field, and stated that the proper use of procedures and drawings would be included in the technical staff's training program. The team reviewed the memorandum dated

August 16, 1990, issued by the Peach Bottom Atomic Power Station (PBAPS) Plant Manager to distribution, indicating the expectations on the use of controlled prints in the field. The team also reviewed the training plans prepared by the PBAPS Training Department addressing the proper use of procedures and drawings. Inside each training plan, there were paragraphs emphasizing the importance of using appropriate and controlled documents and also stating that use of uncontrolled documents was not acceptable. The training was initiated in March 1990 for the technical, maintenance and I&C staffs, and is expected to be finished by the week of October 12, 1990.

The team considered the licensee's corrective actions adequate to resolve the original concern. However, additional review of the use of uncontrolled drawings during maintenance activities will be conducted as follow-up to recently issued violation 90-13-02 related to this same area.

Item 90-200-08 (Closed)

The SSFI found, during a walkdown of the ECT system, that valve 0-48-11211A, ESW to ECT vent valve, was in the open position. It was required to be closed by the system check off list (COL) and the system drawing. The licensee immediately placed the valve in the corrective position and initiated an event investigation report (EIR) to determine the cause and duration of the condition.

The licensee's EIR indicated that "the exact root cause of the event cannot positively be determined, it is believed that this valve mispositioning occurred as a result of the inadequacy of SP 630-3." The procedure included a step to open the valve, but none to reclose it following completion of the test. The licensee's proposed corrective action is to revise procedure SP 630-3 to provide specific instructions for closing the valve.

SP 630-3, "Integrated Test of the Unit 3 Emergency Cooling Water System," was in the licensee's commitment tracking program to be revised by December 1, 1990, to reflect the changes. The licensee committed that the procedure will be revised prior to its next implementation

Item 90-200-09 (Open)

The SSFI team observed several deficiencies regarding the lack of human factors considerations in the Station Blackout procedure, and four specific deficiencies. The licensee stated that they would perform a human factors review of the procedure. Corrective actions for the four specific deficiencies were also implemented. Procedure SE-11 "Station Blackout" Revision 5 was PORC approved on September 13, 1990. The revised procedure incorporated the changes recommended by the human factors review. The four specific deficiencies and the licensee's corrective actions are discussed below.

- The licensee had not prestaged tools, meters, door blocks and other materials needed to expedite conduct of required activities.

The licensee subsequently prestaged the necessary tools and equipment for performance of the actions outside the control room. The team inspected the prestage station and found that all tools and equipment were available. The inspector questioned if routine surveillance of the tool inventory and functioning would be performed. The licensee committed that the SE-11 tools list would be included in routine surveillance test RT 19.7 before the next scheduled performance (the RT is performed semi-annually).

- o The employee simulating performance of the procedure was unfamiliar with the specific actions required to adjust the control system for the HPCI turbine.

  The licensee committed to determine the appropriate individual to perform the actions and to provide training. Licensee operations management determined that non-licensed operators will perform the actions required by SE-11 outside the main control room. Operations training committed to train the non-licensed operators on the new revision of SE-11 along with the use of prestaged tools during the training cycle starting October 9, 1990.

- o The licensee will evaluate if two individuals are needed to operate HPCI under blackout conditions.

  The SSFI team was concerned that one individual could not perform the actions involved. The task included adjusting a null-voltage potentiometer in close proximity to an operating turbine while observing a portable voltage meter attached to a panel some distance away. The licensee indicated that one individual could perform this action if longer test leads were used. The revised SE-11, Appendix 4, indicated that 20 foot test leads were provided in the tool package for this action. The team is satisfied with this resolution.

- o No cautions were present in the procedure concerning the potential for excessive radiation exposure.

  The newly revised SE-11 has a note in Appendix 4 which reads "stay time for the following tasks should be limited due to ALARA because of the physical proximity to the HPCI Turbine Steam Chest." This note satisfactorily addressed the SSFI team's concern.

This item remains open pending the licensee revision of RT 19.7 and completion of the training of non-licensed operators on implementation of SE-11.

Item 90-200-10 (Closed)

The SSFI identified deficiencies in Operating Procedure SO 48.1.B, "Emergency Cooling Water System Startup," associated with startup and operation of the ECW system, and the maintenance of adequate cooling flow to equipment coolers. The review of the licensee's corrective actions and the team's conclusions are summarized in Section 7.5 above.

Item 90-200-11 (Open)

The SSFI team identified that appropriate cautions against overheating during ESW pump operation against a closed discharge valve were not included in test procedures.

The licensee indicated that testing procedures ST 6.3, "ESW Pump, Valve, and Flow Test," and ST 13.21.1, "ESW Pump, ECT Fans, ESW Booster Pumps Test," will be revised to include cautions prior to steps that run the ESW pumps at shutoff head (pump discharge valves closed). The revisions to both STs were not completed at the time of the follow-up inspection, therefore, this item remains open pending NRC review of the revised surveillance test procedures.

Item 90-200-12 (Closed)

The SSFI team found that surveillance test procedures lacked the necessary detail in some cases to verify that safety-related equipment and systems could accomplish their intended functions. The licensee stated that a surveillance test procedure rewrite program with a schedule completion date was in place to evaluate and revise surveillance procedures. The team also expressed several specific procedure adequacy concerns

The ST rewrite program involves 100% of the procedures and has a completion date of September, 1992. There were about 1600 test procedures to be evaluated and rewritten and all procedures were assigned a priority number from 1 to 8. Currently, the licensee is working on priority 3 and 4. The licensee also indicated that, if a test procedure with a lower priority needed to be performed, a temporary change to the procedure would be initiated in accordance with Administrative Procedure A-3, "Temporary Changes to Procedures." The temporary change would incorporate all changes needed to enable the test to be properly performed. Following is a description of the licensee's actions to resolve the specific concerns raised by the SSFI:

- ST 13.21, "ECW Pump, ECT Fan, ESW Booster Pump Operability IST," did not establish acceptance criteria for pump running current, shutoff discharge pressure and suction pressure.

  The licensee stated that the running current, shutoff discharge pressure and suction pressure were recorded for trend analysis only and did not require acceptance ranges. The discharge and suction pressures were also used to determine the pump differential pressure (dp) and the ranges of acceptance for dp were given. The team considered this response acceptable.

- ST 13.21 established an improper flow alignment by including the RBCCW system in the flow path.

  The licensee committed in its response that ST 13.21 would be rewritten by November 20, 1990 to have the RBCCW heat exchanger valved out. This date is before the next

performance.

o Procedures required use of electrical jumpers without specifying the type or size of the jumper to be used.

The licensee indicated that banana test jacks were to be installed in the plant to simplify the use of electrical jumpers for testing. The installation will be completed by the end of the Unit 3 refuel outage (December 1991). Maintenance guideline MG-6.3-2, "Installation of Banana Test Jacks," Revision 1, described the proper way to install the jacks. The team reviewed this approach and considered it acceptable.

o The HPCI low steam pressure flow test specified performance at a nominal pressure of 150 psig, although the TS make no allowance for nominal readings.

The licensee stated in its response that PBAPS would be converted to the Improved Standard Technical Specification (ISTS) with appropriate ranges for HPCI high and low steam pressure flow tests, and the inclusion of allowance for nominal readings. The ISTS conversion is not scheduled to be completed in the near future. The licensee indicated that a PORC approved engineering evaluation verified that performing the test at 170 psig did not constitute an unreviewed safety question. This item is also discussed under issue number 27.

Based on the surveillance test rewrite program and the specific commitments made by the licensee this item is resolved.

Item 90-200-13 (Closed)

The SSFI team identified problems with personnel use of and adherence to procedures. The team was concerned that the specific examples discussed below were indicative of a more extensive performance problem.

While observing ST 21.5-2, "ESW Flow Test Through Room Cooler and RHR Pump Seal Cooler," the inspectors observed the following weaknesses:

o The surveillance test crew performed test steps out of sequence. The licensee responded that there were several contributing factors. The procedure was not written to be performed in the most expeditious manner. Familiarity with the procedure led to performance of the steps in a manner that was technically acceptable but out of sequence with the written test. The test was long, and personnel felt the need to provide test results in a relatively short time.

o The surveillance test working copy was not completed as the test was performed. The test personnel were familiar with the test and checking off the steps as required by the procedure was thought to be unnecessary. The test personnel realized that they should

have signed off the test as it was being performed, but they felt confident that the test was technically correct as performed.

- The procedure independent verification requirements were not adequately implemented. The licensee indicated that the person performing the test had a different definition of independent verification than the inspector. The test personnel believed that independent verification by personnel involved in performance of the same activity in the same area was acceptable. The inspector believed that independent verification required a second individual not involved in the performance of the activity. Independent verification has been defined in other PBAPS documents and regulatory guidance in this manner. This issue will remain unresolved pending review of the licensee's program for implementation of independent verification during maintenance and testing activities (UNR 90-80-02).

- The SSFI team reviewed ST 6.7.4.2, "Core Spray Motor Oil Cooler Heat Transfer Capability," and noted that the thrust bearing temperature at starting was not recorded. The thrust bearing temperature at 0, 70 and 80 minutes were also not recorded. The licensee responded that these omissions occurred because the test personnel did not adhere to test procedures.

- The SSFI team reviewed ST 6.6 F-2, "Core Spray A Loop Pump, Valve, Flow and Cooler Test-Unit 2," and noted that the recorder's initials block in paragraph 78A, Step 77, was not filled in. No independent verification of fluke removal as required by paragraph 79 was performed. The licensee indicated that test personnel failed to adhere to the procedure in these instances.

The licensee concluded that the procedure compliance concerns were indicative of a general feeling among some of the staff that it was acceptable to deviate from a procedure if the deviation did not directly contradict procedure guidance and did not affect the technical adequacy of the procedure or procedure results. The licensee committed to the following corrective actions to resolve these concerns:

- Establish and clearly communicate performance expectations for procedure use and compliance and independent verification.

- Provide instruction on procedure use and compliance to supervisors and have supervisors provide on the job training during actual procedure use to demonstrate acceptable procedure compliance and clarify expectations.

- Solicit and address procedural compliance issues from group personnel to ensure the approach to procedural compliance remains consistent and is properly understood by group personnel.

During the current inspection the team observed a sample of surveillance test performances. In all cases personnel performed the testing in accordance with the procedure. The team reviewed

the licensee's response and corrective action plan and found that although the corrective action plans look acceptable, most actions have not been completed. In response to continuing problems with procedure use and adherence and personnel attention to detail the Plant Manager initiated a task force to evaluate the root cause and recommend additional corrective actions. This effort has the support of the Peach Bottom Vice President. Monitoring of task force progress and ongoing assessment of its effectiveness will be performed by the Resident Inspectors.

Item 90-200-14 (Open)

The SSFI team identified fasteners of the wrong sizes, types, torques, thread engagements, and of indeterminate materials installed in HPCI. The origin of some quality-related piping and fasteners installed in the HPCI System could not be traced through the maintenance request form (MRF) package records. MRF packages contained neither direct delivery system documentation or the required quality conformance data tags.

The team reviewed the corrective actions implemented by the licensee. These actions appear appropriate. The team was unable to assess their effectiveness during this inspection, as discussed in Section 8.0 of this report. This item will remain open pending additional NRC review.

Issue 15

The SSFI identified several instances where original calculations and analyses could not be located, were used as working copies or were never developed. This raised concerns about the licensee's design control program. The team's review of this issue is addressed in Section 7.0 of this report.

Issue 16

The SSFI team identified concern over the licensee's lack of a suitable testing program which would have identified the ESW flow problems. The technical resolution of this issue is addressed in Section 7.0 of this report.

Issue 17

The SSFI team identified the lack of design calculations for the two ECT modes of operation. This issue is addressed in Section 7.0 of this report.

Issue 18

The SSFI report identified instances where design calculations associated with the electrical equipment serving the ESW system were not checked, references were not provided and assumptions were not stated or validated. The licensee informed the team that a program

scheduled for implementation over the next three years had been initiated to reconstitute all protective relay calculations. Further, the specific items identified during the SSFI will be used as a pilot for standardizing the methodology for the reconstitution effort. The pilot review is planned to be completed by the end of the first quarter of 1991. This action satisfactorily addresses the SSFI concern.

Issue 19

The SSFI report identified the potential for a single failure condition that could prevent the restart of an ESW pump following an automatic or manual pump trip with the breaker anti-pump circuitry locked in. The design of the ESW pump control logic did not allow reclosure of the pump breaker in the case where a trip signal (including a manual trip) had been generated following a low discharge pressure automatic pump start signal. This lock out is due to the breaker anti-pump circuitry. No information was available to the control room operator cautioning that the condition existed and providing guidance on the steps needed for pump restart.

The licensee provided the team with revised alarm response cards (ARCs) which referenced Abnormal Operating Procedure AO 33.3, "Emergency Service Water Pump Breaker Manual Reset after Lockout," Revision 0. The procedure provides the operator with guidance for resetting the anti-pump circuitry locally to allow restart of the pump. The team reviewed the circuitry and determined that it satisfactorily met single-failure criteria under the combination of a LOCA with a loss of offsite power, and that the procedure was adequate to assist the operator in restarting a locked-out ESW pump.

Information Notice (IN) 88-75 cited similar examples of locked-out circuit breakers. The licensee's initial review concluded that the problems identified in IN 88-75 did not apply to Peach Bottom, although a number of circuits exist in safety-related pump breakers with lock-out features similar to those identified in the IN. The team questioned if detailed review of each affected breaker had been performed. In response to the team's concern the licensee performed further reviews of the control logic of selected circuit breakers and determined that the breaker closing logics were not subject to lock-out under conditions similar to the ESW pumps as had been originally thought.

The team concluded that the ESW pump lock-out circuit concern was resolved with the institution of additional operating procedure guidance. However, implementation of a design change would more effectively address the issue.

Issue 20

The SSFI team, in response to concerns raised by the resident inspectors, identified that the licensee had not adequately accounted for failure of the non-safety related HPCI and RCIC system gland seal subsystem on equipment environmental qualification.

The licensee prepared a justification for interim operation (JIO). It was determined by the JIO that all equipment required for safe shutdown and located in the HPCI/RCIC rooms were qualifiable to operate up to 150 °F for a minimum of 6 hours. The team reviewed the JIO and found that the minimum qualified temperature for the equipment was 165 °F and minimum time qualified was 6 hours. The team found this evaluation acceptable and considered this item closed.

Issue 21

The SSFI report identified a concern that the licensee had not consistently implemented the guidance contained in Regulatory Guide 1.47. Some recent modifications referenced this RG, while others did not. Specifically, the HPCI auxiliary oil pump trouble alarm may not receive a timely operator response because it is combined with other non-safety equipment trouble alarms.

The licensee provided documentation to the team stating that RG 1.47 was not a design requirement Peach Bottom and that a policy incorporating the requirements of the RG was not appropriate. This position was based on General Electric design document NEDO-10139, which applied to the initial plant design and permitted alarms in conjunction with observation of on/off status indicating lights and control switch positions to determine abnormal or failed equipment conditions.

The licensee stated that Design Basis Documents (DBDs) were being developed which would provide design engineers and other utility personnel with the applicable design commitments for systems, components and equipment. Currently, a pilot program is in progress to develop 12 DBDs with the goal of developing DBDs for each safety system.

The team reviewed the table of contents for the DBDs to assure that the applicable regulatory guides and industry standards would be referenced. No plans exist, however, to develop a UFSAR revision that tabulates the degree of compliance with regulatory guides and industry standards, which the team considered to be a weakness.

Issue 22

The SSFI report identified concern with EDG electrical loading under various post-accident conditions. Plant modifications have resulted in a reduction of previously established design margins to the point where emergency bus loads would have to be reduced below 1400 Kw prior to attempting a manual restart of a residual heat removal (RHR) pump. This load reduction is required to prevent bus voltages from dropping below the minimum required to maintain the remaining equipment in service. The applicable plant procedures did not include strong direction to the operator to ensure that loads had been sufficiently reduced, or provide guidance to assist in selecting loads for removal which would result in the needed reduction.

In response to the concern, the licensee committed to revise procedure SO 10.7.A-2, "Residual Heat Removal System LPCI Mode Manual Start," to include specific action steps, and to reference appropriate guidance on load reduction. Additionally, operator aids will be supplied to ensure proper selection of loads for removal when manually starting a RHR pump. This action satisfactorily addresses the SSFI concern.

Issue 23

The SSFI report identified concerns with the ability of the DC ground fault detection system to actuate in response to certain faults. This concern was primarily due to the inability of the licensee to recover supporting documentation. The licensee initiated corrective action to reconstitute the necessary calculations. This activity was underway at the time of this follow-up inspection and is planned to be completed by October 31, 1990. This action satisfactorily addresses the SSFI concern.

Issue 24

The SSFI report identified several instances in the electrical protection systems where calculations were found to be deficient in terms of proper referencing, substantiation of assumptions, methodology, checking/verification and control of documentation.

The licensee informed the team that in response to the deficient conditions a three year program was being initiated to reconstitute all protective relay calculations. Further, the specific items identified during the SSFI will be used as a pilot program for standardizing the methodology for the reconstitution effort. This pilot project is planned to be completed by the end of the first quarter of 1991.

Issue 25

The SSFI report identified discrepancies between alarm response card information and the setpoints engraved on the control room and remote shutdown panel (RSP) annunciator windows. Outdated ARCs were observed in a holder on the face of the Unit 2 RSP adjacent to the HPCI controls. Additionally, discrepancies were noted between drawings and check-off lists for the HPCI and ESW systems.

The licensee took immediate corrective action during the initial inspection to remove the outdated ARCs from the panel and established an action plan for investigation and resolution of the root cause of the deficiency. The Operations department conducted a walkdown of all alarm panels, comparing window information against procedures and prints. Discrepancies were documented and submitted for resolution under NCR P90362 and NCR P90564. The discrepancies were analyzed collectively and it was determined that no immediate safety concern existed. ARC revisions are currently being implemented. The documentation discrepancies noted for the drawings and valve lineups were minor in nature and are being corrected in accordance with the Unit 2 drawing walkdown and upgrade program.

Issue 26

The SSFI identified several deficiencies with the operational performance of Special Procedure (SP) 630-2, "Integrated Test of the Unit 2 Emergency Cooling Water System." This issue is addressed in Section 7.0.

Issue 27

The SSFI report identified licensee weaknesses in the performance of surveillance test ST 10.1-3, "Unit 3 HPCI Flow Rate at 150 psig Steam Pressure." The objective of this test is to satisfy the requirements of TS 4.5.C.1(3), which calls for the testing of the HPCI system flow rate at 150 psig steam pressure once per operating cycle. The last surveillance test was performed on November 26, 1989, at a reactor pressure of 160 PSIG instead of 150 psig.

The licensee uses PORC Positions to provide management approved guidance to the operating staff on application of certain complex TS. NRC inspections have generally found this guidance to be appropriate and useful. The licensee provided a copy of PORC Position No. 24, Revision 1, dated February 14, 1990, which concluded that the subject HPCI test method was acceptable. The licensee altered the TS test point of 150 psig, to a allow a range of values, 150 psig to 170 psig, using the PORC Position. The need for this relaxation stems from main turbine electro-hydraulic control system performance limitations which make operation of HPCI at this steam pressure difficult. The team agreed that the previous test conducted at 160 psig was technically adequate, and that no safety concern existed. However, the team was concerned that in this case the licensee used a PORC Position to alter a specific numerical limit in the TS. The team concluded that the licensee needs to evaluate a revision to the TS if the specified testing is not practical.

Issue 28

The SSFI report identified a weakness in the licensee's methodology used by maintenance for root cause analysis of equipment failures. Review of this area was not within the scope of this team inspection. Discussion of this area was included in the recently issued Peach Bottom SALP Report, and it will receive inspection follow-up in the future.

Issue 29

The SSFI identified a weakness in the licensee's issuance, control and disposition of equipment trouble tags (ETTs). The licensee's procedures require placement of an ETT when a deficient material condition is identified in the plant. Processing of the ETT results in generation of an NCR or MRF to resolve the defect. Following completion of the work, licensee procedures require removal of the ETT. Instances were identified where ETTs remained in place on equipment after maintenance had corrected the deficiency, tags were placed on equipment but the licensee did not initiate a MRF or NCR, and the ability to track ETT status to ensure corrective action was implemented could not be demonstrated.

The licensee provided the SSFI follow-up team a response package which contained a draft of an Administrative Guideline AG-26.1, "Equipment Trouble Tag (ETT) Initiation and Processing." There was no documentation supporting a root cause analysis or identifying corrective action planned or taken. The team reviewed Administrative Procedure A-26, Revision 27, "Corrective and Preventive Maintenance Using Champs," which is currently used, and was in use during the SSFI, to establish requirements for the initiation and processing of ETTs. The guidance contained in the revised AG-26.1 mirrored the already established procedural requirements in A-26.

The team concluded that the procedures were clear, but that implementation had not been adequate. A sample of seventeen ETTs in place in the plant was selected by the team to determine the extent of the weakness. Of the seventeen only four had associated active MRFs. No MRFs could be identified for three and the MRFs associated with the remaining ten had been either completed or canceled. Failure to initiate a MRF after placement of an ETT, or failure to remove the ETT following completion or cancellation of the MRF has the potential to mask material deficiencies in the plant. Licensee personnel would not be likely to initiate a MRF for a problem if the presence of an ETT implies that one has already been initiated. Additionally, operators may have less confidence in equipment performance if a substantial number of ETTs are present. The licensee agreed to evaluate the weakness and to implement corrective action. This item will remain unresolved pending completion of the licensee's review and evaluation by the NRC (UNR 90-80-02).

Issue 30

The SSFI identified specific areas where housekeeping needed to be improved and where unrestrained maintenance trolleys were stored in the area of safety-related equipment.

The licensee completed immediate corrective action for the items identified. Further, the licensee revised Administrative Guideline AG-26.5, "Defects Found and Work Performed," to provide additional guidance to prevent recurrence. The specific steps delineated in the guideline are adequate. However, the institution of a guideline does not ensure corrective action in that adherence to the guideline is not required, as a procedure requirement would be. Housekeeping at Peach Bottom has been noted as a strength during past inspections, and remains good. Based on this the team considered this action adequate.

Issue 31

The SSFI report identified that the ECT/ECW system DBD was not being developed concurrently with the ESW system DBD. The licensee provided the team with documentation which authorized and required completion of the identified DBDs by March 31, 1991, which was satisfactory for closure of this item.

10.0 CONCLUSION

The team conducted an exit interview on October 3, 1990, to brief licensee management regarding the inspection findings. It appears that the licensee has implemented an effective program of corrective action in response to the SSFI. This program includes short-term and long-term measures to prevent recurrence of the violations identified, and has received substantial management attention. Perhaps the most noteworthy effort is the licensee's self-initiated program of internal SSFIs. This effort, in conjunction with the developing DBD program, should help to identify and address similar design, maintenance and test issues. Several areas requiring additional NRC and licensee follow-up were identified and are noted as unresolved items in the report.

APPENDIX A
DOCUMENTS REVIEWED

Following is a list of the significant procedures, specifications, calculations and other documentation reviewed by the team during the inspection. Additional support information was also included in the review but has not been included in the listing.

Procedures

NEDP 3.11	Procedure for Processing Engineering Work Requests, Revision 1
NA-03N001	Control of Nonconformances, Revision 1
NQA-16	Open Items, Revision 1
NQA-25	Corrective Action, Revision 2
NA-02R001	Identification and Evaluation of Potentially Reportable Items and Events of Potential Public Interest, Revision 0
NA-02A002	Investigation of In-house Events, Revision 0
SO 48.1.B	Emergency Cooling Water System Startup, Revision 6
SP 1353	ESW Booster Pump Discharge Valve Throttling Limit Determination, Revision 0 with TCs 90-0364, 90-0369, 90-0375, 90-0377, 90-0378, 90-0381
A-8:C	Locked Valve List - Common, Revision 11
AG-12	PORC Administration, Revision 3
NEDP 3.3	Procedure for Performance of 10CFR50.59 Reviews, Applications for Amendment to Facility Operating Licenses, Changes to the PBAPS and LGS UFSARs, and Completion of the Fire Protection Review Checklist, Revision 18
NA-02C001	Commitment Tracking Program, Revision 1
NA-02R002	10CFR50.59 Reviews, Revision 0
AG-66	Use of Form for Documenting 10 CFR 50.59 Reviews, Revision 0
ST 21.5.1	Dual Unit ESW Test of ESW to ECCS Ring Headers and Diesel Generator Coolers
ST 21.5-2	ESW Flow Test Through ECCS Room Coolers and RHR Pump-Seal Coolers - Unit 2

ST 21.5-3 ESW Flow Test Through ECCS Room Coolers and RHR Pump-Seal Coolers - Unit 3

Safety Evaluations

Safety Evaluation for EWR P-51246

Safety Evaluation for SP 1355, diesel Oil Transfer Pump Performance Test

Safety Evaluation for EIR 3-90-032

Safety Evaluation for MOD 1542, Revision 1 - Drywell Cooler Fan Logic

Licensee Audit Reports

Peach Bottom APS, NQA Audit PA 89-06, Audit of Control of Hardware Nonconformance (NQA-24), April 18, 1989

NCR Quality Review Task Force Report, June 1, 1990

Temporary Plant Alterations

TPA 40-02 to Install Blanks on Rx Building Vent Supply to A and C RHR Rooms

TPA 62-8 to Remove digit display and clear rod drift

Modifications

MOD #1419, Replacement of Safety Related Rosemount Model 1151 Electronic Transmitters

MOD 1498, Replacement of Testable Check Valves AO-18, AO-22 and AO-13A&B

MOD 1891, Replace Drywell Spray, Suppression Chamber Spray, RCIC, HPCI, etc. Flow Transmitters for RG 1.97

MOD 5011, Remove the RSCS and Lower RWM Low Power Setpoint

Correspondence and Other Documents

Memo, Gallagher to Pyrih, NCR Quality Workshop, July 31, 1990

Memo, NCR Quality Task force to Pyrih, June 8, 1990

Memo, Baker to Coyle, NCR NGAP Revision, LQDM 90-0234, August 31, 1990

Memo, NCR Quality Task Force to Pyrih, September 18, 1990

Technical Specification Change Request 89-20

Memo, ST 21.5-2 Flow Out Tests, J. S. Humphries to William Jefferson, September 24, 1990

Memo, ESW Room Cooler Failures During ST 1.5-2 (3), J. S. Humphries to William Jefferson, September 28, 1990

Letter, Peach Bottom ESW/HPCI SSFI issues and corrective actions, H.D. Honan to distribution, August 06, 1990

Study, ESW Piping (metallurgical laboratory note number 84-822), R. S. Fleischmann to E.C. Kistner, October 04, 1984

Letter, NRC follow-up inspection to SSFI performed on PBAPS ESW and HPCI systems, J.G. Hufnagel Jr. to J.A. Basilio, September 17, 1990

Calculations

PM-106	Determine ESW Booster Pump Suction Pressure, Revision 0
ME-087	Verify the Stress in Conduit and Conduit Supports are within Allowable Limits, Revision 0
EE-011	LOCA/MSLB Temperature Effects on Drywell Hi Rad Monitors RE-0103A,B,C,D and RE-9187A,B,C,D, Revision 0
EE-018	Calculate Setpoint for Level Switches LS-2898, 3898, Revision 0
ME-094	Verify Stress in conduit and Supports are within Allowable Limits - Zone 78B, Revision 2
EE-036	Calculate the Adequacy of the 200HP Diesel Generator Rating Using Motor Break HP and Review KW Load Values in FSAR vs Current Plant Documentation, Revision 0
ME-084	Verify Stress in Conduit and Supports are within allowable Limits - Zone 78B, Revision 1
ME-082	Verify Stress in conduit and Supports are within Allowable Limits - Zone 78B, Revision 2
ME-090	Verify Stresses in conduit and Supports are within Allowable Limits, Revision 2

ME-227	Design Lead Shielding for Radwaste Resin H20 Drain Line
EE-033	Analysis of DC MOVs Voltage Adequacy for PBAPS Unit 2 - Response to NRC Audit Question Item #1 89-87-1 of Revision 2 -Including Unit 3, Revision 3
670803 -2.2-001	HPCI Pump Room Heatup Analysis
670803 -2.2-002	RCIC Pump Room Heatup Analysis

Safety Evaluations

10CFR50.59 for Mod 5095, Emergency Cooling Water System Upgrade, Revision 7

10CFR50.59 Review for the Temporary Isolation of the Standby ECCS and RCIC Unit Coolers

10 CFR 50.59 Review for Throttling of ESW Flow to the Emergency Diesel Generators, Revision 2

10 CFR 50.59 Review for Opening of Cross-Tie Valves 0-33-512 A & B on the Common Cross-Tie Line Between Discharges of ESW Pumps OAP-57 and OBP-57, Revision 0

Training Documents

EAT-0001	Engineering Assurance and Training Branch Lesson Plan, Revision 0 (expanded training regarding 10CFR50.59 reviews)
NEDP 2.1	Procedure for Training of Nuclear Engineering Department Personnel
NGAP-0010	Lesson Plan - Nuclear Training; 10CFR50.59 Reviews, Revision 1
TST-1610	Tech Staff and Management Training, 10CFR50.59 Reviews, Revision 0
	Nuclear Quality Assurance - Independent Safety Engineering Group - Guideline for Review of 10CFR50.59 Safety Evaluations, Revision 3

EWRs

P50097	Reactor Pressure Vessel Thermal Cycles
P50371	Wide Range Reactor Water Level Loop Setpoint Calculations
P50397	ECT Pump Bolting Material

P50621	Temporary Sealed Penetrations
P50656	Inter flooding Blockouts Filled
P50704	Flood, Air Pressure and Radiation Seals for Conduits
P50821	Analysis of Failure of a GE CR120A Relay
P50837	Deletion of SCRAM Solenoid Pilot Valves From the EQ Program
P50860	MCC Walkdown Results
P51111	Safety Evaluation Review for Partially Installed Modifications
P51292	HELB Inside Containment - NRC IN 89-55
P51416	Inadequate Sealing of ECCS Rooms
P51527	Locked Valves
P51571	Internal Flood Seals

NCRs

P90118	Relocation of an instrument tap
P90451	Upgrading pressure control valves on containment purge and vent valve backup nitrogen supply
P90407	Replacement of check valve #62
P89784-312	Damaged feedwater piping supports
P90085	Inconsistencies between installed fuses and design drawings
P90443	Upgrading of DG cables
P90437	Upgrading of DG cables
P90438	Upgrading of DG cables
P90538	Drawing change to indicate closed valve to match plant procedures
P90232	Throttling of ESW flow to the EDGs

P90369	Discrepancies between design documents on fuse sizes
P90433	Downgrading of valves and cables
P90275	Repair leak on ESW piping
P90171	Repair leak on ESW piping
P89908	Move space heaters
P90011	Jet compressor steam flow low switch setpoint
P89839	Upgrade of spring pipe support
P90375	Testing and justification of fuses
P89982	Cracked HFA relays
P89781-533	Conduit seals on Rosemount transmitters
P89809-312	Repair pump hold-down bolt
P89961	Exceeding pipe expansion program limits
P90463	Repair RBCCW room seals
P90510	Revise UFSAR radiation zones
P90048	Fusing of loads
P89947	Equipment required following a MSLB
P90015	Revision to Q-list for HPCI
P90576	DG crankcase drain line
P90175	Blocked reactor core delta P transmitter
P89916	Seal hatch covers effect on Rx building ventilation system
P90158	LPCI manual pushbuttons effect on DG operability
P90034	Periodic maintenance of stored motors

CARs

PS89-12-01 Reservoir orientation on hydraulic snubbers

PC89049411 Processing of potentially reportable items

PA89-37-01 Absence of required limits in diesel oil transfer pump functional test

PA89-34-07 Elimination of diverse design features in pressure sensors

PC89-040412 Use of teflon tape without a rework MRF

SFIP89-001 Battery/Switchgear Room Ventilation Damper Maintenance and Alarm Procedures

SFIP89-009 Calibration and Trip Testing of Battery Charger AC Input Breakers