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REGION I

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LICENSEE: PECO Energy
P.O. Box 195
Wayne, Pennsylvania 19087-0195

FACILITY NAME: Peach Bottom Atomic Power Station Units 2 & 3

INSPECTION AT: Delta, Pennsylvania

INSPECTION DATES: November 29 - December 3, 1993


INSPECTOR:



Alfred Lohmeier, Sr. Reactor Engineer
Materials Section, EB, DRS

2-15-94
Date

APPROVED BY:



Michael C. Modes, Chief
Materials Section, EB, DRS

2/15/94
Date

Areas Inspected: The inspection assessed the following areas: engineering organization and responsibilities, goals and current issues for 1993-94, engineering performance, engineering quality assurance, modification design engineering, plant operations review committee, shift engineer interviews, and cyclic operation data retention and monitoring.

Results: Completion of NEEDS tasks is on schedule. Engineering management has publicized major goals and issues. PBAPS provides for a comprehensive program to focus management attention on improving plant operation effectiveness. Performance indicators, covering a wide range of issues, provide a measure of the overall engineering operation and indicate many successful areas and several areas requiring management attention for improvement. Engineering assurance has noted both improvement of engineering effectiveness and needed improvement in several areas. NEEDS reorganization of quality assurance responsibility to the line organization represents a major redirection of quality. Modification schedule reports comprehensively describe the status of 80 ready-to-work modifications. The technical background, experience, education, and training of system shift engineers is good.

DETAILS

1.0 SCOPE OF INSPECTION

The scope of this inspection included the assessment of engineering and technical support activity at Peach Bottom Atomic Power Station (PBAPS). Included in the assessment were engineering organization and responsibilities, goals and current issues for 1993-94, engineering performance, engineering quality assurance, modification design engineering, plant operations review committee, shift engineer interviews, and cyclic operation data retention and monitoring.

2.0 FINDINGS

2.1 Engineering Organization and Responsibilities

The inspector reviewed the Peach Bottom Atomic Power Station (PBAPS) engineering and technical support activity; reorganized under the NEEDS program. The inspector found that the vice president of PBAPS has resigned, effective November 24, 1993, and was replaced by the former vice president of station support at the nuclear headquarters in Chesterbrook, Pennsylvania. The new vice president of PBAPS has been with PECO Energy Company (PECO) for 24 years; three of which were spent as station superintendent at PBAPS.

From review of the NEEDS implementation schedule, dated December 1, 1993, the inspector found the engineering organizational changes at PBAPS under the NEEDS program to be almost fully implemented. With few minor exceptions, the transfer process of personnel to PBAPS is complete. Several items for which completion is expected in 1994 are initiation of modification engineering at the site, resolving non-conformance report ageing issues, and reduction of the engineering backlog. On the basis of this review, the inspector found the completion of the PBAPS administrative tasks under NEEDS is on schedule and nearing completion early in 1994.

2.2 Goals and Current Issues for 1993-1994

The inspector found that the PBAPS goals, consistent with the overall nuclear group goals relating to safety, regulatory performance, financial performance, investment protection, internal/external relations, and organizational effectiveness, are being followed by means of site objectives for PBAPS. PBAPS is communicating its overall objectives through identification of a current list of issues. The list includes continued investment in people, a process of continued improvement, continued investment in Peach Bottom, increase in plant reliability and availability, implementation of NEEDS, and addressing major plant issues.

The issues of significance to PBAPS engineering are the improvement of site facilities, removal of stored waste, development and implementation of plant performance monitoring, addressing chronic equipment problems, reduction of engineering and maintenance backlog, and timely return of systems to service.

Major plant issues that are identified in the statement of goals are Thermo-Lag, reactor water level, fuel performance, station warehouse inventory, raw water systems, vehicle intrusion threat, and foreign material exclusion.

The inspector finds PBAPS engineering management has targeted the major goals and issues related to plant operation. Management has also widely publicized these goals and issues to PBAPS personnel.

2.3 Assessment of Engineering Performance

The inspector reviewed the PBAPS monthly update of station performance indicators, dated November 9, 1993, that provide for an assessment of engineering department performance. These include evaluation of Licensee Event Reports (LERs), Engineering Open Items (EOIs), Reportable Event Investigation Forms (REEIFs), and Plant Operations Review Committee (PORC) Reports.

Another means of engineering department assessment is through observation of the Daily Leadership Meeting, during which the on-going plant operational problems are discussed with the participation of engineering representatives. At this meeting, progress in addressing the top thirteen chronic issues at the plant, called the "Baker's Dozen", is openly discussed. The concept of limiting the top issues to thirteen will be discontinued by PBAPS in not restricting the total number of issues considered significant. The concept is presently under review, with new significant issues being identified on the basis of more recent assessment of performance needs.

The inspector found that PBAPS provides for a comprehensive program to identify major issues affecting plant operation. These areas are given focused management attention to improve plant operation effectiveness.

The specific results of PBAPS performance assessment related to engineering are discussed in the following sections:

Plant Emergency Core Cooling System Safety Assessment

The inspector reviewed PBAPS safety system performance indicators, which can be a direct or indirect indication of engineering performance. Specifically, the performance of the emergency core cooling system high pressure coolant injection system (HPCI) and reactor core isolation cooling system (RCIC) for PBAPS 2 and 3 availability were reviewed by the inspector. It was noted that the 36 month rolling average of unavailability of Unit 2 was 1.5 percent, under the goal of 2.5 percent. Unit 3 was at 2.8 percent, only slightly above the targeted goal of 2.5 percent. PBAPS stated that unavailability for October for both units was zero. Therefore, the inspector found that performance of these safety systems were not adversely affected by NEEDS related changes in organization and personnel.

The inspector further reviewed the residual heat removal system (RHR) and emergency ac power system (EGEN) availability performance. The 36 month rolling averages for RHR system unavailability are 0.7 percent and 0.4 percent, respectively for units 2 and 3 RHR systems, below the target of 2.0 percent for each; unavailability for October was zero. The 36 month rolling average for EGEN was 1.9 percent. This average is below the PBAPS targeted 2.0 percent unavailability. The inspector found that performance of these safety systems were not adversely affected by NEEDS related changes in organization and personnel.

Regulatory Performance Self Assessment Indicators

The inspector reviewed several regulatory performance indicators covering a wide range of issues. These include evaluations of new issue generation, age of open issues, reportable event investigation form (REEIF) issuance, licensee event reports (LERs), plant information management system backlog, commitment closure quality/timeliness, and vendor manual management program progress. PBAPS assessments of their performance in these issues are given in the following paragraphs:

PBAPS has indicated that the number of reported events has increased steadily during 1993 at PBAPS. There were 45 clearance and tagging events, 7 equipment failures, and 12 equipment damage events. The steady increase in events has been identified by PBAPS and continues to be of concern to management.

The age of open investigation reports greater than 2 months old remains steady. However, the total number of open issues has continued to increase to over 200. This indicates a need for management attention to prevent a larger backlog from occurring.

LERs for 1993 have decreased from a rate of 2.91 events per month in 1992 to 2.20 events per month in 1993. Event causes monitored were procedure/program deficiencies, personnel error, technical specification/license violations, and equipment failure events. The number of personnel errors increased slightly from .66 events per month in 1992 to .70 events per month in 1993. There were no unique circumstances indicating specific locations of adverse changes in trends. The inspector found no event trends were attributed to NEEDS changes.

Analysis of the loss of safety systems by PBAPS indicated an increase in LERs from .25 events per month in 1992 to .60 events per month in 1993. PBAPS noted that the increase was due to five HPCI problems. Other factors including technical specification violations, ESF actuation, and scram events for 1993, were less than the 1992 average.

The inspector noted that the plant information management system (PIMS) backlog covering the era 1987 - 1991 is 966 commitments. Of these, 700 have been annotated into appropriate programs and procedures. There also exists a backlog of 895 items from prior to 1987, not included in PIMS, of which 300 have been dispositioned and 550 being reviewed for current relevance. The inspector finds that a backlog of approximately 860 items exists. Trend

curves indicate that these items are steadily being resolved. However, a large number of items remain as backlog. The tracking and trending of this backlog by PBAPS is a positive indication of management knowledge of, and pursuit of, resolution of the backlog problem.

The inspector found that significant effort has been expended in the initiative of review and incorporation of vendor manuals into the PIMS. As of the week of October 25, 1993, the outstanding vendor manuals to be processed since May 17, 1993 has been reduced from 5,300 to 420. The inspector found the vendor manual program is being successfully implemented.

An important initiative monitored by PBAPS is the number of temporary plant alterations (TPAs) installed. The inspector noted that the number of TPAs for both Unit 2 and Unit 3 have been significantly reduced from approximately 40 to below 20 since July of 1992. It was noted that the trend is related to success of changes in the responsibilities of plant engineers.

Engineering Documentation Performance Indicators

PBAPS indicators were reviewed by the inspector for trends of open PBAPS design documents (DCDs), including engineering change requests (ECRs) and nonconformance reports (NCRs). The total number of ECRs since August of 1993 has decreased from 1036 to 984. The total number of NCRs has decreased from over 1200 in December of 1992, to 658. Design equivalent change engineering change requests (DEC-ECRs) have decreased from 335 in April, 1993 to 206.

In review of other performance indicators, the inspector noted that engineering work requests (EWRs) decreased as a result of increased effort to close overdue EWRs. PBAPS modification design change ECRs (MDCH-ECRs) increased due to the more timely attention being placed on the timeliness of addressing ECRs.

In reviewing the foregoing indicators, it was noted by the inspector that there was a generally favorable trend in engineering documentation performance indicators.

Summary of Engineering Performance Review

In reviewing the self assessment program implemented by PBAPS, the inspector finds PBAPS has openly reviewed its performance over a wide range of considerations related to engineering. The measurement of effectiveness of PBAPS engineering is based on adherence to corporate, nuclear group, and station goals. Outstanding issues are publicized widely to station engineering personnel. Station reorganization through the NEEDS program has been well planned and progress toward planned goals well monitored.

The performance indicators reviewed by the inspector cover a wide range of issues. In providing an assessment of the overall engineering operation on the basis of this review, it is noted that there have been many successes along with several areas requiring management attention for improvement. The engineering backlog issue is an area requiring management attention, and it was noted by the inspector that the issue has been self-identified through the performance assessment program.

The inspector noted that, for most of the measured performance indicators, it was believed by PBAPS that the NEEDS program was not a cause of any negative trends. In fact, it was found that, through interviews with systems management and engineering personnel, operational improvement in systems engineering was taking place as a consequence of the reorganization under NEEDS.

2.4 Engineering Quality Assurance

As part of the NEEDS program, Nuclear Quality Assurance has changed areas of focus and organizational responsibility. Reporting to the Director of Nuclear Quality Assurance at Chesterbrook Headquarters are the manager of PBAPS site quality assurance and the manager of the Independent Safety Engineering Group (ISEG). The PBAPS site quality assurance group provides for quality assurance audits and assessments of Peach Bottom activities, and the PBAPS independent safety engineering group performs a technical specification mandated role of examining information related to improvement of unit safety.

Included in the Quality Assurance organization changes related to PBAPS engineering are line organization responsibility for in-line verification, transfer of quality assurance understanding to line organization and facility cultural change, revision of nuclear group programs, policies, and procedures, elimination of NQA review of administrative procedures, transfer of corrective action verification and closure to line organizations, transfer of nuclear review responsibility to line organization, transfer of in-line review of procurement documentation to the line organization, transfer of receiving inspection to the materials department, transfer of non-destructive examinations and planning to the maintenance department, transfer of maintenance and installation inspection to the line organization, transfer of NDE support from NQA to Nuclear Materials Department (NMD), elimination of the administrative and quality support sections, merging quality engineering and vendor audits into one section, and merging audits and technical monitoring into one section.

The inspector finds the reorganization of quality assurance activity responsibility to the line organization represents a major redirection of the quality assurance responsibility. The outcome of the transformation will require some time to assess, since the effectiveness, or lack thereof, will not be immediately apparent. The transformation, however, is committed, and progress toward that direction is proceeding on schedule.

The inspector reviewed recent PBAPS Nuclear Quality Assurance (NQA) surveillances and audits related to engineering activity at PBAPS. These included installation of a reactor backfill system (PSR-93-0184 - surveillance), engineering review request forms and engineering change requests (A0771799 - Nuclear Engineering Division (NED), NED setpoint control program activities (A0779630 - audit), logic system and functional test program (A0680038 - audit), and integrated leak rate and local leak rate test programs (A0680055 - audit). Reports of these surveillance activities are comprehensive. The reports are well written and provide for an executive summary, detailed description of activity, findings of the surveillance, corrective activities taken, and assessment of performance.

The inspector reviewed recent ISEG reports related to PBAPS engineering activity issues. These included review of reactor water reference legs backfilling procedures during power operation of Unit 2 (ISEG 93-35), and review of reactor water level transients following reactor scrams at power (ISEG 93-09). These reports are comprehensive and well written. They provide for a summary, background, details of the review, and conclusions with recommendations where appropriate.

Another quality assurance organization affecting PBAPS, although centered at Chesterbrook Headquarters, is the Engineering Assurance Group. Activities of this group include design review board, assessments of activities, partnership with NQA, root cause analysis, performance indicators, task forces, self assessment direction, attendance at interface meetings, and business plan development. As a result of its activities, engineering assurance has noted improvements including increased efforts towards closeout of the backlog, increased communication with sites, immediate responses to site problems (core shroud issue, MOV issue), proactive work management effort. Needs for improvement were noted in procedural responsibility training and technical awareness, need for procedure simplification, confidence in management, clear resolution of issues, and strengthening of management. The engineering assurance group provides a necessary oversight at headquarters of engineering performance at PBAPS.

2.5 Modification Design Engineering

The inspector reviewed the program of engineering to design small modifications at PBAPS. It was found that, at present, all modifications are being designed at Chesterbrook headquarters. PBAPS is directing its engineering resources, at the present time, toward the problem of reducing engineering backlog. PBAPS engineering will begin developing small modifications early 1994. Major modification design projects will remain the responsibility of headquarters engineering.

PBAPS prepared a status report for monitoring the non-outage 9th and 10th cycle modifications. Included in the submittal were milestone reports on the Unit 2 forced outage modifications, the Units 2 and 3 non-outage 1993 modifications, the Units 2 and 3 non-outage 1994 modifications, and the Unit 2 10th cycle modifications. These reports comprehensively describe responsible program management, funding sources, schedules for

NED engineering, contract management, installer of choice, lead station representative, and scheduled ready to work date. The schedule comprehensively covers the status of 80 modifications. The inspector finds the course of the modifications to be well managed.

2.6 Plant Operations Review Committee (PORC)

The inspector attended the PORC meeting of December 2, 1993 to observe the participation of engineering personnel in PBAPS issues presented at the meeting. Included in the discussions was a modification action request for detectors in the off-gas tunnel, radiation monitor replacement, acoustic leak detection system for feed water heater leaks, bottom head drain modification, and set point changes. Discussions were also held on the rerate issue. Each issue was comprehensively prepared and discussed, from which the PORC members displayed generally wide knowledge of the issues being discussed. The meeting was well organized and minutes taken on the spot of the decisions made on each issue. The cooperation among design and systems engineering, and operations personnel was apparent from the discussions.

2.7 Interview with System (Shift) Engineer

In order to examine the qualifications of system engineers, the inspector interviewed an engineer from the Instrument and Control Electrical Group. By means of the interview, the inspector determined his technical background, experience, education, training, and attitude toward his assigned position.

The system engineer was employed with PECO Energy Company for 13 years, of which 3 were with PBAPS. His 10 previous years were with fossil power generation systems at the Eddystone power generation plant. He is a graduate electrical engineer. As a shift engineer, he shares responsibility with 4 other engineers to be available for shift work on a rotational basis with the others. After joining PBAPS, he received extensive training, with 40 percent of his time during the first year at PBAPS spent in reactor engineer training. The training also included special courses, such as advanced fluid flow. He has also been given shift engineering training.

The system engineer commented on the fact that most plant functions appreciate the concept of the shift engineer, which has been going on for about two years. He stated the NEEDS program reduced the shift engineer staff by 1 from the original 6. There was much internal bargaining among groups to keep the systems engineer concept in force.

The inspector was impressed with the technical background, experience, education, training, and positive attitude of this shift engineer.

2.8 Cyclic Operation Data Retention and Monitoring

The inspector reviewed progress made in resolving URI 277/90014-02. Consistent with the request of NRC during the previous Engineering and Technical Support Inspection 93-18, PBAPS provided for a schedule of data retrieval that will provide for information sufficient to close the UNR. The delay in obtaining this schedule was due to unavailability of the engineer assigned to complete the schedule. The schedule presented to the inspector, during the inspection, included development of the data acquisition procedures (December 15, 1993), development of cycle counting methodology (March 31, 1994), determination of necessary past data required from archives (April 30, 1994), perform preliminary review of cycle counting and archive data sufficiency (May 31, 1994), determine total number of transients expended to date, and prepare a table of cycles expended to date and compare with each transient listed in the Updated Safety Analysis Report, Table 4.2.4, evaluating the percent of total component life expended (December 31, 1994).

The inspector finds the main impediment to cyclic life evaluation is obtaining the necessary data on which to base the evaluation. The inspector checked the system by which such data might be obtained from the archives through the document retrieval section at PBAPS. It was found that, if one knows exactly what is needed, the retrieval can be very fast.

The inspector finds PBAPS to be actively pursuing a reasonable action plan to provide sufficient operating data to enable URI 277/90014-02 to be closed.

3.0 UNRESOLVED ITEMS

Unresolved items (URIs) are matters about which more information is required to ascertain whether they are acceptable items or violations. The examination of an unresolved item previously identified in inspection report 50-277/90-14, 50-278/90-14, was reviewed for closure by the inspector and requirements for closing the item were identified in inspection report 50-277/93-20, 50-278/93-20.

4.0 CONCLUSIONS

- Vice President of PBAPS has been replaced with one having extensive PECO management background, including that of station superintendent at PBAPS.
- Completion of the PBAPS administrative tasks under NEEDS is on schedule and nearing completion early in 1994.
- Engineering management has targeted major goals and issues for PBAPS, and has widely publicized these goals and issues to PBAPS personnel to provide for more effective and safe operation of the plant.

- Performance indicators covering a wide range of issues provide an assessment of the overall engineering operation indicate many successful areas and several areas requiring management attention for improvement, such as the engineering backlog.
- Engineering assurance has noted increased efforts towards closeout of the backlog, increased communication with sites, immediate response to site problems (core shroud issue, MOV issue), and a pro-active work management effort. Needed improvement was noted in procedural responsibility training and technical awareness, need for procedure simplification, confidence in management, clear resolution of issues, and strengthening of management.
- The NEEDS reorganization of quality assurance responsibility to the line organization represents a major redirection of the quality assurance. The outcome will require some time to assess.
- PBAPS prepared modification schedule reports that comprehensively describe the status of 80 ready-to-work modifications.
- The technical background, experience, education, and training of system shift engineers is good and a positive attitude was displayed by an interview shift engineer.
- The inspector finds PBAPS to be actively pursuing a reasonable action plan to provide sufficient operating data to enable UNR 90-14-02 to be closed at the end of 1994.

5.0 MANAGEMENT MEETINGS

The inspector met with PBAPS representatives at the entrance meeting on November 29, 1993, and at the exit meeting on December 3, 1993, at the Peach Bottom Atomic Power Station in Delta, Pennsylvania. The names of PBAPS personnel contacted is shown on Attachment A.

The findings of the inspection were discussed with licensee management at the December 3, 1993 exit meeting. PBAPS personnel did not disagree with the findings of the inspector.

ATTACHMENT A

Entrance and Exit Meeting Attendance List

Peach Bottom Atomic Power Station

* J. M. Armstrong	Senior Manager, Plant Engineering
* R. J. Blomquist	Assessor, Nuclear Quality Assurance
* W. W. Bowers	Independent Safety Evaluation Group
A. Fulvio	Manager, Nuclear Quality Assurance
D. Foss	Regulatory Engineer
* F. A. Cook	Senior Manager, Design Engineering
* J. Jordan	PBAPS Engineering Training
* I. F. Mitman	Manager, Component Engineering
* T. Niessen	Director, Site Engineering
* R. K. Smith	Regulatory Engineer
F. Valentino	Manager, Engineering Assurance, NED

Site Representatives

* H. R. Abendroth	Site Representative, Atlantic Electric
* J. Carey	Site Representative, PSEG

Those names with an asterisk (*) attended the exit meeting on 3 December 1993.