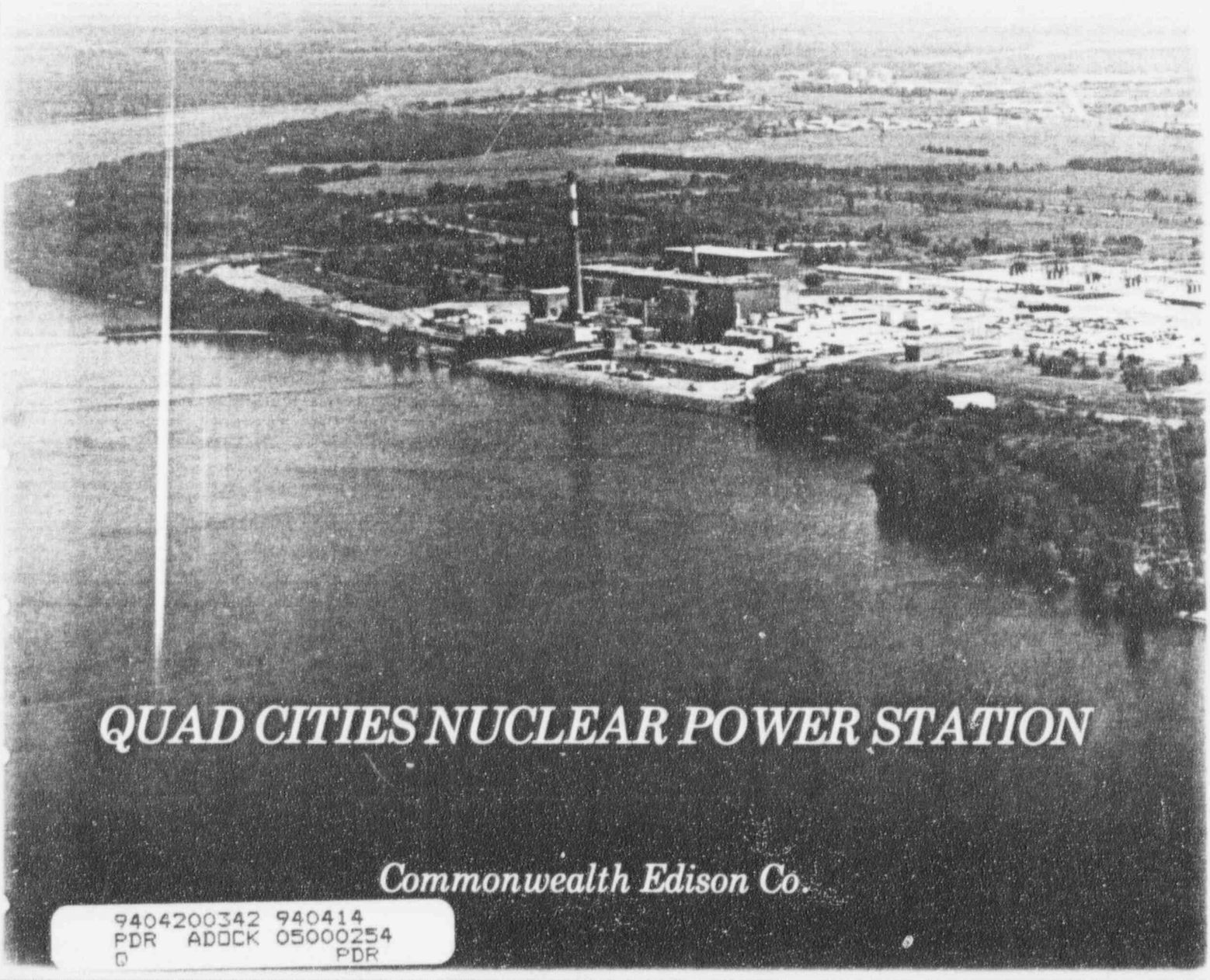
QUAD CITIES

NUCLEAR POWER STATION

COURSE OF ACTION



QUAD CITIES NUCLEAR POWER STATION

Commonwealth Edison Co.

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April 7, 1994

STATEMENT OF THE SENIOR VICE PRESIDENT AND CHIEF NUCLEAR OFFICER

As Senior Vice President and Chief Nuclear Officer of Commonwealth Edison Company, I want to underscore my commitment to support the Quad Cities Nuclear Generating Team's initiatives set forth in this Course of Action (COA). Over the next three years, plant performance and reliability will be improved to a level equal to or better than the industry average. In the longer term, I expect we will achieve a performance level equal to the best industry performers. Although the continued safe operation of the plant is not in question, significant areas for improvement have been identified by ourselves and others. Whether viewed through the eyes of our customers, our employees, our stockholders, or our regulators, the continued safe operation of Quad Cities is our most important concern.

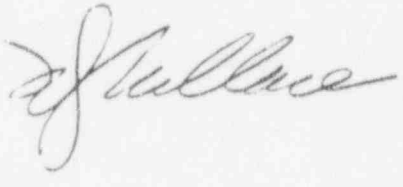
In the past we have developed improvement plans but did not completely implement them. Hence, certain identified issues persisted. Our efforts are now focused on executing our plans and sustaining measurable and substantive results. To accomplish this objective, we are establishing an aggressive corrective action culture founded upon intrusive management techniques, timely and formal problem identification, root cause analysis, as well as close management oversight of personnel performance and equipment performance and trends.

The purpose of the COA is to focus the collective intelligence and work ethic of the Quad Cities Nuclear Generating Team on upgrading Quad Cities Station, first, to a level of good performance and, eventually, to "World Class" performer status. Several actions have been undertaken to develop our COA and fulfill its purpose. In June 1993, the Business Development Team (BDT), a self- assessment group, reviewed Station performance to anticipate problem areas prior to the arrival of the NRC Diagnostic Evaluation Team (DET). The BDT Report and DET Response focused our attention on areas in need of further improvement. In January 1994, a Systematic Assessment of all recent performance evaluations led to the further identification of the causal factors underlining performance issues at the Station. The COA, which was formulated as a result of the analysis of the aforementioned data, will serve as the cornerstone of our improvement efforts.

It is important to note that we have not waited for the development of the COA to take aggressive actions addressing performance issues. Late in 1993, mid-cycle maintenance outages were conducted at both Quad Cities units to upgrade their materiel condition. Examples of other immediate improvement efforts that are independent from the COA include the strengthening of management, the improvement of the MOV program, and the efforts taken to improve problem identification and commitment tracking.

The last two years have witnessed major structural and cultural changes in our nuclear operations. Structurally we have established the position of Site Vice President and accorded that individual total responsibility and accountability for the Station's success. The Site Vice President position provides leadership and will be used to establish an uncompromisingly high standard of performance. Leadership also has been strengthened at Quad Cities Station by appointing experienced senior management personnel with proven performance records at other companies. During the past year, we have deployed many of the Corporate support services directly to the sites. The biggest move has come in transferring Engineering services to the sites to provide prompt and interactive support. These actions already have set our course for betterment.

I wish to state unequivocally that I, together with our Chairman and Board of Directors, are committed to providing the resources, both personnel and fiscal, to achieve and maintain a high level of performance at Quad Cities. Our commitment to sustained improvement at Quad Cities will be driven by our desire to attain our goals for improved performance and eventual excellence. We will take those actions necessary to address outstanding issues, not just their symptoms. These actions will assure that, guided by the strong sense of responsibility felt by the Quad Cities and Corporate management team, the job gets done.



ESK-94-001

April 14, 1994

TO: All Quad Cities Station CECo Employees

The Quad Cities Course of Action (COA) sets the direction that we must take in order to demonstrate steady, measured improvement to ourselves and, foremost, to our customers. I am fully committed to ensuring its successful implementation at Quad Cities and call you to join me in that effort. Together, we will improve Site performance and demonstrate our willingness and ability to develop and effectively implement a comprehensive improvement effort.

The COA charts the journey we must undertake to achieve the expectations and standards necessary for continued safe and reliable plant operation. The actions set forth in this document will cause us to change the way we do business at Quad Cities over the next three years and elevate our standards to meet or exceed those currently accepted in the industry. The COA goes further; it represents the sound foundation upon which continued improvements can be made throughout the licensed life of the Quad Cities Nuclear Power Station.

The Site's line managers developed the COA with two fundamental objectives in mind: (1) to identify the major issues and deficiencies in Quad Cities' performance; and (2) to prepare "Action Plan Summaries" that define the objectives that we must accomplish in order to resolve those issues. In drafting the COA, the line managers looked to information contained in existing Quad Cities self-assessments, as well as the NRC Diagnostic Evaluation Team (DET) and Systematic Assessment of Licensee Performance (SALP) 11 reports. The COA is the mid-term (3 year) document. The Quad Cities Business Plan is the 5 year planning document and the annual Quad Cities Management Action Plan serves as the annual document implementing the COA.

As you are aware, the major issues at Quad Cities are safety system/equipment performance, management and leadership, and problem identification and resolution. The COA requires a fundamental cultural change that no longer tolerates mediocre performance. The most critical standards are those that we will be establishing for ourselves. Programs and processes alone will not remedy mediocre performance. It also requires a personal commitment from each member of the Station team.

In order to meet our expectations and achieve the level of performance of which we are capable, we will approach our work with absolute integrity; be open and direct in communications; address irregularities immediately before they evolve into major problems; and emphasize the importance of quality. There are no insignificant jobs at Quad Cities. Each job contributes to our overall success. Quality must become second nature and anything less will not be accepted. Completing activities correctly the first time will become a matter of routine at the Station.

The DET recognized, as a strength, the capabilities of the Quad Cities work force. By pairing our technical capabilities with a work ethic grounded in quality and absolute integrity, we eventually will achieve "World Class" status. I want each member of the Quad Cities Station team to elevate their involvement to a personal commitment to do what is necessary to realize the performance potential of our Station. I will join you in this effort and together we will be successful.

E. S. Kraft, Jr.
Site Vice President
Quad Cities Nuclear Power Station

ESK/db

EXECUTIVE SUMMARY

Commonwealth Edison Company (CECo) is committed to the highest standards for its nuclear power plants. Results of both external and internal reviews, indicate that these standards are not always being met in important areas at Quad Cities Nuclear Power Station. Appropriately, CECo officers and management are focussing attention on performing activities that are necessary to address the issues identified through these reviews.

CECo recognizes that it has developed a reputation of initiating aggressive plans for resolving programmatic issues at its nuclear facilities -- but often not carrying such plans to completion due to insufficient corporate and plant management commitment. This, unfortunately, has been the case with previous improvement activities at Quad Cities. Further, CECo has been inwardly-focused and has not fully benefitted from the experience of other portions of the nuclear industry, both in terms of the lessons-learned from other plants and significance of ever increasing standards of the nuclear industry as a whole.

As described herein, important and substantive changes have been made in the management and commitment of both Corporate and Site personnel, which will ensure the success of our performance improvement activities at Quad Cities. As described in Appendix A, many of these improvement activities have already been initiated, and it will be our challenge to maintain this momentum while we simultaneously develop and implement the other improvement efforts contained in the Quad Cities Course of Action (COA).

IMPROVEMENT APPROACH

CECo's Corporate management has given Edward S. Kraft, Jr., the newly assigned Site Vice President for Quad Cities, a specific mandate to provide the leadership required to effect substantive improvements in Quad Cities performance and reliability. In this capacity, Mr. Kraft initially will report directly to the Senior Vice President and Chief Nuclear Officer, Mr. Michael J. Wallace. In late May 1994, J. Stephen Perry will assume the position of Vice President Nuclear Operations for BWRs. The latter organizational changes will ensure additional Corporate focus on the performance improvement activities for Quad Cities, as well as at other CECo facilities. Mr. Kraft and Mr. Perry bring with them a broad perspective of performance excellence derived from both their experiences in nuclear power.

Recognizing that management and leadership shortcomings have been important contributors to Quad Cities' decline in performance, the following additional actions have been taken:

- Leadership has been strengthened at Quad Cities through the appointment of experienced senior management personnel from outside CECo to fill the positions of Station Manager, Technical Superintendent, Operations Manager, and Regulatory Assurance Supervisor. In addition, proven managers from other CECo facilities have been assigned to the positions of Maintenance Superintendent, Performance Improvement Supervisor, and Financial Services Director. (See Section 1.3.1)

- The Site Planning Group monitors and reports to senior management variances in the implementation of objectives specified in the COA and corresponding action plans detailed in the annual Management Plan. (See Section 1.3.1)

- Technical oversight at the Site has been enhanced by the newly-formed Technical Review Board. It is responsible for reviewing and prioritizing technical issues and identifying resource-intensive actions that need to be integrated into the COA and Annual Management Plan. (See Section 1.3.1)

- The Plant Operations Review Committee provides safety oversight and will provide increased assurance that the Station is operated, maintained, and modified in accordance with the design and licensing basis. (See Section 1.3.1)

- CECo has implemented an Integrated BWR Strategy which defines an improvement strategy for the immediate, mid-term, and long-term time frames. The immediate phase of the strategy targets improvement efforts at arresting materiel condition deficiencies, radiation protection issues, problem identification weaknesses, and human performance deficiencies. (See Section 1.4) The mid-term effort is described by the COA and the long-term strategy by the Business Plan.

Summarized below are: (1) the issues and objectives set forth in the COA, and (2) other near-term improvement initiatives that have been accomplished and/or currently are underway at the Site that further ensure effective implementation of the COA. It is important to note that our improvement efforts are not limited to those described in the COA. Long-term improvement will be the result of effective implementation and follow-through by Site management.

The Framework For Sustained Site Improvement -- The Quad Cities Course of Action

CECo recognizes that overall performance at Quad Cities Nuclear Power Station has declined since 1990. The observed decline in equipment, materiel condition and safety system reliability at the Station is due, in part, to issues involving past leadership and management. Current Site management is dedicated to carefully planning, coordinating, and executing actions that will arrest and reverse this trend and result in steady, measured improvement at the Station.

In order to improve performance efforts over the next three years and create a framework for sustained progress, CECo has developed the COA. It identifies the major issues responsible for the Station's declining performance and specifies corresponding "Action Plan Summaries" to address identified deficiencies.

Detailed, measurable activities implementing each of the "Action Plan Summaries" set forth in the COA will be found in the Site's Management Plan. As the working-level document, the annual Management Plan will serve as the vehicle by which to define specific improvement activities, measure and track their results, make any necessary corrections to improvement actions, and assign accountability and responsibility for their implementation at the Station. Examples of the expected level of detail that the Management Plan and its supporting documents will contain are presented in Appendix B. The Annual Management Plan is available for review at the Station.

Site management at all levels will be responsible for implementing the actions specified in the COA and accompanying Management Plan. Specific individuals will be assigned responsibility for managing and completing each action item. Internal self-assessment techniques will be employed to track implementation of the COA. Site and Corporate managers will be provided with periodic progress reports and briefings in order to keep them informed about COA implementation efforts. External review by the Course of Action Team, comprised of CECo personnel and external industry experts, will be used to follow and assess the closeout and effectiveness of COA improvement efforts.

Issues and Objectives

The following summarizes the major issue areas and corresponding action plan objectives specified in Sections 2 through 4 of the COA:

- **Management and Leadership**

The fundamental issues at the Site have been ineffective management and leadership. The results of this are manifested in many ways: e.g., inadequate establishment and communication of roles, responsibilities, accountability, and performance expectations both on individual and Site-wide levels; a willingness to accept equipment degradation without aggressively pursuing corrective actions; ineffective resolution of underlying root causes and prior unsuccessful improvement initiatives; and ineffective personnel training and development. (See Section 2.1.1)

In order to address these issues at Quad Cities, the Action Plan Summaries in Section 2 call for an aggressive and intrusive management style to effect fundamental change in safety culture, expectations standards, and Site performance. The Site's leadership team has already been significantly strengthened through the addition of experienced managers both from inside and outside Commonwealth Edison. Through the use of leadership by example and a focused effort to ensure clear communications, all departments and individuals will gain greater understanding of their roles, responsibilities, and accountabilities. Management involvement in day-to-day operations will be heightened at Quad Cities. The effectiveness of the management improvement objectives specified in the COA will be monitored and assessed in order to make necessary adjustments and to ensure steady measured progress. (See Section 2.1.2.4)

- **Operations**

Operations performance can be described as inconsistent. Observations include the ineffective implementation of previous improvement initiatives, ineffective communications with other Site departments, limited awareness of equipment degradation, and acceptance of situations that require work-arounds. (See Section 3.1.1)

A leadership change in Operations has been made with the assignment of a new Operating Manager and Shift Operating Supervisor. Operations management has adopted a style of leadership that provides the central focus for Site activities and has a high level of involvement in key Site processes . Operating deficiencies will be addressed by specific objectives including greater Operations involvement in the development of Site corrective actions, and the combined staffing of a new Work Control Center with both Operations and Maintenance personnel. The Operations Department has reorganized its control room staff to increase management presence. The direction previously provided by a single Station Control Room Engineer now is provided by two individual Unit Supervisors. (See Section 3.1.2)

- **Maintenance**

Maintenance issues involving work request inventory management, work package planning, scheduling, and implementation have been identified. Further, the preventive maintenance program is not sufficiently developed, as indicated by the high reliance on corrective maintenance. (See Section 3.2.1)

Overall maintenance work processes will be improved by centralizing the focal point of all work processes in the new Work Control Center. The new work control process combines the efforts of System Engineers and Operations personnel for the prioritization of work, work planning, and "system window scheduling." The "system window scheduling" concept has been adopted to facilitate the successful execution of work scheduling. A strategy to review the work request backlog also has been developed and a process is being deployed to effectively reduce the Maintenance backlog. (See Section 3.2.2)

- **Engineering**

Issues involving Engineering support have been identified at Quad Cities. They have resulted from unclear and misunderstood responsibilities, as well as inadequate levels of system knowledge. Additionally, large backlogs in most Engineering support products, inefficiencies in Engineering processes, and an acceptance of longstanding equipment problems have resulted in a reactive approach to engineering support. (See Section 3.3.1)

To address Engineering support issues, guidelines clarifying responsibilities, expectations, and standards will be developed and communicated throughout the Site. Experience and knowledge levels will be augmented by targeted training in specific areas including system design bases, operability evaluation, and root cause analysis. Specific plans will be developed to address backlog issues related to design changes, temporary alterations, long-standing generic issues, drawing changes, and vendor information. The temporary alteration process will be strengthened and clarified, and the number of temporary alterations will be reduced. A Technical Review Board (TRB) has been formed to enhance technical oversight at the Site. It is responsible for reviewing and prioritizing technical issues for input into the Site Planning Group (SPG). (See Section 1.3.1)

- **Quality Verification**

Specific items contributing to ineffective Quality Verification (QV) activities at the Station included failure to implement existing QV programs to efficiently elevate issues to senior management, failure to systematically incorporate issues identified by field monitoring into the existing corrective action program, and insufficient staffing levels to fully accomplish QV activities. (See Section 3.4.1)

Quad Cities has implemented changes to increase the QV Department's ability to affect Site decision making. A senior level director has been established and the Department is in transition for directly reporting to the Site Vice President. QV Department members have been trained on a process to ensure that key issues are elevated to senior managers' attention. A methodology will be developed to strengthen the review and resolution of identified issues and assess their collective safety significance. Improvements in the communication opportunities with other departments will be developed to ensure valuable information is shared and acted upon. (See Section 3.4.2)

- **Radiation Protection**

The Site has had a high outage and non-outage collective radiation exposure level. Plant material condition and work practices have contributed to high collective exposure rates. NRC Notices of Violation have been received for deficiencies in the control of radioactive waste shipments. (See Section 3.5.1)

A program to address the near-term reduction of the radiological source term and plant area contamination has been developed which includes short-term and year-end goals. Additional initiatives address radiation protection concerns including improvements in radiation worker practices and improved control of high radiation areas. (See Section 3.5.2)

- **Corrective Actions**

Ineffective and untimely corrective action processes have contributed to a number of equipment issues at the Site. A fragmented approach to problem identification diminished the effectiveness of corrective action efforts. Root cause determinations have not been consistently performed nor have root cause analyses been of a consistent high-quality nature. Corrective action follow-up is not emphasized and site management has accepted multiple due date extensions without a formal review of safety significance or programmatic consequences. (See Section 4.1.1)

The problem identification process will be improved by integrating existing programs into a single system. Problems will be identified at a low threshold, with the level and detail of investigation and analysis scaled to safety significance. The commitment tracking process will be modified in order to improve the timeliness of corrective actions. Corrective action effectiveness reviews will be formalized in order to ensure effective corrective action follow-up. A performance measure will be developed to assess management effectiveness in the corrective action arena. (See Section 4.1.2)

In the interim, a dedicated group has been assigned to perform root cause assessments. Over the longer term, formal root cause training will be conducted which will be customized to the individual portions of the organization (e.g., Engineering and Maintenance).

- **Self-Assessment**

Despite the existence of numerous Site self-assessment efforts, site performance improvement efforts have not been fully effective; e.g., the Vulnerability Assessment Team (VAT), Business Development Team (BDT), and 1992 Event Assessment Team (EAT) Reports. In addition, Site organizations have not aggressively evaluated or pursued resolution of the results of their individual self-assessment efforts. (See Section 4.2.1)

Quad Cities will review the findings resulting from prior self-assessment efforts to determine outstanding action items and will improve both the quality of and follow-up on future Station self-assessment efforts -- beginning with the COA. For example, outstanding VAT issues will be re-prioritized and accountability assigned for their resolution. In addition, the self-assessment processes of each Site Department will be improved with a rigorous approach to detecting, preventing, and resolving issues. This will provide a tool with which to evaluate performance on a departmental basis. Self-assessment findings will be integrated into the Site's issues management and commitment tracking process. (See Section 4.2.2)

- **Human Performance**

A number of events were attributed, at least in part, to Human Performance. Human performance will be improved by effective implementation of the collective efforts contained in the Course of Action and Management Plans.

- **Procedural Adequacy**

Commonwealth Edison recognizes that there are issues pertaining to the quality of certain procedures at the Site, including Operations, Maintenance, and Engineering. Procedural quality issues have led to reliance on operator training and craft capability to successfully complete some work. The procedure approval process is cumbersome and inefficient resulting in a large backlog. (See Section 4.3.1)

The plant currently is reviewing the scope and approach to the procedure upgrade process based on the prioritization (ranking) of procedures, skill of the craft, job-task analysis, and the results of an evaluation of recent personnel error events. (See Section 4.3.2)

- **Materiel Condition**

Commonwealth Edison acknowledges that materiel condition improvements are necessary at Quad Cities. Engineering did not effectively address plant vibration problems. Similarly, Maintenance did not adequately address predictive maintenance and plant performance indicators, or identified deficiencies. (See Section 4.5.1)

Actions already have been completed and/or initiated to improve the materiel condition of the Station. The Station has completed two mid-cycle outages, initiated in November and December 1993. The outages were conducted to complete high priority maintenance activities on safety equipment and systems (e.g., Emergency Diesel Generators) and equipment vibration issues. (See Appendix A.) Additional materiel condition improvements are scheduled for the 1994 outages (e.g., HPCI Steamline Sparger). Actions are also underway to prevent recurrence of materiel issues including improvements in performance monitoring and trending, as well as predictive maintenance activities. (See Section 4.5.2)

SECTION 1

INTRODUCTION

SECTION 1

INTRODUCTION

1.1 Background

In late 1990, Commonwealth Edison Company (CECo) initiated actions (i.e., the Performance Enhancement Program (PEP)) to improve performance at Quad Cities Nuclear Power Station. Performance, however, continued to decline in 1991 as evidenced by a number of significant operational events. Corrective actions implemented in late 1991 were incorporated into the PEP and, later, the Quad Cities Management Plan.

While the corrective action program was still in the initial implementation phase, it became evident to CECo in 1992 that the frequency of events being experienced at the Station was inconsistent with the results expected of the PEP and Management Plan. As a result, in June 1992, CECo discussed the Site's declining performance trend with NRC Senior Managers. This meeting was followed by an NRC management team visit, in August 1992, to evaluate the long-term effectiveness of Station improvement efforts. The team concluded that improvements were being made at the Station.

In February 1993, CECo initiated a reorganization at the Station as part of an effort to address company-wide organizational deficiencies that were perceived as barriers to the efficient conduct of plant operations. The reorganization aligned Site organizations, systems, and resources to allow sustained performance improvements, higher levels of accountability, and greater responsiveness to operational needs.

In May 1993, CECo management recognized that sufficient progress was not being made to attain measurable improvements in performance at Quad Cities. Station performance was once again the subject of discussion at the June 1993, NRC Senior Managers meeting. As a result, CECo established an independent team to assess performance of Site activities so that comprehensive improvement actions could be developed on the basis of sound information and analysis.

A diagnostic evaluation (DE) was performed at Quad Cities by the NRC in August and September 1993. Equipment performance problems (e.g., high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems) and organizational changes at the Station led the NRC to conclude that additional information was necessary in order to make an informed decision on overall Site performance. In February 1994, the NRC Senior Managers placed Quad Cities on the declining plant list.

1.2 The Quad Cities Course of Action

1.2.1 Course of Action Overview

The primary mission of Quad Cities Nuclear Power Station is to be a safe, reliable, producer of electricity. To support this mission Quad Cities originally developed a long-term (5 year) Business Plan which in turn is supported by a year-to-year activity called the Management Plan. As explained below, the Course of Action (COA) serves as the mid-term (3 year) planning document.

Figure 1 describes the relationship between the different planning documents used at the Site. Our overall direction is set by the Nuclear Operating Division's Vision and Key Strategies. This direction is incorporated into the Site's five-year Business Plan and implemented through detailed action plans that comprise the Management Plan.

The COA has been developed to address specific issues that exist in plant materiel condition and management processes. The COA identifies the issues related to the recent decline in performance and proposes objectives to resolve known issues. For example, the COA focuses attention on the enhancement and development of management and leadership mechanisms. Further development of management and leadership will support the identification and resolution of other issues which exist or may exist in the future. Management and leadership will be visible through a questioning attitude toward existing ways of conducting business.

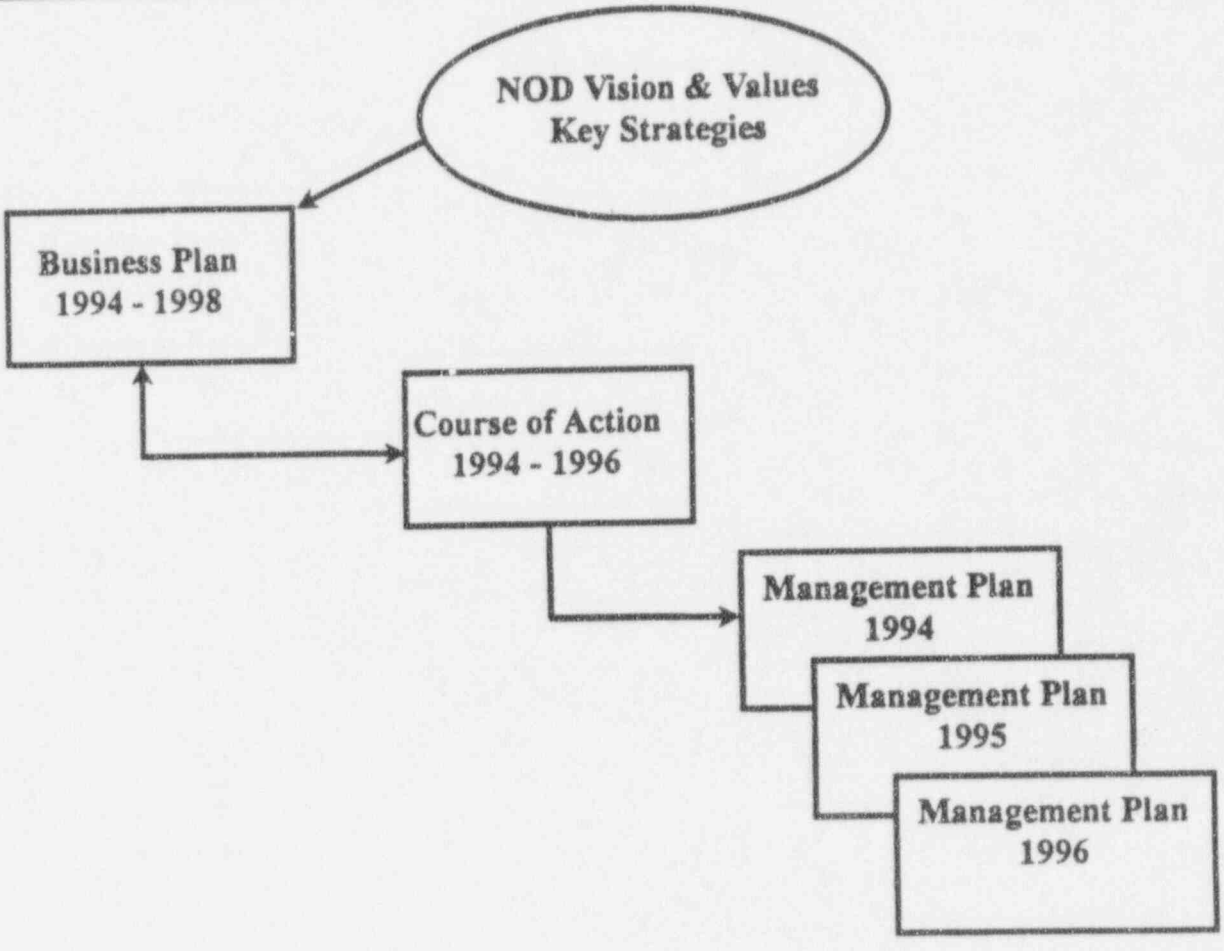
When the COA objectives are accomplished, the results will be evident in steady, measured improvements in Site performance. In addition, issues and objectives identified in the COA will feed back to the long-term planning process and the Business Plan. This feedback will ensure that the selection of Nuclear Operating Division strategies and the allocation of resources are supportive of COA completion.

Based on the COA objectives, Quad Cities Site management will develop and refine detailed implementing action plans in the Annual Management Plan. (Figure 2 provides an overview of COA Development and Deployment.) Comments on these action plans will be provided by the COA Team and a revised 1994 Management Plan will be issued.

Quad Cities management will monitor and assess the implementation of the revised 1994 Management Plan. The COA Team will provide an independent assessment of the effectiveness of action plan implementation at the Station. Interim reports to both Corporate and Site executive management will be made regarding the progre s of COA implementation. Closeout reviews will be performed by management and the COA Team. A method to conduct effectiveness assessments will be developed and implemented.

Overview of Planning Documents

Figure 1



Course of Action Development & Deployment
Figure 2

Development

Systematic Assessment:
Review of all Quad Cities issues raised since (01/92) by: NRC / INPO / CECo Self Assessments / Other Independent Reviews

"COURSE OF ACTION"

Issues important to declining performance trends identified and classified by Functional Area and Key Processes

Objectives to Address Issues Developed with results to be accomplished clarified.

Revised Detailed Management Plan
Contains implementing Action Plans with sufficient detail to accomplish COA objectives

Implementing Detailed Action Plans revised or developed for:
1994 Objectives by 05/15 /94
1995 Objectives by 12/15/94
1996 Objectives by 06/15/95

Deployment & Oversight

Quad Cities Management develops and refines individual Detailed Action Plans. COA Team provides comments.

Quad Cities Management and COA Team Monitor / Assess Action Plan Implementation

Interim reports to Corporate & Site Vice President on COA Implementation Effectiveness

Closeout and Effectiveness Review

1.2.2 Purpose and Scope

Commonwealth Edison is committed to improving performance, on a long-term basis, at Quad Cities. To realize that objective, CECo has developed the COA. The purpose of the COA is two-fold: (1) to identify the major issues that are responsible for declining performance and (2) to provide corresponding "Action Plan Summaries," comprised of discrete "Objectives" and implementing actions, to address the identified issues.

As explained above, the COA provides the framework that will guide management planning efforts and improvement actions at Quad Cities over the course of the next 36 months. Companion, detailed action plans implementing each of the objectives specified in the COA will be found in the Quad Cities Annual Management Plan. This Plan will continue to serve as the working level document that will be revised over time and serve as the basis against which to measure the effectiveness of improvement efforts.

1.2.3 Methodology and Approach to the Course of Action

1.2.3.1 Document Review - Systematic Assessment

The issues summarized in the COA have been identified on the basis of a systematic assessment and comprehensive review of documents and assessments regarding Site performance from January 1992 to the present. The documents reviewed include the NRC Diagnostic Evaluation Team (DET) Report, NRC Staff Requirements Memorandum (SECY-92-228), Quad Cities internal audits and self-assessments such as the Quad Cities Station Business Development Team (BDT) and Vulnerability Assessment Team (VAT) Reports, NRC Notices of Violation, NRC Systematic Assessment of Licensee Performance (SALP) Reports, INPO Assessments, the Integrated Reporting Program, Licensee Event Reports, Corporate Performance Assessments, and Corrective Action Reports.

1.2.3.2 COA Development

The COA was developed by Quad Cities line management. In order to facilitate the development process, line managers have been assisted by three experienced individuals from the Site's Maintenance, Operations, and Engineering organizations. These individuals served as important points of contact with Site and Corporate personnel during preparation of the COA. A Course of Action Team (COAT), consisting of three individuals from outside CECo who have extensive management and nuclear power technical expertise, provided guidance to line management during the development process.

1.2.3.3 COA Organization

The COA is divided into four sections including this Introduction. Section 2, "Management," focuses on the issues and objectives pertinent to management and leadership. Due to the fundamental importance of these issues, the corresponding objectives, and the crucial role they play in achieving long-term improvement at Quad Cities, they are addressed in a separate section of the COA. The third section of the document identifies issues specific to Site organizations (i.e., Maintenance, Operations, Engineering, Quality Verification, and Radiological Protection). Finally, Section 4 identifies the issues/objectives that cross-cut multiple functional areas and are important to short- and mid-term improvements.

1.2.3.4 COA Validation and Tracking

Issues and objectives identified in the COA have been validated by Site line management. Implementation of the actions outlined in the COA will be tracked to completion by Quad Cities Site management. Site management will be provided with periodic progress reports throughout the implementation period and Course of Action Team personnel will periodically meet with the Site Vice President and Site management to provide their independent assessment.

The COA will be implemented through the Site's annual Management Plan. As the working-level document, Management Plan action items are detailed, specific, and scheduled. (See Appendix B). Effective implementation of the Management Plan is the responsibility of Site management at all levels -- with specific individuals accountable for completion of discrete action items. Oversight and follow-up on the achievement of Management Plan results will be facilitated through the use of the Planning and Performance Review (PPR) Process. Tracking and additional oversight will be provided by incorporating all Action Plan items into the Site's improved corrective action process.

1.3 Completed Improvement Initiatives

Improved performance will result by the resolve shown by Site management in successfully implementing the COA. As set forth more fully in Appendix A, CECo already has taken significant steps towards resolving those issues by strengthening the leadership team and practices at the Site. Improving the Station's materiel condition has and will continue to be a management focus for the near term.

1.3.1 Completed Management Improvements

Key management positions at the Site have been strengthened through the incorporation of experienced CECo and external management personnel. Since September 1993, new personnel have been placed in the following positions: Site Vice President, Station Manager, Operations Manager, Maintenance Superintendent, Technical Services Superintendent, Regulatory Assurance Supervisor, Performance Improvement Supervisor, and Financial Services Director. These changes are expected to result in immediate, measurable improvements in both accountability and performance standards.

Quad Cities also has established several new management groups to help direct and oversee the implementation of planned activities at the Site. These include the Site Planning Group, the Technical Review Board, and the Plant Operations Review Committee.

- The Site Planning Group manages the implementation of items in the COA and the Annual Management Plan to ensure that performance expectations are met or exceeded within allowed resource allocation.

- The Technical Review Board reviews and prioritizes technical issues and identifies those resource intensive actions that need to be incorporated into the plan.

- The Plant Operations Review Committee provides increased assurance that the Site is operated, maintained, and modified in accordance with the design and licensing basis.

1.3.2 Completed Materiel Condition Improvements

Commonwealth Edison acknowledges that materiel condition improvements are necessary at the Station and has taken immediate steps to initiate improvement actions. Mid-cycle outages at both Units, in November and December 1993, have been completed to address concerns identified by the NRC DET and other inputs regarding equipment condition and safety system performance. Materiel condition improvement actions that have been accomplished at the Station focused on high priority maintenance activities on critical safety equipment/systems (Emergency Diesel Generators (EDGs), Reactor Core Isolation Cooling (RCIC), High Pressure Coolant Injection (HPCI), Residual Heat Removal (RHR) and RHR Service Water). Also addressed were operator work-arounds, priority equipment issues, and initial activities to address vibration issues.

Additional materiel condition improvements are scheduled for the 1994/1995 outages. The outages have been extended, based on the realistic estimate of the time needed to complete additional improvements. Among the major activities scheduled for the outages are replacement of snubbers on the Main Steam Lines (MSLs), the overhaul and alignment of certain pumps, as well as motor refurbishments.

Upon completion of these actions, major strides will have been made in addressing important materiel condition issues at the Station, e.g. Electromatic Relief Valve (ERV) performance, MSL vibration, HPCI and EDG System enhancements, Intermediate Range Monitor (IRM) and Source Range Monitor (SRM) System performance, Feedwater Regulating Valve (FRV) performance, and known vibration issues will have been addressed.

As explained in greater detail in Section 4.5, the effectiveness of these materiel condition improvement efforts will be assessed. This assessment will be conducted utilizing pre-established standards, and materiel condition improvement efforts will be adjusted if necessary.

1.4 Integrated BWR Strategy Initiatives

In addition to the COA and near-term improvement initiatives previously discussed, CECo has implemented an Integrated BWR Strategy which defines an improvement strategy for the immediate, mid-term, and long-term time frames.

1.4.1 Immediate Phase (one year)

The immediate strategy focuses upon the current problems associated with declining performance at the BWRs.

- material condition deficiencies;
- radiation protection issues;
- problem identification weaknesses; and
- human performance deficiencies.

CECo has established targets to measure the results of the immediate strategy initiatives and ensure there is an adequate rate of performance improvement and reversal of adverse trends. These targets consist of a series of objective measurement standards.

1.4.2 Mid Term Phase (1 to 3 years)

The mid-term strategy will ensure that Site management will complete actions necessary to address the root causes of declining performance. This will be facilitated by resolving the issues identified in the COA.

1.4.3 Long Term Phase (3 to 5 years)

The long-term strategy focuses on the attainment of a high level of performance consistent with the 5-year business plan. Quad Cities will strive to raise performance levels to "World Class," be a "Competitive" generation facility, and function as a "Nuclear Generating Team."

SECTION 2

MANAGEMENT

SECTION 2

MANAGEMENT

Increased emphasis on effective leadership, teamwork, communications, and accountability among Site managers is needed. This need is evidenced by previous management failures in accepting full responsibility and accountability for low standards of performance. These management deficiencies have manifested themselves in below average equipment performance stemming from inadequate root cause evaluation and ineffective corrective actions. Senior Site management is responsible for providing clear performance expectations and establishing ownership and accountability for achieving these expectations with Site personnel.

The leadership and management issues that have existed at Quad Cities Station are listed below:

2.1 Management and Leadership

2.1.1 Issues

- Management has not established and communicated clear direction and expectations for Station and individual performance and oversight of field activities was weak.
- Management has not provided the management development training to ensure that qualifications are maintained and that advanced skills are continually developed.
- Management did not foster an atmosphere where individuals accept ownership of their responsibilities and where individuals have experienced accountability for their actions.
- Management has not clearly defined roles, responsibilities, accountabilities, interfaces, and expectations of each Quad Cities department.
- Management was not effective in resolving underlying root causes and improving performance.
- Management was willing to accept equipment problems without aggressively pursuing corrective actions, or evaluating performance issues.
- Management failed to ensure that lessons learned from Zion and Dresden were fully implemented.

2.1.2 Action Plan Summary

The new Quad Cities management team in place is committed to providing vision and direction for steady, measured improvement over the next three years which will bring the Site to a level of performance which ensures continued safe, event-free operation. An aggressive and intrusive management style has been established that will be infused throughout the organization through interactive coaching and monitoring to effect fundamental changes in our work ethic, safety culture, performance expectations and, most importantly, our results.

Clear expectations and standards have been and will continue to be established and communicated to all individuals for the performance of their work. Individuals will know the goals and priorities of the Site and be able to execute decisions consistent with this direction. They will know without a doubt what is expected of them as they carry out their assigned duties.

Each department and individual will understand its roles, responsibilities, accountabilities, and interfaces needed to ensure that work is accomplished effectively and efficiently, commitments are met, and teamwork is evident in the day-to-day business of safe, event-free operation.

Site management routinely will spend time with the workers to reinforce these goals, vision, and expectations. It will be common for managers and supervisors to be in the plant on a regular basis discussing and demonstrating the appropriate standards and values established by the management team. Quad Cities personnel will know that we have been successful in improving the leadership and management performance of our team when safe, event-free operation is made a reality, equipment performance is at or above industry norms, and everyone understands and exhibits our vision and values.

Objective 2.1.2.1: Strengthen Leadership

- Senior management personnel who have demonstrated elsewhere within the industry the requisite leadership skills to produce the necessary performance results have been appointed to fill the Site Vice President, Station Manager, Technical Superintendent, Operations Manager, and Regulatory Assurance Supervisor positions. These people have shown that their high expectations for technical and operational excellence, coupled with demonstrated management team development, can produce significantly improved Station performance.

- Quad Cities senior management will ensure that clear expectations for Station management involvement are communicated effectively and implemented through the use of the Performance Planning and Review (PPR) process and periodic assessments of the effectiveness of management involvement. In addition, management expectations and accountability will be reinforced through routine, scheduled meetings conducted by the Site Vice President and the Station Manager. Open communications at all levels will be the norm at Quad Cities.

- Quad Cities senior management will lead by example. These managers will clearly communicate performance expectations, demonstrate personal performance standards, and reinforce such standards and expectations by a formal "Walk the Talk" program which will require routine intrusive management involvement in daily work activities. This active management style will reinforce an ethic that managers must act consistently with published Site values. To assure effectiveness and accountability for this program, an audit mechanism will be developed to assess compliance and trend feedback.

Objective 2.1.2.2: Leadership and Management Development

- Quad Cities Station management will receive appropriate continuing training in management and leadership skills and techniques. This training, which began in 1993, will continue through 1995 and will extend down to the first line supervisor.

- Quad Cities senior management will be responsible for ensuring that individuals selected for supervisory and management positions are qualified to effectively carry out their assigned responsibilities. This will be accomplished through the development and implementation of a formal management selection process.

- Quad Cities management will use the PPR process to identify and track required actions to improve individual leadership and management skill deficiencies. Progress will be monitored, and feedback will be provided, on a quarterly basis.

Objective 2.1.2.3: Performance Expectations, Responsibilities and Accountabilities.

- Quad Cities Senior management will clearly define and communicate the vision and direction for achieving sustained Station performance improvement to all Site personnel.

- Actions will be taken to clearly define the roles, responsibilities, accountabilities, interfaces, and performance expectations for each Quad Cities department. These actions also will be repeated on an individual level. The results of these actions will be integrated into department charter documents and management PPRs to strengthen communication and accountability.

- Individual performance measures for effective implementation of the Management Plan responsibilities will be integrated into PPRs. Individual progress will be monitored on a quarterly basis to recognize both superior and unsatisfactory performance.

- Actions will be taken to ensure that discipline is applied in an appropriate and consistent manner. This appropriate and consistent disciplinary program will become a measure of accountability when required performance is not satisfactory. Similarly, programs will be developed to reward and encourage individuals who significantly contribute to performance improvement.

Objective 2.1.2.4: Effectiveness Monitoring and Assessment

- Quad Cities Station management will continue to develop appropriate mechanisms, such as Integrated Quality Effort (IQE), employee surveys, and other performance indicators, to measure the effectiveness of management in setting standards, reinforcing defined performance expectations, and achieving desired results.

- Current management tools (such as tracking and trending programs) will be evaluated to ensure that they effectively provide the information needed to assist Quad Cities Station management in performance monitoring, priority issue awareness, and decision making processes.

SECTION 3

ISSUES AND ACTION PLANS
BY ORGANIZATION

SECTION 3

ISSUES AND ACTION PLANS BY ORGANIZATION

This section identifies organization-specific issues. Also included is a summary of objectives and corresponding actions planned to address the issues. Detailed action plans and schedules have been or currently are being developed in conjunction with the "Objectives" listed below and are available for review at the Station.

3.1 Operations

3.1.1 Issues

The Operations Department's performance has been described as inconsistent. Ineffective implementation of previous improvement initiatives, lack of clear direction for the department, and ineffective communication and definition of performance standards are indicative of inadequacies in Operations management. The following issues contribute to this situation:

- The Shift Control Room Engineer (SCRE) position provided limited oversight of control room activities. This also contributed to issues concerning control room professionalism and rigor in performance of routine activities.

- Communications between the Operations Department and other Station departments are inadequate. This is especially true with the Maintenance Department as indicated by inadequate inter-department communication and teamwork. For example, Nuclear Work Request (NWRs) were not written on degraded equipment because some operators did not believe Maintenance would repair the equipment in a timely manner.

- Management expectations were not clearly communicated to Operations personnel. Personal accountability was low and standards are not being reinforced.

- The roles and responsibilities of the Operations Department are not well-defined. The organization accepted equipment deficiencies.

- Timely and effective corrective actions are not always implemented when problems are identified. Operations personnel do not agressively pursue problem resolution which contributes to operator work-arounds and decreased sensitivity to control room annunciators.

- Operations management has not implemented effective corrective actions that will ensure procedure adherence. The operators do not always take timely corrective actions when a procedure issue is identified.

- Control of plant activities is weak at times and contributes to unavailability of equipment and in some cases unanticipated evolutions.

- Operations management did not always ensure that degraded equipment conditions are formally evaluated for operability.

3.1.2 Action Plan Summary

To address the issues identified, CECo has established the following objectives and associated actions:

Objective 3.1.2.1: Define Roles, Responsibilities, and Accountability of Operations Personnel

- A Senior Reactor Operator (SRO) Unit Supervisor has been added for each unit. This eliminates the SCRE position and provides greater management overview of activities. The Unit Supervisor is responsible for all activities that take place on his unit and is supervised by the Shift Engineer.

- A new Station Conduct of Operations manual is being written that will clearly define the roles and responsibilities of every member of the Operations Department. This manual will be modeled after the INPO "Guidelines for the Conduct of Operations at Nuclear Power Stations" and will address every aspect of how the Operations Department is to conduct its business. Every Department member will be held accountable for their performance, as defined by the manual and management. In the interim, Operations Memos and letters have been written to specify expectations concerning critical parts of Conduct of Operations. This interim guidance will be replaced by the Conduct of Operations manual.

- Expectations of Control Room conduct and professionalism has been communicated to the crews by the Shift Operations Supervisor. Overview to ensure these expectations are being met is accomplished on a shiftly basis by the Shift Engineer and on a daily basis by senior Operations management.

Objective 3.1.2.2: **Facilitate and Promote Interdepartmental Communications**

- Operating Engineers have been assigned functionally to the Work Control Center (WCC) to primarily interface with Maintenance personnel. They will be responsible for prioritizing NWRs and providing schedule input to the WCC schedulers. They will clearly communicate the Operations Department problems and needs to Maintenance and ensure these items are reflected in the schedule. In this manner, Operator work-around, Degraded Equipment Log entries, Caution Cards, Annunciator Problems, Control Room Work Requests, and other operating issues will receive the necessary attention.

- The Shift Engineer is attending the morning Superintendents meeting to directly communicate problems to the Station Senior Managers. These items will be tracked and resolved in most cases within 24 hours, or scheduled and monitored for resolution if 24 hours is not achievable.

Objective 3.1.2.3: Improve Communication of Performance Expectations

- Senior Operations management will provide regular feedback to Operations supervisors to reinforce performance expectations. This will be accomplished by increasing control room and simulator overviews and providing feedback to the Shift Engineer.

- Shift Supervisors and Shift Engineers have increased their field involvement and provide coaching to crew members and support organizations. These coaching sessions will be documented and forwarded to Operations senior management as feedback addressing job performance barriers.

- All Operations management personnel will be given performance objectives using the Performance Planning and Review (PPR) process to ensure that senior management expectations are met. Senior management will monitor and periodically evaluate the effectiveness of management performance.

- Regular meetings between the Shift Engineers and the Station Manager are being held to promote communication and reinforce expectations of senior management.

- Regular meetings between the Unit Supervisors and the Shift Operations Supervisor are being held to promote communications and reinforce expectations of senior Operations management.

- Regular Operations Department meetings are being held by the Operations Manager to promote communications and reinforce the expectations of senior management.

Objective 3.1.2.4: Take A Proactive Role in Correcting and Preventing Plant Problems

- Quad Cities has held Safety Culture Seminars for all Operations Department personnel. These seminars addressed individual roles and responsibilities in regard to a nuclear safety work ethic and Department practices that will achieve a strong Safety Culture. The aspects of Safety Culture addressed include problem identification and resolution, operator work-arounds, and the importance of control room annunciators.

- The Operations Department has developed and maintains an "Operator Work Around" list that will be used by the Operating Engineer as a work schedule input. Identified equipment deficiencies on this list will be given high priority and worked as soon as practical.

Objective 3.1.2.5: Improve Corrective Action Processes

- The Operations organization will adopt the "Action Plan" specified in Section 4.1 ("Corrective Action Program") of the COA.

- Shift involvement will be strengthened in the areas of investigating and determining causal factors and root causes for problems and events occurring on shift, and in applying appropriate corrective actions.

Objective 3.1.2.6: Promote Procedural Adherence

- Strict procedure adherence and requiring a procedure for all operating evolutions is required by senior Operations management.

- Communication and overview activities discussed in Objective 3.1.2.3 of this Section will include the monitoring of procedure adherence during operating evolutions.

- The on-shift procedure change process has been streamlined to better facilitate procedure changes when problems are encountered while performing a procedure. Top priority is given to normal procedure changes requested by the operating crews.

Objective 3.1.2.7: Improve Control of Plant Activities

- An SRO Unit Supervisor has been added for each unit. This eliminates the SCRE position and provides greater management overview of routine activities. The Unit Supervisor is responsible for all activities that take place on his unit and is supervised by the Shift Engineer.

- The Work Control Center (WCC) has been established and all work will be screened by WCC SROs prior to the work package reaching the control room. This screening will ensure that the work will have no impact on unit operation or shift activities.

Objective 3.1.2.8: Improve Operability Evaluations

- The Problem Identification Form (PIF) is used to document all problems including degraded equipment. The PIF process also is used to initiate operability determinations. The operability determination is documented using Administrative Procedures.

- Operations management is now responsible for making all operability determinations. Engineering assistance is requested, as needed, to determine if the affected equipment would be capable of performing its intended function. This information is then used by Operations management in making the operability determination.

Objective 3.1.2.9: Improve Management and Decision Making

- Operations managers will be monitored in order to recognize both superior and unsatisfactory performance.

- Superior management performance will be rewarded and direct feedback will be provided to correct unsatisfactory performance.

- New programs will be created, and existing programs will be revised and/or reinforced, directing Operations managers to observe the Station and their personnel.

- Management effectiveness will be assessed, as perceived by Operations personnel.

- Operations managers will be provided with appropriate continuing education and training in management and leadership skills/techniques. This training will extend down to first-line supervision.

3.2 Maintenance

3.2.1 Issues

- The materiel condition of some Station systems is degraded. Some of the programmatic and performance deficiencies that contributed to this situation are:

  - Inadequate response to plant performance and materiel condition indicators, such as unit capability loss factors and safety system unavailability. In addition, the performance indicators for the Maintenance backlog did not accurately reflect the overall materiel condition of the Station.

  - Failure to respond in a timely and effective manner to identified deficiencies, as indicated by the necessity of declaring equipment inoperable due to degraded materiel condition.

  - Inadequate response to trends, such as increased operator work-arounds, increased radiation exposure, and increased areas requiring radiological control.

- Inadequate response to predictive maintenance indicators, such as identified high vibration on some plant equipment.

- Inadequate communication of degraded equipment status has resulted in some Operations personnel being unaware of equipment condition.

- A significant Maintenance backlog and incorrect prioritization contributed to reduced reliability of some safety systems. Strict adherence to outage schedules also contributed to the high backlog of work items.

- There are deficiencies in the communication of management expectations, as exhibited by the following:

  - Maintenance activities on degraded systems with safety significance were assigned an inappropriate priority.

  - Potential safety consequences were not always evaluated for corrective and preventive maintenance work items.

  - Inadequate root cause analysis resulted in incorrect maintenance leading to safety system unavailability.

  - Housekeeping practices were inconsistent.

- There are weaknesses in the work process including package preparation, planning, scheduling, and implementation.

  - Work packages require unnecessary reviews before implementation.

  - Many work packages contain poor quality drawings and procedures.

  - Some work packages contain insufficient technical instructions.

  - Some work packages contain inadequate specification of post-maintenance testing.

  - There is poor coordination of interdependent activities between Maintenance and other plant organizations.

  - Work packages are voluminous.

- The preventive maintenance and inservice testing programs are not sufficiently developed. The existing programs do not clearly define the methodology for task development and updating. Preventive maintenance recommendations from maintenance history and reliability centered maintenance reviews have not been adequately implemented.

- Lessons-learned from in-house and industry experience are not fully utilized to improve Station performance. Inadequate monitoring and trending of identified problems contribute to less than effective use of in-house failure information. Industry experience is not adequately communicated to Maintenance. In addition, corrective actions are not fully implemented and follow-up actions are not always effective.

3.2.2 Action Plan Summary

To address the issues identified above, Quad Cities has established the following objectives and associated actions:

Objective 3.2.2.1: Improve Plant Materiel Condition

- Develop and implement action plans to improve materiel condition through initiation of, or improvements in, the following:

  - Communication of management expectations for materiel condition. See Objective 3.2.2.3 ("Improve Maintenance Management Effectiveness").

  - Reduction of work request backlog. See Objective 3.2.2.2 ("Reduce Maintenance Backlog").

  - Preventive maintenance program. See Objective 3.2.2.5 ("Improve the Effectiveness of the Preventive Maintenance Program").

  - Conduct of and response to predictive maintenance analysis (i.e., vibration, thermography, oil analysis). See Objective 3.2.2.5 ("Improve the Effectiveness of the Preventive Maintenance Program").

  - Root cause analysis of component and system failures. See Objective 3.2.2.6 ("Improve Station Performance Through Enhanced Incorporation Of Lessons-Learned from In-House and Industry Experience").

  - Trending of equipment/system performance and failures. See Objective 3.2.2.6 ("Improve Station Performance Through Enhanced Incorporation Of Lessons-Learned from In-House and Industry Experience").

- A self-assessment process that includes periodic review of performance indicators such as:

  - safety system unavailability factors,
  - unit capability factors,
  - overdue preventive maintenance tasks,
  - work request backlog,
  - equipment performance and failure trends,
  - INPO Nuclear Plant Reliability Data System Component Failure Analysis Reports.

- Incorporation of lessons-learned from in-house and industry experience. See Objective 3.2.2.6 ("Improve Station Performance Through Enhanced Incorporation Of Lessons-Learned from In-House and Industry Experience").

- Reclamation of plant areas. This plan includes:

  - selection of area owners for all plant equipment and work space areas;
  - identification and scheduling of all work activities required for area upgrade; and
  - development and implementation of a recurring area condition monitoring program.

- Reduction of generic deficiencies, such as:

  - temporary alterations;
  - drip funnel; and
  - radiation hot spots.

Objective 3.2.2.2: Reduce Maintenance Backlog

- Implement the actions specified in Objective 3.2.2.4 ("Improve the Work Process Including Package Preparation, Planning, Scheduling and Implementation"). In addition, a group has been established that is currently:
  - identifying the content of the work request backlog,
  - validating the deficiency described on the work request,
  - validating the accuracy and completeness of the work request,
  - updating supporting databases.

Objective 3.2.2.3: Improve Maintenance Management Effectiveness

- Develop and implement an action plan that requires each Maintenance Department manager to perform the following:
  - Develop expectations that include, but are not limited to, the following:
    - communications;
    - work standards;
    - qualification, skill, and knowledge levels;
    - work ethics;
    - decision making authority and responsibility;
    - problem identification thresholds;
    - accountability;
    - self-checking;
    - level of involvement in problem resolution; and
    - succession planning.

- Communicate expectations. The following are suggested methods:
    - direct, daily contact with Maintenance personnel;
    - individual "one-on-one" consultations;
    - periodic "all-hands" meetings;
    - daily meetings;
    - plant and work-space tours; and
    - individual performance reviews.
- Follow-up using the methods listed above to ensure open communications and a clear understanding of expectations.

- Enhance the management performance review system to include individual performance measures for the implementation of the Quad Cities Management Plan.

- Implement the performance appraisal process for bargaining unit personnel.

Objective 3.2.2.4: Improve the Work Process Including Package Preparation, Planning, Scheduling and Implementation

- Establish a Maintenance work process Continuous Improvement (CI) effort to:
    - Identify and develop action plans to address all work process steps. The following are the minimum process steps:
        - Deficiency identification
        - Work prioritization
        - Work package development
            - Content
            - Format
            - Level of Detail (Instructions)
            - Clarity of Instructions
        - Use of technical maintenance procedures for providing work instructions
        - Drawing accessibility and accuracy

        - Parts availability and suitability
        - Supporting database interfaces
        - Equipment identification accuracy
        - Post-maintenance verification and testing program
        - Coordination between work package planning and work scheduling
        - Inter-discipline work instruction and implementation coordination
        - Task planning in support of ALARA, foreign material exclusion, fire protection, etc.
        - Inter-department schedule coordination
        - Assignment, control, and tracking of work packages
        - Performance of work activities
        - Package review, history documentation, and closeout
        - System/window scheduling
        - Planned/forced outage planning and scheduling
    - Each action plan shall address the following:
        - Process review
        - Deficiency identification
        - Corrective action development
        - Implementation details
    - Assign individual(s) responsibility for implementation and reporting ongoing status and completion.
    - Develop and perform a periodic self-assessment of the work process.
- The Maintenance organization will adopt the "Action Plan" specified in Section 4.3 ("Procedural Adequacy") of this Course of Action.

Objective 3.2.2.5: Improve the Effectiveness of the Preventive Maintenance Program

- Develop and implement an action plan that requires the following:
  - Review and implementation of the reliability centered maintenance and Maintenance History Evaluation recommendations.
  - Enhancement of the preventive maintenance program to include the following:
    - Criteria for task selection and frequency determination emphasizing the use of predictive maintenance;
    - A methodology for task implementation (i.e. procedures, materials, scheduling);
    - A mechanism for feedback and program upgrade; and
    - A process for periodic effectiveness review and update.

Objective 3.2.2.6: Improve Station Performance Through Enhanced Incorporation Of Lessons-Learned from In-House and Industry Experience

- Review (Benchmark) other facilitys' programs and processes that have programmatic strengths. Within the next eighteen months, accomplish the following:
  - Select of at least six programs or areas to be Benchmarked. The following are candidate programs or areas:
    - Control of Work
    - Work Package Development
    - Use of Maintenance Procedures
    - Operations Experience Assessment
    - Preventive Maintenance
    - Post-Maintenance Verification and Testing
    - ASME Section XI Repair and Replacement
    - Personnel Safety
    - Weld Control

- Select of individual(s) who will:
  - conduct Benchmarking at two or more facilities for each area identified,
  - develop action plans to implement those attributes that will contribute to station program improvements, and
  - facilitate and track activities to completion.

- Assign personnel to the INPO Peer Evaluator and Assist Visit Programs.

- Develop or enhance an operational experience assessment function that will perform the following:
  - Monitor NETWORK (Daily).
  - Monitor INPO Nuclear Plant Reliability Data System Component Failure Analysis Reports (Quarterly).
  - Review all current INPO Good Practices.
  - Review the in-house and industry experience database for open industry experience items.
  - Monitor other industry experience, such as:
    - NRC Information Notices, Bulletins, Letters, Generic Letters
    - New INPO Good Practices
    - INPO industry experience notices
    - NSSS vendor and other technical bulletins
    - Vendor Notices
    - Notice of Manufacturing Defects (10 CFR Part 21)
  - Screen the above for applicability to Quad Cities.
  - Identify industry information contacts and course(s) of action that other facilities have developed to address the item(s).
  - Develop or enhance a status and tracking tool for applicable items.

- Assign items to responsible individuals within appropriate departments who will:
  - confirm their applicability,
  - develop action plans to identify and implement activities to address the item,
  - facilitate and track the activities to completion,
  - report ongoing status and completion.

- The operational experience assessment function will also:
  - review the in-house and industry experience database for open in-house events,
  - Monitor (on a daily basis) in-house events and screen for trend, root cause, or common cause analysis and submittal to NETWORK,
  - develop or enhance a status and tracking tool for selected items,
  - Review NETWORK responses and provide them to the responsible individual(s).
  - Assign items to responsible individuals within appropriate departments who will:
    - perform appropriate analyses,
    - evaluate NETWORK responses,
    - develop an action plan to identify and implement indicated preventive actions,
    - facilitate and track the actions to completion, and
    - report ongoing status and completion.
  - The operational experience assessment function aiso will develop and periodically provide in-house and industry event preventive action completion reports.

- The Maintenance organization will adopt the "Action Plan" specified in Section 4.1 ("Corrective Action Program") of this Course of Action.

3.3. Engineering

3.3.1 Issues

- **Engineering Effectiveness and Timeliness**
  Engineering actions have not always been effective or timely in:

  - resolving plant problems (e.g., equipment vibration problems, electromatic relief valves);

  - resolving equipment design issues (e.g., potential loss of safety-related switchgear due to seismic concerns, Emergency Diesel Generator (EDG) loading, inoperable heat trace line on Standby Liquid Control (SBLC) System); and,

  - responding to requests from Site organizations.

- **Engineering Standards and Expectations**
  The roles, responsibilities, standards, and expectations for Engineering personnel are not well defined and, as a result, accountability is unclear and misunderstood. Additionally, at times, lateral communications among Engineering groups (e.g., Site Engineering, Corporate Engineering, contracted Engineering) does not facilitate problem solving.

- **Engineering Experience Level**
  System knowledge, experience levels, and resources within Engineering are lower than desired.

- **Engineering Products and Functions**
  There are large backlogs in most Engineering products and functions. Examples include:

  - design changes;

  - drawing changes;

  - vendor manual reviews and updates

  - Site Quality Verification (SQV) commitments.

- **Temporary Alterations**
  Implementation of the Temporary Alteration Program has not been effectively controlled and, as a result, there is a large number of temporary alterations at the Station.

- **Configuration and System Design Basis Information**
  Drawings do not reflect plant configuration, and system design basis information (e.g., design basis documentation, design calculations) is not readily available, often resulting in extensive verification and/or retrieval activities.

- **In Service Testing (IST) Program**
  Some procedure deficiencies exist in the IST Program (e.g., acceptance criteria for some tests).

- **Monitoring and Self-Assessment**
  Engineering monitoring and self-assessment have not been routinely performed.

3.3.2 Action Plan Summary

The Engineering Organization has established the following objectives, and associated action items, to address the identified issues. These actions will strengthen the safety focus and provide a more comprehensive and rigorous approach in resolving Engineering issues.

Objective 3.3.2.1 Engineering Effectiveness and Timeliness

The following actions will result in improved Engineering support for the plant, as well as, Site organizations (e.g., Operations and Maintenance Departments). Comprehensive and timely technical support, which reduces challenges to the plant and personnel, will support the Station goal of safe, event-free operation.

- The Technical Services Department, through the System Engineering Group, will become the lead organization responsible for identifying and managing to completion technical solutions for the plant. Actions which promote and support this lead organization concept include the following:

  - Duties and responsibilities, as currently defined in the System Engineer Program, are being reviewed for enhancement with emphasis placed on:

    - ownership of system performance, with the responsibility for meeting assigned system performance goals;

    - the development of an intrusive and questioning attitude with the goal of improved plant performance and safety; and

    - the support necessary for System Engineers to be effective system managers.

  - An Electrical, Instrumentation and Controls (E&IC) Group is being established within System Engineering to improve support, by providing a lead organization/group, to Operations and Maintenance Departments on E&IC-related issues.

- A Process and Assessment Group is being established within System Engineering to monitor, assess, and enhance work processes in order to raise standards, improve efficiencies, and reduce Engineering backlogs.

- Quarterly reviews of System Engineering will be performed to determine the effectiveness of performance. The review will include feedback from interviews with Operations and Maintenance Department personnel with a focus on "customer service".

- A Site Motor Operated Valve (MOV) Team has been established that will coordinate the design and implementation of enhancements to the MOVs. This will restore safety margins and assure the completion of performance testing. Additionally, the performance monitoring program will be further developed. For further details on the activities of the Site MOV Team, see Section 4.6 (MOV Program).

- A multi-disciplined Site Vibration Team, led by Engineering, has been established to evaluate equipment/system vibration issues, provide corrective actions, and assess the effectiveness of those corrective actions following implementation. The Site Vibration Team has:

  - developed a charter;

  - determined a work scope; and

  - identified those vibration issues (e.g., Main Steam Line/Electromatic Relief Valve vibration, cavitation induced vibration from the Residual Heat Removal test return and Core Spray test return valves) that will receive priority attention during current and upcoming outages.

- The quality of operability determinations will be improved through specific actions that include:

  - implementing guidelines for use in completing operability determination evaluations;

  - providing training on the operability determination guidelines and the operability determination process;

  - ensuring operability determinations are timely, rigorous, and complete; and

  - trending and assessing the timeliness and effectiveness of follow-up actions required by the operability determinations.

- A complete, consistently formatted set of critical control room drawings, which reflect the Station's currently known as-built configuration, has been issued.

- Engineering will implement administrative guidelines which clarify and establish roles, responsibilities, and expectations that are clear and consistent with interfacing departments.

Objective 3.3.2.2 Engineering Standards and Expectations

Engineering Management will foster an environment that promotes timely, effective, and comprehensive recommendations and solutions to plant problems.

- In an administrative guideline, Engineering management will define and document roles, responsibilities, and expectations in a clear and consise manner. Communication of the guideline throughout the Engineering Organization will be accomplished through:

  - departmental and/or individual (one-on-one) meetings; and

  - the Performance Planning and Review (PPR) Process.

- Engineering management will identify and conduct benchmarking activities (e.g., site visits - Monticello). Assist visits (e.g., INPO) will be used to assess engineering performance and recommend improvements.

- Appropriate plant system performance goals and standards will be established. A Process and Assessment Group is being established which will develop routine monitoring tools to assess and support an effective management decision making process. See Objective 3.3.2.8 for further details on the Process and Assessment Group.

Objective 3.3.2.3 Engineering Experience Level

The following actions will improve the experience level and training of Engineering personnel and thereby enhance the Engineering organization's capabilities and effectiveness.

- The Engineering organization's capabilities and experience base is being improved by obtaining talented and experienced managers and individual contributors from outside of CECo (e.g., Technical Services Superintendent, Auxiliary Systems Group Leader, Results Engineering Group Leader).

- A Senior System Engineer Program has been established which incorporates experienced engineers, who have strong technical qualifications, into the System Engineering Department. This Program provides those experienced engineers an additional career advancement opportunity outside the traditional supervisory path.

- The training needs of individuals in the Engineering organization will be assessed against the Engineering and Technical curriculum and position-specific technical requirements. Specific training to improve Engineering knowledge and effectiveness will be determined and targeted. Known areas requiring increased training include:

  - Root Cause Analysis;
  - System Engineer Qualification Cards;
  - Operability Training;
  - System Design Basis;
  - Work Process training; and
  - 10CFR50.59 Safety Evaluations.

- The training strategy described above will be conducted over the next three years.

Objective 3.3.2.4 Engineering Products and Functions

The following actions will address the large backlogs that exist in Engineering products and functions. Backlogs exist in the areas of design changes, drawing changes, vendor manual reviews and updates, and SQV commitments.

- Design Changes
  - Design Change Criteria
    - A management expectation which emphasizes maintaining existing equipment and preserving the existing system design will be established and communicated throughout the Engineering organization. To that extent, future design changes will be evaluated relative to the level of their contribution to the following set of criteria:
      - enhance safety or increases margins;
      - ensure regulatory compliance; and
      - increase plant availability.

      This expectation, as well as the design change criteria, will be communicated through the System Engineer Program and departmental meetings.

- Backlog Reduction

  - A 10% reduction in the design change backlog recently has been accomplished through application of the previously described design change criteria.

  - A design change closure functional group will be established to facilitate further backlog reduction.

- Drawing Changes

  - The drawing change process will be enhanced in order to improve efficiency and responsiveness. Such enhancements include:

    - elimination of redundant administrative controls through the centralization of the process; and

    - generation of associated 50.59 safety evaluations in parallel with drawing revisions (versus upon completion of drawing revisions).

  - The drawing change process enhancements will support management expectations pertaining to:

    - revising and distributing critical control room drawings concurrent with a design change being operation authorized; and

    - reducing the current backlog of open drawing requests.

- Vendor Manual Reviews and Updates

  - The vendor manual update process will be enhanced (e.g., increased System Engineer involvement) to ensure that accurate vendor technical information is available in a timely manner.

  - An action plan will be developed and implemented to reduce the backlog of vendor technical information. A management expectation has been established to eliminate the backlog of safety-related vendor technical information by the middle of 1995.

- Commitments
  - Establish a culture of meeting all internal and external commitments by promoting the following:
    - ownership of issues;
    - an understanding of issues and objectives;
    - defined outcome and completion;
    - proactively established reasonable, realistic schedules; and
    - a zero tolerance threshold for missing commitments.
  - Evaluate long-standing Engineering issues in the NTS database. For those issues which warrant resolution, determine realistic completion dates. Consistent with the culture being established, completion dates will be met.
- A Process and Assessment Group is being established that will assist in reducing Engineering backlogs. See Objective 3.3.2.8 for further details on the Process and Assessment Group.

Objective 3.3.2.5 Temporary Alterations

In order to reduce operator challenges and to promote a culture for permanent engineering solutions, the following management expectations have been established: (1) reduce the number of temporary alterations greater than 90 days old; and (2) reduce the number of temporary alterations for a unit at the conclusion of a refueling outage (specifically, those temporary alterations which require an outage for removal).

- The following actions will enhance the temporary alteration process, identify existing temporary alterations and reduce the number of existing temporary alterations.
  - Revise/Enhance the temporary alteration (TA) process and procedures in accordance with INPO Guidelines in order to:
    - provide clear definition and identification criteria;
    - strengthen safety evaluations;
    - provide sufficient TA information to the Operators;
    - identify and implement compensatory measures;

- identify required actions to remove a TA;
- strengthen the review and approval; and
- ensure documentation and enhance tracking.

- Through personnel training (on the Revised/Enhanced TA process) and the routine walkdowns performed by the System Engineers, identify, document and evaluate all TAs that are identified by the new process.

- Increase the priority of work which is required to be completed in order to remove long-standing temporary alterations.

- A management reporting system will be established to monitor the effectiveness of the Revised/Enhanced TA Program by trending the total number of temporary alterations, and the number of new and removed alterations on a monthly basis.

Objective 3.3.2.6 Configuration and System Design Basis Information

The following actions will enhance the quality and increase the availability of configuration and system design basis information to Site personnel.

- Improvements to the quality and accuracy of the Station's drawings, with respect to the as-built plant configuration, are being accomplished through the following:

  - A complete, consistently formatted, set of critical control room drawings which reflect the Station's currently known, as-built configuration has been issued.

  - Detailed System Walkdown Program (DSWP).

    - Complete Phase I of the DSWP which will result in accurate as-built mechanical drawings (e.g., P&IDs, C&IDs) for the initially selected 28 systems. A management expectation has been established to complete the walkdowns associated with Phase I in 1994, with any required drawing updates completed in 1995.

    - Complete Phase II of the DSWP which will result in accurate as-built electrical drawings (e.g., schematics, wiring diagrams) for the initially selected 28 systems. A management expectation has been established to complete the walkdowns and any required drawing updates by the end of 1996.

    - Identify and develop DSWP scope and schedule activities for the remaining plant systems.

- A reduction in the current drawing revision backlog (see Objective 3.3.2.4).

- System Design Basis Information

  - Complete the Design Basis Document (DBD) Program for the initially selected 37 systems/topicals. This effort includes the issuance of the design basis document, and the loading of the DBD source documents (e.g., system design specifications, design calculations) into the design library, for each system/topical. A site management expectation has been established to complete this effort by the end of 1996.

  - Identify any additional systems/topicals for inclusion into the DBD Program.

Objective 3.3.2.7 In Service Testing (IST) Program

The following actions will ensure IST Program compliance, improve implementation of the Program, and enhance management oversight.

- Conduct a full review of IST Program requirements to ensure compliance with the Code.

- Document the basis for required testing and the basis for acceptance criteria.

- Revise testing procedures, as required, to achieve compliance with the recent/current revision of the Program.

- Clearly define IST Program standards and expectations regarding the conduct and the performance of procedures and enforce compliance.

- Establish training for appropriate Operations and Maintenance Department personnel on the intent of IST testing and the Code.

- Reassign auxiliary duties currently assigned to the IST coordinator in order to allow for full-time attention to the Program.

- Establish monitoring/trending methods and tools to assess the effectiveness of the IST Program.

Objective 3.3.2.8 Monitoring and Self-Assessment

The following actions will enhance the self-assessment capabilities of the Engineering organization.

- A Process and Assessment Group is being established within System Engineering to monitor, assess, and enhance work processes in order to raise standards, improve efficiencies, and reduce Engineering backlogs.

- Appropriate plant system performance goals and standards will be established. The Process and Assessment Group will develop routine monitoring tools which will be used to assess and support an effective management decision making process.

- Quarterly reviews of Engineering will be performed to determine the effectiveness of performance. The review will include feedback from interviews with Operations and Maintenance Department personnel with a focus on "customer service".

3.4 Quality Verification

3.4.1 Issues

- The changing roles and responsibilities of the Quality Verification Department were not clearly understood by Quality Verification or the Station and were not perceived by the Station as adding value.

- The authority of the Quality Verification Supervisor was diminished by organizational reporting relationships, due to the Supervisor's low tier management level. The appropriate management level was positioned offsite.

- Systematic and aggressive review of identified items was not stressed by Quality Verification in order to reach resolution for closure with the Station.

- Quality Verification failed to implement an existing escalation program at both the Site and Corporate levels to facilitate effective management intervention and support in escalating issues.

- Quality Verification did not assess or understand the individual safety significance versus the collective significance of its findings (HPCI Event, Corrective Action Record Follow-up).

- Quality Verification procedures and practices have not been integrated to reflect organizational changes.

- Site problems identified by Quality Verification field monitoring activities were not systematically incorporated into an existing field monitoring program.

- Insufficient staffing impeded the Quality Verification Department from successfully accomplishing its mission. This was due to a reduction in workforce and increase in workload.

- Quality Verification communications with Senior Management and across departmental lines was ineffective in identification, follow-up, closeout, and escalation of issues.

3.4.2 Action Plan Summary

Objective 3.4.2.1: Strengthen the Role and Authority of the Quality Verification Function

- Changes in senior Quality Verification personnel have been made to implement necessary improvements. A restructuring of the Quality Verification Department includes three distinct functions reporting to a Site Quality Verification Director: Audit, Integrated Safety Engineering (ISEG), and Integrated Analysis (See Objective 3.4.2.4).

- The Site Quality Verification organization is transitioning from presently reporting to an offsite Nuclear Oversight Manager to report directly to the Site Vice President. This change is being made to strengthen Quality Verification's role and authority at the Station.

- The role of Quality Verification personnel will be to conduct independent assessment activities and maintain awareness of, but not direct involvement in, line self-assessment and investigation activities. To support this role Quality Verification conducted departmental workshops defining the roles and responsibilities of the independent assessment functions of Quality Verification. A model relating the independent assessment and self-assessment roles (Defense-In-Depth Model) was developed and disseminated beginning in December 1993.

- The completed "Roles and Responsibilities" and the "Independent Assessment versus Self-Assessment" models were used to train Quality Verification personnel to ensure an understanding of their current roles and responsibilities. Presentations will be made by the Quality Verification personnel to management and bargaining unit personnel.

- The Quality Verification Director is a member of the Quad Cities Safety Review Board which meets periodically to assess Station performance. This provides direct input into measurement of Station performance by a senior quality individual.

- The Commonwealth Edison Nuclear Quality Assurance Program Policy has been approved for implementation by Commonwealth Edison's Chairman and Chief Executive Officer. In support of this policy, the Senior Vice President and Chief Nuclear Officer has issued a policy letter that describes the Chief Nuclear Officer's expectations of the Site Vice Presidents for Quality Assurance Program implementation. (See Attachment A.)

- An Independent Assessment Policy Statement will be issued by the Site Vice President. (See Attachment B.) This policy will describe the role of independent assessments in achieving performance improvements, as well as senior management's expectation that all personnel will welcome, encourage, and cooperate with those performing such audits and assessments.

Objective 3.4.2.2: Strengthen the Process of Review and Resolution of Identified Issues

- An issues escalation standard has been established with concurrence from the Senior Vice President and Chief Nuclear Officer which defines the criteria for escalation of Quality Verification Findings to the Site Vice President, Nuclear Oversight Manager, and the Senior Vice President and Chief Nuclear Officer.

- To address self-identified deficiencies, Quality Verification conducted internal training for Site Quality Verification personnel reinforcing the quality requirements and expectations for identification, followup, closeout, and escalation of issues.

- A new position of Site Quality Verification Director has been developed and tasked with both responsibility and accountability for the performance of the Quality Verification Department at the Site, including responsibility for identifying significant issues and ensuring the implementation of effective corrective actions.

- A new program will be developed to define data acquisition, analysis and assessment of the collective significance of Site Quality Verification findings. This process also will be used to validate the Station's self-assessment capabilities.

Objective 3.4.2.3: Improve the Effectiveness and Timeliness of Quality Verification Products and Processes

- An outside effectiveness review of Quality Verification was conducted by an independent contractor and identified areas for Quality Verification improvement. Quality Verification conducted a Site meeting with the independent contractor to gain a better understanding of the issues and develop a schedule for addressing them. Currently, two areas (communication of issues and converting Corrective Action Records to Problem Identification Forms) are being addressed by Quad Cities Quality Verification, with a July 1994 completion date. Once these two areas are complete, additional subject areas will be selected until all areas have been addressed.

- Quality Verification, as part of the Nuclear Oversight organization, has developed a Nuclear Oversight Coordinating Committee to bring consistency and interaction between CECo Corporate Nuclear Oversight and Site Quality Verification organizations. The three top priorities of this organization are to:

  - develop the "Roles and Responsibilities Model" for the organization (complete),

  - develop the "Defense-In-Depth Quality Model (independent assessment versus self-assessment)" (complete), and

  - enhance processes and products for the Audit/Field Monitoring Report, ISEG, and Integrated Analyst areas (in progress).

- A periodic Escalated Issues Report has been developed to bring unresolved issues to the attention of senior management and thereby assure timely and effective resolution of each issue.

- The timeliness and content of Site Quality Verification reports will be improved to make them more useful to Site management through feedback from the recipients of the reports and personal accountability.

- Quality Verification procedures are being revised to reflect organizational and process changes at the Station.

Objective 3.4.2.4: Ensure Quality Verification Staffing Experience Levels Support Effective Execution of Necessary Processes

- A review of the Quality Verification organization will be conducted to assess the effective use of Quality Verification Department resources.

- 1994 Site Audits were reviewed for inclusion of technical experts on audit teams and ISEG projects to provide enhanced technical content in audits and assessments. All four audits completed to date were supplemented with technical subject matter experts. The audited organizations commented on improved audits utilizing the technical experts.

- Interaction and use of other utilities' technical personnel for use in the audit and assessment organizations will be expanded to improve oversight effectiveness capabilities at Quad Cities. Recently, the Environmental Protection Audit was enhanced through the utilization of a Radiation Protection Supervisor from another utility.

- Site visits to utilities outside of Commonwealth Edison will be performed to enhance organizational performance. Two such visits are scheduled for 1994.

- Staffing has increased by approximately 50% in order to provide a more senior and experienced staff at the Site, as evidenced by the following:

  - Senior experienced personnel have been assigned to fill the Site Quality Verification Director, Audit Supervisor, ISEG Supervisor, and Integrated Analysis Administrator positions.

  - Senior Reactor Operator licensed or certified personnel have been added in each Quality Verification functional discipline.

  - A senior PRA experienced engineer has been added to the ISEG group.

  - A senior Maintenance person with INPO experience has been added to the Department.

  - Eight additions were made to the staff. Six were individually selected for their expertise from various offsite CECo locations. The other two were proven senior line managers from the Site.

  - The Department is in the process of hiring additional engineers to increase its' capabilities for overviewing Site engineering activities.

Objective 3.4.2.5: **Improve Quality Verification Communication Effectiveness**

- Quality Verification will orally communicate the intent and results of its observations to the organization or individuals. This feedback will facilitate an understanding of the Quality Verification oversight process.

- Daily Quality Verification conference calls are conducted involving Site and Corporate Supervisors to ensure rapid dissemination of issues among Sites.

- Quality Verification attends the new daily Superintendents' Meeting. This provides an avenue for immediate identification of Quality Verification issues to Senior Site Management.

- The Quality Verification Director is a member of the newly-developed Site Management Team and the Business Planning Group which are chaired by the Site Vice President. This membership provides additional access to Senior Site Management for communication of Quality Verification weekly issues.

- The Quality Verification Director and Quality Verification Supervisors attend the Monthly Department Head Meeting. The meeting provides a format to communicate Quality Verification issues to first line supervisors.

3.5 Radiological Protection

3.5.1 Issues

- Station workers receive high collective radiological dose.

- A high percentage of the plant area is radioactively contaminated.

- Some workers are not rigorous in following good radiological work practices.

- High Radiation Area controls have not been fully effective.

- Controls over the management and shipment of radioactive materials have not been fully effective. Improvements are needed in the control of radioactive material egress and vehicle shipment.

- Selected deficiencies in the administration of the radiological environmental monitoring program have been noted.

3.5.2 Action Plan Summary

Objective 3.5.2.1 Reduce Workers Collective Radiological Dose

- Reducing the collective radiological dose and improving the plant materiel condition are closely linked objectives. Section 4.5 of this Course of Action addresses the improvement to the materiel condition of the plant. This objective details radiological dose reduction efforts at the Site.

- Quad Cities recently has implemented the Optimum Water Chemistry Program (OWC). This program includes evaluation of alternative techniques (e.g., operational water chemistry changes, decontamination practices, material design changes) for reducing the overall and local radiological source term within the plant. Based on this evaluation, priorities for source term reduction activities will be established considering effectiveness, impact on operation and outage activities, and worker exposures.

Examples of OWC program elements are:

- Zinc Injection System installation.
  - A 1990 study determined that zinc injection was not cost effective at that time.
  - A re-evaluation will be performed in 1994-1995 to reflect current industry experience and costs.
- Source term modeling.
  - Computerized modeling will be performed in 1994-1995 to identify additional areas of concentration.

The following describes some short- to intermediate-term actions that are being taken in parallel with these evaluations and prioritizations:

- Reduction of the extent of activation products contributing to the source term, including:
  - Chemical decontamination of specific systems:
    - Continuing routine decontamination of the Reactor Recirculation System and Reactor Water Clean-up (RWCU) System.
      - Recent decon of the RWCU resulted in removal of 12 Curies with a DF of 4, reducing drywell dose rates from 1000 mRem/hr to 250 mRem/hr.
    - Expanding decontamination efforts to include Residual Heat Removal (RHR) system (estimated to save 50 Rem of worker exposure).
  - Control Rod Blade replacement continues with non-stellite models as scheduled.
  - A 1989 study prioritized stellite-containing components for replacement. All components identified as first priority have been replaced.

- New valves and repair parts are being procured to cobalt-free specifications.

- Enhancements in ALARA will be accomplished by increased involvement of line management and workers in the work planning process.

Objective 3.5.2.2 Reduce Contaminated Areas

- Improving plant materiel condition (Section 4.5) is critical to limiting the number of contaminated areas at the Station. Improvements, such as minimizing system leakage painting, trash, and cleanliness, contribute to the elimination of contaminated areas and the ability to maintain radiologically clean areas at the Site.

- A new drip funnel program is being used as a performance indicator to monitor plant leakage by counting and trending the number of installed drip funnels. Contaminated area reduction can then be achieved by correction of system leaks that are identified via the drip funnel program. This program includes the:

  - identification of leaks by systems,

  - determination of appropriate corrective actions, and

  - scheduling of work in appropriate system window or outage time period.

Objective 3.5.2.3 Improve Radiological Work Practices

- High standards are being reinforced through increased line management involvement and the PIF process.

  - Preventable personnel contaminations events (PCEs) are assigned via Problem Identification Form (PIFs) to specific work group supervision for follow-up action.

  - Line management involvement in ALARA program is increasing.

- Improved radiation worker training for appropriate specific activities will continue. Additional activities will be evaluated for inclusion.

  - Valve contractors receive additional training.

  - Laborers are receiving special training on decontamination procedures.

  - Mock-ups in use for Control Rod Drive (CRD) disassembly training helped to decrease dose per drive from >250 mRem in 1990 to 120 mRem in 1993.

Objective 3.5.2.4 Improve High Radiation Area Controls

- Further improvements are needed in the controls of High Radiation Areas. A root cause analysis is being performed to identify improved controls and determine why previous corrective actions have not been sufficiently effective. Areas of investigation include:

  - Improved control of high radiation areas requiring a barrier and posting (< 1000 mRem/hr).

  - Improved control of high radiation areas requiring more substantial controls, such as a lock (> 1000 mRem/hr).

  - Designing controls which workers will recognize and understand.

  - Analysis of current training programs.

  - Reduction of the number of routine required accesses.

  - Consideration of reduced surveillance frequency and increased use of remote monitoring.

Objective 3.5.2.5 Improve Radioactive Material Controls

- The amount of material released at the egress of the radiological posted area will be reduced by implementing a centralized tool issue area inside the posted area of the plant in 1994. A tool survey and tagging program has been established as an interim compensatory measure until the permanent tool issue area is functioning.

- The control of radioactive materials has been improved through the use of the Laundry-Tools-Decon (LTD) Building. It houses shops for Maintenance personnel to work on contaminated components in a controlled environment and provides improved controls on protective clothing shipping, receipt, and storage.

- The accuracy of surveying radioactive materials has been improved by relocating the main exit point. The new location has lower background radiation levels. This results in decreased interferences with monitor readings.

- Improvements in the control of vehicles both inside and outside the protected area have been established through procedure revisions. This ensures surveys are performed prior to and after receipt of radioactive material shipments.

Objective 3.5.2.6 Increase Station Involvement in the Radiological Environmental Monitoring Program

- Procedures have been revised and actions taken resulting in more Station involvement in the radiological environmental monitoring program. This includes relocation and verification of sampling locations and onsite review of the Offsite Dose Calculation Manual (ODCM) revisions.

SECTION 4

ISSUES AND ACTION PLANS
FOR SELECTED TOPICS

SECTION 4

ISSUES AND ACTION PLANS FOR SELECTED TOPICS

This section summarizes the issues which cross-cut multiple functional areas and which are important to both short- and mid-term improvements at Quad Cities Station. Detailed action plans are included in the Quad Cities Management Plan. As these plans are developed and refined, they will be available for review at the Site.

4.1 Corrective Action Program

4.1.1 Issues

- Ineffective and untimely corrective action processes contributed to a number of equipment problems to continue. Examples of this include acceptance of long-standing motor operated valve (MOV) deficiencies, and repetitive problems with toxic gas analyzers and charcoal absorber vessel temperatures.

- The lack of accountability for Site problem resolution resulted in short-term, rather than long-term, solutions.

- Due to the existence of numerous systems, the effectiveness of problem identification efforts was diminished at the Site. As a result, the Site lacked a central focus for issue identification and resolution.

- Root causes determinations have not been conducted in a consistent manner. They have been ineffective in identifying root cause and producing corrective actions that eliminate problem reoccurrence (i.e., ground water inleakage).

- The communication of Operating experiences and actions to address them has been ineffective in improving performance.

- The corrective action monitoring system does not provide a sufficient mechanism to elevate the priority of overdue commitments.

- Corrective action implementation dates often are extended multiple times without a formal review of safety significance or programmatic consequences.

- Follow-up on corrective actions are not stressed (e.g., failure to trend and analyze for repetitive equipment or performance problems).

- Failure to establish and maintain accountability for problem resolution contributes to continuing problems with equipment.

4.1.2 Action Plan Summary

Objective 4.1.2.1: Improve Problem Identification and Root Cause Analysis Processes

- The Integrated Reporting Program (IRP) will be effectively deployed, thereby reporting through a single system. Problems will be identified at a low threshold with the level and detail of investigation scaled to safety significance. This will result in the early identification and remediation of lesser event causes, thereby reducing the probability of significant events.

- The Root Cause Analysis Program will be effectively deployed and fully integrated with the IRP so that root cause solutions and corrective actions are implemented in a timely manner. Maintaining quality and ensuring consistency will be provided by a process expert group. This expertise will then be integrated into line management for continuous performance improvement. Additionally, improved performance monitoring/trending will be implemented. The combined effectiveness will increase the probability of preventing other events.

Objective 4.1.2.2: Enhance the Use of Lessons Learned and Operating Experience Information

- Quad Cities will maximize information obtained from Operating Experience reports to improve Site performance through formalization of the process and the conductive of effectiveness reviews.

- The Human Performance Enhancement System (HPES) will be implemented to support line management's accountability for human performance improvement. The HPES Coordinator will act as a single point of contact regarding human performance issues at the Station. The coordinator will monitor performance/trending of the IRP database; coach management and individual contributors in techniques to improve performance; and champion efforts such as training and assist line organizations in the investigation of events involving less than adequate performance. This focus will improve plant safety by making human actions more reliable.

Objective 4.1.2.3: Improve the Timeliness of Corrective Actions

- The commitment tracking process will be modified to require senior level approval to extend commitment dates and will provide for timely identification of past due and upcoming commitments to line management.

- The Issues Management Process will be effectively deployed and will result in the integration and prioritization of issues that significantly effect resources not currently identified by the Site Planning Group.

Objective 4.1.2.4: Communicate Consistent Expectations To Ensure Effective Follow-up of Corrective Actions

- Quad Cities will formalize the corrective action effectiveness process by establishing, at routinely scheduled intervals, multidiscipline reviews of implemented actions and their effectiveness.

- The Performance Planning and Review (PPR) process will be revised to include an assessment of corrective action follow-up. Career development opportunities will be subject to progress on outstanding corrective action implementation.

4.2 Self-Assessment

4.2.1 Issues

- Despite the performance of numerous Site self-assessment and improvement efforts, these activities have not been fully successful in improving Site performance; e.g., the Vulnerability Assessment Team (VAT) and 1992 Event Assessment Team (EAT) Reports. For example,

  - the Station's ranking of VAT issues did not accurately reflect their significance and status; and

  - self-assessment findings were not effectively communicated to Site management.

- Site organizations have not aggressively evaluated the importance of, or adequately responded to, the results of their self-assessment efforts. For example,

  - corrective actions taken in response to self-assessment findings have not been integrated into Site organizations' routine work processes.

4.2.2 Action Plan Summary

Objective 4.2.2.1: Address all outstanding Site self-assessment findings and improve the internal evaluation, in response to, and implementation of the results of future self-assessment activities at the Quad Cities Site.

- Outstanding VAT issues will be evaluated and re-prioritized for implementation with accountabilities assigned for ultimate resolution.
  - Evaluation and prioritization will be done within the existing Issues Management Process.
  - Resulting action items will be tracked in the Nuclear Tracking System.
- Site administrative procedures will be revised to reflect a requirement to evaluate the issues or findings raised during self-assessment processes performed on Site.

Objective 4.2.2.2: Improve the Quality of Future Internal Self-Assessment Processes

- The Quad Cities Site will develop and implement a comprehensive self-assessment process that will detect conditions which impact the safe and effective operation of the plant.
- Implement the Integrated Quality Effort (IQE) Program at the Site as an internal tool to monitor and assess the performance of the various Site work groups and the Site as a whole. This program monitors relevant performance elements within Site work groups on a monthly basis and measures these elements against pre-determined criteria.

4.3 Procedural Adequacy

4.3.1 Issues

- Overall procedural quality is not adequate as demonstrated, for example, by inadequate fire protection procedures and incomplete procedures to meet MOV program requirements, inadequate HPCI procedures, inadequate incorporation of Engineering requirements into Maintenance procedures, and inadequate scaffolding erection and inspection procedures.
- Procedures do not reflect the condition of the plant; e.g., some operating procedures do not reflect the manner in which the plant is operated.
- Poor procedure and drawing quality contributed to safety system unavailability and unnecessary shutdowns.

- Procedure revisions are not aggressively pursued.

- The Quad Cities procedure development effort is fragmented and the approval process is cumbersome and inefficient resulting in an excessive procedure backlog. In addition, an ineffective vendor technical manual upgrade program and a large backlog of drawing updates contribute to certain procedure inadequacies.

4.3.2 Action Plan Summary

Objective 4.3.2.1: Reduce Procedure Backlog

- A single coordinator has been assigned responsibility for reviewing the existing procedure review and approval process. The review will provide the basis for identifying a process that is less cumbersome and more efficient, resulting in a reduction of future procedure backlogs.

- Procedures that have been in review for greater than 200 days will be recalled and reviewed again to reflect changes in their source documents. They will then be re-introduced for review process consistent with their "rank-by-use" classification.

- Provide additional trained resources for the performance of 10 CFR 50.59 reviews in each department. In addition, guidance regarding which procedure revisions require 10 CFR 50.59 reviews will be developed.

Objective 4.3.2.2: Improve the Coordination and Timeliness of Procedure Revisions

- A single point for the coordination and tracking of procedure revisions has been established in each department in order to improve procedural content and reduce the resources required to develop, review, and approve procedures.

Objective 4.3.2.3: Improve Existing Procedures

- Existing procedures will be reviewed to ensure that they reflect the actual configuration and operation of the station. (e.g., HPCI procedures, MOV program procedures).

- Criteria will be developed to establish the priority of various Site procedures to be reviewed and to establish a schedule for completion.

- The procedure writers' guide will be reviewed and assessed to improve the quality of Site procedures and ensure that human factors considerations are in place. Additionally, administrative guidelines will be reviewed to ensure adequate technical review.

- An investigation is underway to objectively assess the contribution of procedure format or technical content to personnel errors. (Maintenance procedures will receive particular attentions in this review.) The results of this study will be factored into plant procedures as they are upgraded or during the bi-annual review process.

4.4 Procedural Compliance

4.4.1 Issues

- Management's failure to enforce procedural adherence has resulted in non-compliance with procedures.

- Inadequate personnel attention to routine activities has resulted in procedural non-compliance.

- Overall, procedural compliance is weak as demonstrated by, e.g., procedures related to temporary alterations, material shipping requirements, operability requirements, shutdown cooling event, administrative requirements, and personnel errors.

4.4.2 Action Plan Summary

Objective 4.4.2.1: Convey Management Expectations to Plant Personnel

- Quad Cities Administrative Procedure and plant implementing procedures are being modified to clearly indicate and define procedure compliance requirements.

- Staff meetings at all levels have and will continue to be used by management to restate and reinforce procedure compliance expectations.

- General Employee Training sessions will be used to periodically reinforce these expectations.

- The Performance Planning and Review (PPR) process will be used to emphasize the importance of procedural compliance on an individual's performance evaluation.

- Performance indicators will be prominently displayed to emphasize the importance of procedural compliance and reinforce management's expectations.

Objective 4.4.2.2: Performance Trending

- The Problem Identification Form (PIF) process will be used to monitor and trend the Station's and individual departments' procedural violations. These trends will be made available to management and workers as performance indicators which can be used to determine the need for corrective actions.

Objective 4.4.2.3: Procedure Improvements

- The Station's procedure improvement program will continue. Program objectives enhance the usability of procedures and incorporate new formats to improve their usability.

- A process will be developed to rank procedures by frequency of use and complexity of the task to better facilitate the use of procedures to perform plant evolutions.

Objective 4.4.2.4: Accountability

- Worker accountability for procedure compliance will be emphasized by trending, corrective actions, and the employee evaluation process.

Objective 4.4.2.5: Evaluate Other Processes

- Visits and/or discussions will be held with other nuclear sites and INPO to determine if other techniques are available to enhance procedural compliance.

4.5 Materiel Condition

Several issues have been identified and CECo has taken immediate actions to achieve improvement in the Station's materiel condition. Mid-cycle maintenance outages were undertaken and completed in November and December 1993. As explained below, materiel condition improvements already implemented at the Station have focused on items identified by the Vulnerability Assessment Team (VAT), other high priority Maintenance activities on critical safety/equipment systems, operator work-around, priority equipment issues, and initial activities to address vibration issues.

4.5.1 Issues

- The materiel condition of some Station systems is degraded. The following are some of the programmatic issues:
  - inadequate response to predictive maintenance indicators,
  - inadequate response to plant performance indicators,
  - inadequate response to degrading trends, and
  - failure to respond in a timely and effective manner to identified deficiencies.

4.5.2 Action Plan Summary

Objective 4.5.2.1: Improve Plant Materiel Condition

- The Maintenance organization will develop and implement an action plan to improve plant area, equipment, and system materiel condition through initiation of, or improvements in, the following processes:
  - communication of management expectations for material condition,
  - plant area reclamation,
  - Nuclear Work Requst (NWR) inventory reduction,
  - preventive maintenance program,
  - conduct of and response to predictive maintenance analysis (e.g., vibration, thermography,oil analysis),
  - root cause analysis of component and system failures,
  - trending of equipment/system performance and failures,
  - development of and response to plant and system performance indicators,
  - incorporation of lessons-learned from in-house and industry experience, and

- periodic assessment of plant materiel condition using indicators such as:
  - safety system unavailability factors,
  - unit capacity factors,
  - the quantity of overdue preventive maintenance tasks,
  - work request inventory,
  - equipment performance and failure trend reports,
  - Nuclear Plant Reliability Data System/Component Failure Analysis Report (NPRDS/CFAR), and
  - number of outstanding below-standard or adverse trend predictive maintenance indicators.

4.6 Other Issues

4.6.1 Motor Operated Valve (MOV) Program

4.6.1.1 Issues

- Limited Corporate and Station management support of the Motor Operated Valve (MOV) program hindered the timely resolution of Generic Letter (GL) 89-10 issues.
- The GL 89-10 testing program did not emphasize testing the most safety significant valves.
- At the time of the NRC GL 89-10 Phase II inspection (7/93), only 9 of approximately 66 valves had been dynamically tested. The ability to meet Quad Cities' dynamic testing commitments was questionable.
- The design margin for all GL 89-10 valves was not clearly understood.
- Several technical issues/assumptions in MOV program have not been justified to the satisfaction of the NRC.
- MOV programmatic controls are not adequately defined and are not consistently implemented.
- Design evaluations have been performed in an untimely manner due to limited support.

4.6.2 Action Plan Summary

Objective 4.6.2.1: MOV Program Staffing

- A change in management priorities involving the MOV program is clearly evident. One priority of the mid-cycle maintenance outages in November-December 1993 was to make significant progress in the dynamic testing program. MOV testing has been given higher priority in the work planning process. Additional staffing, since August 1993, in the MOV area include the following:

  - A department head level individual has been assigned responsibility for the MOV program.

  - One engineer has been added to assist in administrative program responsibilities.

  Approximately ten personnel have been added to the Corporate MOV staff including an engineer dedicated specifically to interface with Quad Cities.

Objective 4.6.2.2: MOV Testing Priority

- The MOVs have been prioritized based on a Probability Risk Assessment. A schedule has been developed to ensure that all high- and medium- priority valves are tested by the end of Q2R13. Currently 42 of 66 planned dynamic tests have been completed.

Objective 4.6.2.3: MOV Margin Review

- A design margin review is in progress and will be completed on all safety related MOVs by July 1994. Numerous changes to restore design margin have been implemented since November 1993. Eleven valves were modified during each of the 1993 mid-cycle maintenance outages and 12 valves currently are scheduled to be modified during the Unit 1 refueling outage, Q1R13. The scope of the next Unit 2 refueling outage is expected to be similar to Q1R13.

Objective 4.6.2.4: MOV Valve Issues

- The two most significant technical issues are selection of an appropriate valve factor and motor capacity determination. A white paper on valve factor selection has been developed and is being used. With respect to the motor capacity issues, testing is being conducted to confirm CECo's conclusions.

Objective 4.6.2.5: MOV Program Control

- A new Station procedure has been developed and approved to formalize programmatic control of the MOV program. Implementation and refinement of the procedure is in progress.

4.7 Residual Heat Removal (RHR) System

4.7.1 Issues

- The RHR torus cooling line valves have a history of failure due to cavitation induced vibration.

- It was found during a design review that the motor operated RHR shutdown cooling suction valves have yokes originally designed for manual operation. Although these valves have not failed, the potential failure to open could have led to failure of the RHR system to achieve cold shutdown within the specified time.

- The 1B and 2C RHR pump motors have experienced high vibration on the upper motor bearing.

- The high leakage rates and high failure rates of the RHR service water pumps causes an operating environment which further degrades the reliability of the RHR service water pumps.

- RHR torus suction valves and Low Pressure Coolant Injection (LPCI) testable check valves were not seat leak tested.

4.7.2 Action Plan Summary

Objective 4.7.2.1: RHR Vibration Analysis

- Failure of the torus cooling valves was treated as an independent event. The root cause investigation process has determined that cavitation induced vibration was the cause of the failures and the valves will be replaced with valves containing anti-cavitation trim. The replacement, that will occur during Q1R13 and Q2R13, should eliminate the cavitation and vibration problems that occurred in the past.

Objective 4.7.2.2: RHR Shutdown Cooling Valves

- The shutdown cooling valves will be replaced on Unit 1 during Q1R14. The Unit 2 valves will be replaced during Q2R13. The MOV program will determine if there are other valves with the potential for failure due to misapplication of valve yokes.

Objective 4.7.2.3: RHR Vibration Analysis

- A diagnosis of the root cause of the high vibrations on the 1B RHR pump motor will be completed during the current Unit 1 refueling outage. The results of this diagnosis will be used to develop a plan and schedule to correct the root cause of the high vibrations.

Objective 4.7.2.4: RHR Service Water Pump Impeller Modifications

- The high pump seal leakage rates are caused by higher than desirable vibration due to pump cavitation and pipe strain induced alignment stresses. The pump vibrations will be eliminated by improving the design of the pump impeller. The alignment stresses will be relieved by installing adjustable pipe supports. In addition, new pump mechanical seals and improved seal cooling will be installed at the Station. Two RHR service water pumps in each unit have had the improved "cutwater" impellers installed. The two remaining pumps in each unit will have the modification completed in 1994. The mechanical seals on all Unit 1 and Unit 2 pumps will be replaced by the end of 1994. All pumps will have new seal lines installed when the seals are replaced. Two pump motors on Unit 1 and one pump motor on Unit 2 have been refurbished. The two remaining motors on Unit 1 will be refurbished during the current outage. Refurbishment of the remaining pump motors on Unit 2 is planned for Q2R13 and Q2R14.

Objective 4.7.2.5: RHR Test Line Installation

- The Unit 1 RHR torus suction valves will be replaced during the Q1R14 outage. Replacement of the Unit 2 RHR torus suction valves will be completed during Q2R13. Test lines have been installed on the RHR testable check valves on Unit 2. Installation of test lines on the Unit 1 testable check valves will be completed during the current refueling outage. The installation of the test lines on the check valves will allow seat leakage testing which will be performed during each refueling outage. There is no plan to seat leak test the RHR torus suction valves. There is no requirement to seat leak test these valves because the valves are open post-LOCA, receive no closure signal, and have a water seal above them post-LOCA.

4.8 High P essure Coolant Injection (HPCI) System

4.8.1 ssues

- The general materiel condition of the HPCI system needs further improvement. There have been an increasing number of system component age and wear related failures and some system components are not included in a preventive maintenance program. For example:

  - HPCI flow, oil, and steam pressure switch failures and/or setpoint drifts have occurred due to age,

  - HPCI steam supply and turbine exhaust drain pot level switches have failed due to age,

  - flow restricting orifices are not inspected on a formal frequency,

  - there is no diaphragm replacement program in place for system air-operated valves,

  - there is no program which establishes an inspection frequency on the steam supply and turbine exhaust drain pot level switches, and

  - there is no maintenance program which establishes routine rebuilding or replacing solenoid operated valves.

- Torus vibrations and hydraulic loads occur during HPCI operation. These excessive vibrations and hydraulic loads cause alarms in the control room and excessive cycling of the HPCI steam exhaust check valves.

- Unit 2 HPCI pump vibration readings are in the In-Service Testing (IST) alert range.

4.8.2 Action Plan Summary

Objective 4.8.2.1: Implementation of RCM Recommendations

- The Reliability Centered Maintenance (RCM) study of the HPCI system has been completed and all high priority issues identified in the study were addressed during the mid-cycle maintenance outages, Q1M09 and Q2M11. A preventive maintenance program for the system will be established and remaining issues identified by the RCM study will be started within their base frequency beginning with Q1R13 and Q2R13 outages.

Objective 4.8.2.2: Drain Pot Level Alarm Resolution

- Special testing to determine the cause of drain pot high level alarms is in progress on both units. The results of this testing will be evaluated and used to develop a solution which will be implemented on Unit 1 during the current refueling outage (Q1R13) and on Unit 2 during the next outage of sufficient duration to allow completion of the work. Periodic functional testing of the HPCI turbine steam supply and turbine exhaust drain pot level switches will be implemented.

Objective 4.8.2.3: HPCI Sparger Modification

- A new HPCI exhaust line sparger, which will reduce torus vibration and exhaust line chugging by evenly distributing exhaust steam for condensation, will be installed on Unit 1 during the current refueling outage (Q1R13) and on Unit 2 in Q2R13.

Objective 4.8.2.4: HPCI Maintenance Overhaul

- The HPCI pump vendor has reviewed the vibration readings for Unit 2 booster and main pumps and found them to be acceptable. There currently is no operability concern with the pumps. The Unit 2 HPCI booster pump, however, will have the "cutwater" modification completed, thereby reducing pump vibration. In addition, piping stresses will be relieved, resulting in less alignment stresses on the pumps and lower vibration during operation. After these changes have been completed, the pump will be realigned. This work is being performed to reduce vibration levels such that the vibrations readings will meet IST requirements.

Objective 4.8.2.5: HPCI Performance Indicators

- System performance indicators, in addition to those of the IST and Safety System unavailability programs, will be established, monitored, and evaluated to trend system performance.

4.9 Reactor Core Isolation Cooling (RCIC) System

4.9.1 Issues

- The general materiel condition of the RCIC system needs improvement. There have been an increasing number of system component age and wear related failures and some system components are not included in any preventive maintenance program. For example:
  - RCIC flow, oil, and steam pressure switch failures and/or setpoint drifts have occurred due to age,
  - RCIC steam supply drain pot level switches have failed due to age,
  - RCIC turbine governor electronics have failed due to age,
  - system restricting orifices on system are not inspected on a formal frequency,
  - there is no diaphragm replacement program is in place for system air-operated valves,
  - there is no program that establishes an inspection frequency on the steam supply drain pot level switches; and
  - there is no maintenance program that establishes routine rebuilding or replacing solenoid operated valves.
- Unit 1 RCIC turbine exhaust rupture disks leak and leaks have occurred on the Unit 2 rupture disks in the past. The leaks are caused by steam cuts on the flange faces of the inboard rupture disks.
- There is no performance trending program or performance acceptance criteria, other than the In Service Testing (IST) and Safety System Unavailability (SSU) programs for the RCIC system.

4.9.2 Action Plan Summary

Objective 4.9.2.1: Implement RCM Recommendations for RCIC

- The Reliability Centered Maintenance (RCM) study is complete and implementation is approximately 95% complete. All high priority issues currently identified in the study were addressed during the mid-cycle maintenance outages, Q1M09 and Q2M11. A preventive maintenance program for the system will be established and all remaining issues identified by the RCM study will have been completed within their base frequency by the end of Q1R13 and Q2R13. System performance indicators will be established and used to trend system performance and plan system work accordingly.

Objective 4.9.2.2: RCIC Rupture Disc Modification

- The design of the rupture disk assemblies are being upgraded to eliminate the steam leakage issue. The change has been completed on Unit 2 and is planned for completion during the current Unit 1 refueling outage.

Objective 4.9.2.3: RCIC Performance Indicators

- System performance indicators, in addition to those of the IST and SSU programs, will be established, monitored, and evaluated to trend system performance.

4.10 Emergency Diesel Generator (EDG)

4.10.1 Issues

- Lack of adequate preventive maintenance contributed to less than optimal crankcase vacuum. The latter was a contributor to degraded diesel performance.

- Recurring fuel oil system leaks have resulted in decreased availability and degraded performance of the emergency diesel generators.

- The level of instrumentation on the emergency diesel generators and their associated auxiliary systems does not support complete system performance trending.

- Inadequate moisture protection, copper tubing, and obsolete instrumentation on the starting air system contribute to increased system maintenance and degraded system performance.

- Degraded diesel generator cooling water pump performance resulted in reduced system flows and less than optimal system performance.

4.10.2 Action Plan Summary

Objective 4.10.2.1: EDG Preventive Maintenance Program

- A comprehensive preventive maintenance program, developed by the diesel generator owners group and approved by the diesel vendor, is being implemented at the Station. As part of the preventive maintenance program, the sealing elements on the Unit 1 and Unit 2 diesels have been replaced, resulting in improved crankcase vacuum. A plan to replace the sealing elements on the Unit 1/2 diesel is under development.

Objective 4.10.2.2: EDG Fuel Oil Supply Modification

- System modifications, which installed flexible hoses in place of hard pipes, flanged type pumps in place of threaded body pumps, and additional pipe supports, have been installed on the Unit 1 and Unit 2 diesels. These modifications should lower the frequency of fuel oil leaks for these diesels. The Unit 1/2 diesel will have the modifications described above completed in 1994.

Objective 4.10.2.3: EDG Instrumentation Modification

- Modifications to install additional system instrumentation are being planned. These modifications, when installed, will allow more complete system condition evaluations including heat exchanger and pump performance, filter and strainer differential pressures, and in-depth monitoring of crankcase vacuum.

Objective 4.10.2.4: EDG Air Dryer Modification

- Modifications to the starting air system, including the installation of air dryers, the replacement of copper tubing with stainless steel tubing, and the replacement of obsolete instrumentation, are under development.

Objective 4.10.2.5: EDG CWP Modification

- Diesel generator cooling water pumps and motors were replaced on all three diesel generators, resulting in significant improvement in system performance.

NUCLEAR QUALITY ASSURANCE PROGRAM POLICY

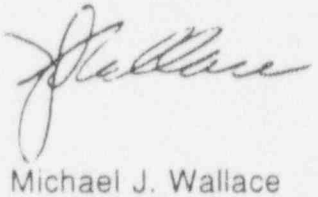
It is the policy of Commonwealth Edison Company to provide a safe, reliable, cost effective source of electrical service to our customers on demand.

Implementation of this policy in our Nuclear Division requires a commitment by employees to uncompromising safety and technical excellence. This commitment will assure that those systems, equipment, and structures essential to the prevention of nuclear incidents, which could adversely affect the health and safety of the public, are maintained at a high degree. Functional integrity and reliability will be assured, thereby mitigating the consequences of such incidents in the unlikely event they should occur.

The Commonwealth Edison Quality Assurance Program will be established as one means of achieving the objectives of this policy. It will define specific individual and organizational responsibility and authority, will prescribe procedures for compliance with regulatory requirements, and will establish appropriate guidelines for implementation of these procedures.

It is the policy of executive management that responsibility for the implementation of the Nuclear Quality Assurance Program is interdisciplinary and not the sole responsibility of any one organization or group. It will be the responsibility of each company or contractor employee working under the scope of this Nuclear Quality Assurance Program to reflect the attitude of executive management on quality assurance, and to implement the contents of this Nuclear Quality Assurance Program rigorously in the execution of their duties.

Each Site Vice President shall be assigned the responsibility for ensuring that the Nuclear Quality Assurance Program is established and implemented at the Station. Periodically, he shall review the overall effectiveness of the Nuclear Quality Assurance Program and assure that I am kept informed of the program's overall effectiveness. Overall responsibility for the Nuclear Quality Assurance Program will remain with the Senior Vice President and Chief Nuclear Officer.



Michael J. Wallace
Senior Vice President
Chief Nuclear Officer

INDEPENDENT ASSESSMENT POLICY STATEMENT

It is Quad Cities Nuclear Power Station's policy to fully utilize independent assessments as part of our continuing efforts to achieve the highest level of performance.

In an effort to improve, the Station performs self-assessment which is a continuing critical evaluation of one's own performance. Improvement begins with self-assessment and it is the responsibility of each Station employee to critique activities and self-performance. Self-assessment cannot be performed by anyone else and is an important compliment to independent assessments.

Independent assessments performed by Quality Verification, Quality Control, Independent Safety Engineering, the Nuclear Regulatory Commission, the Institute for Nuclear Power Operations, and others are valuable tools that can be used to ensure that our performance reflects the highest level of quality.

I expect Quad Cities Nuclear Power Station personnel to welcome and encourage independent assessments as part of our continuing efforts to improve performance. While assessments are being planned or performed, we will cooperate to the maximum extent possible. We will not be defensive or argumentive when discussing the observations, inquiries, or results of an assessment. We will carefully consider all of the recommendations presented.

Any attempt to discourage or inhibit the discussion of quality concerns is intimidation and is unacceptable.

By implementing this policy, we will fully realize the contributions independent assessment can make towards our mission of safe, efficient, and reliable power generation.

E. S. Kraft, Jr.
Site Vice President
Quad Cities Nuclear Power Station

APPENDIX A

COMPLETED IMPROVEMENT INITIATIVES

APPENDIX A

Completed Improvement Initiatives

Since mid-1993, Commonwealth Edison Company (CECo) has implemented immediate improvement actions at Quad Cities Nuclear Power Station that are independent from the activities specified in the Course of Action (COA).

First and foremost, immediate steps have been taken to improve management and leadership at the Site. Experienced senior management personnel from outside CECo have been appointed to fill the positions of Site Vice President, Station Manager, Technical Superintendent, Operations Manager, and Regulatory Assurance Supervisor. Proven managers from other CECo facilities also have been assigned to the positions of Maintenance Superintendent, Performance Improvement Supervisor, and Financial Services Director. Engineering was reorganized and clear accountability and direct control of design-related and support functions resides with the Site Engineering and Construction Manager. Of a total of 125 managers and professional staff, 100 have attended the Leadership Development course.

In addition to the above-described management changes and improvement initiatives, the following groups have been established to oversee and improve Site performance:

Event Screening Committee (ESC): Classifies events (problems), reviews problems for operability and reportability requirements and for non-conforming conditions, assigns root cause investigations to appropriate departments, and requests immediate corrective actions if necessary.

Plant Operations Review Committee (PORC): Provides senior management review of safety-related activities and investigations. The PORC review ensures that revisions, recommendations, or modifications to Station hardware (plant equipment) and software (procedures, Technical Specifications, FSAR) are implemented in a manner that assures continued safe plant operations, consistent with Station Technical Specifications.

Site Planning Group (SPG): Manages the implementation of the annual Management Plan to ensure that performance expectations are met or exceeded within allowed resource allocations.

Technical Review Board (TRB): The primary forum for technical issues. Comprised of personnel from System Engineering, Regulatory Assurance, Engineering and Construction, Work Control, Operations, and Maintenance, the TRB performs technical oversight of the facility and is the oversight organization for ongoing physical plant improvement efforts. The TRB performs technical issue management and provides input to the SPG for all non-routine technical issues.

Business Planning Group (BPG): Manages business planning activities for the Site and resolves resource and strategic issues as they emerge.

Commonwealth Edison also has established and implemented processes and programs to ensure that improvement efforts are sustained at the Station over the long term. These programs include the following:

Integrated Planning Process (IPP): The effectiveness of resource allocation to Site activities has been improved through the adoption of the IPP which provides an integrated, Site-wide plan addressing business planning, issue management, and budgeting functions.

Integrated Reporting Program (IRP): Provides a common, integrated methodology to identify problems, establish methods of investigating those problems, identify root causes, develop appropriate corrective actions that will prevent recurrence, and provide data that can be used for problem trending.

Problem Identification Forms (PIFs): Provide a common method for anyone to identify problems that may require additional investigation. Since January 1, 1994, approximately 755 PIFs have been issued.

Root Cause Investigations: There is an appropriate level of management support and multi-disciplinary coverage in these investigations.

Work Control Center: Staffed by Operations and Maintenance personnel, the Work Control Center has been implemented to improve work processes.

Procedure Compliance Policy: Operations management has restated its expectations regarding strict procedural compliance at the Station.

Nuclear Work Requests: A process has been implemented to review and validate all open Nuclear Work Requests.

Hot Spot Reduction: A hot spot reduction program has been initiated which includes flushing and elimination of significant contributors to dose.

Plant Leakage Reduction: A new drip funnel program is being used as a performance indicator to monitor plant leakage by counting and trending the number of installed drip funnels.

Vibration & Cavitation Concerns: Actions have been taken to correct the known pump and valve vibration and cavitation problems.

Mid-cycle Maintenance outages on Unit 1 and Unit 2 were conducted to upgrade equipment and enhance system reliability and performance. Quad Cities Station placed a high priority on outage tasks which potentially could result in the greatest improvement in the margin of safety. Quad Cities considered the following factors in determining the highest contributors to the Site's safety margin: the Quad Cities IPE results; the Quad Cities Vulnerability Assessment Team (VAT) issues; existing operator work-around and concerns; and the Station's top priority equipment issues. Actions completed include the following:

- approximately 770 Nuclear Work Requests,
- approximately 60 modifications,
- approximately 80 Vulnerability Assessment Team (VAT) issues have been resolved, and
- approximately 20 identified Operator Work-Around were eliminated.

Specific Unit 1 mid-cycle Maintenance actions included:

Emergency Diesel Generator (EDG): The Diesel Generator Cooling Water Pumps (DGCWPs) were replaced and inspection/replacement performed on all 20 EDG engine power packs.

High Pressure Coolant Injection (HPCI): Dp testing of turbine steam supply and minimum flow valves was performed prior to Unit shutdown as part of the MOV program. Additional maintenance activities during the mid-cycle outage included: inspection/refurbishment of the motor speed changer and motor gear unit; replacement of motor actuator torus suction valve; replacement of GEMAC pump flow and pressure transmitters to Rosemount models; replacement of diaphragms on air operated valves; replacement of obsolete HPCI pump oil pressure switches with new models; upgrade of drain pot level switches; and repair of turbine-pump coupling.

Reactor Core Isolation Cooling (RCIC): Dp testing of the minimum flow and lube oil cooler cooling water supply valves were performed prior to unit shutdown as part of the MOV program. Additional maintenance activities performed on the RCIC system during the mid-cycle outage include: upgrade of drain pot level switches; replacement of actuator motors on the pump discharge valves; and replacement of diaphragms on various air-operated valves.

Core Spray (CS): The 'B' Core Spray pump was overhauled and a new motor-pump coupling was installed and balanced. Additionally, obsolete room cooler thermostats were replaced in the CS rooms with environmentally qualified temperature switches.

Residual Heat Removal (RHR) and RHR Service Water (RHRSW): Dp testing of heat exchanger bypass valves, LPCI injection valves, and torus spray shutoff valves were completed as part of the MOV program. Other maintenance activities performed on the RHR and RHRSW include: replacement of motor pinion, worm shaft gears, and motor for a torus return isolation valve; replacement of gearing on drywell spray valves; modification of the control circuitry of heat exchanger bypass valves to "seal-in" logic; replacement of yoke-to-actuator bolts on the LPCI injection valves; replacement of obsolete room cooler thermostats for the RHR rooms with environmentally qualified temperature switches; motor refurbishment of the RHRSW D pump; replacement of RHRSW D pump discharge valve; and inspection of crossover piping for the RHRSW pumps (A, F, C and D) for erosion.

Other Activities: Mid-cycle maintenance activities also included pressure testing Core Spray testable check valves, replacement/repair of SBLC heat trace; and replacement activities of Rosemount transmitters for NRC Bulletin 90-01.

Additional Unit 2 mid-cycle maintenance activities are described below:

Emergency Diesel Generator (EDG): All 20 EDG engine power packs were inspected and replaced. Modifications on EDG fuel oil system were installed to allow for flexible hose installation. A new digital tachometer was installed on the local diesel generator panel. As a result of previous inspections, local panel transformers (power control and current) were replaced.

High Pressure Coolant Injection (HPCI): Dynamic (Dp) testing of the steam admission valve was completed during unit start-up. The motor gear unit was inspected and refurbished. The torus suction valve actuator motor and GEMAC pump flow and pressure transmitters to Rosemount models were replaced. Obsolete HPCI pump oil pressure switches have been replaced with new models; drain pot level switches have been upgraded; and a "cold" alignment check on turbine-pump was performed.

Reactor Core Isolation Cooling (RCIC): Drain pot level switches and turbine exhaust line rupture disc design have been upgraded. The actuator motor and gearing on the pump discharge valve and the diaphragms on various air-operated valves have been replaced. Barometric condenser internals were inspected.

Core Spray (CS): Mid-cycle maintenance outage activities included balancing the motor-pump coupling for B pump and converting testable check valve 1402-9B to conventional swing check design to alleviate pneumatic actuator concerns.

Residual Heat Removal (RHR) and RHR Service Water (RHRSW):
Dp testing of the heat exchanger bypass, minimum flow, crosstie, LPCI injection, and torus spray shutoff valves were completed as part of the MOV program. Motor pinion, worm shaft gears, and motor for torus return isolation valve were replaced. Gearing on the containment spray valves and the obsolete room cooler thermostats for the RHR rooms with environmentally qualified temperature switches were replaced. Control circuitry of the heat exchanger bypass valves to "seal-in" logic was modified. Yoke-to-bonnet bolts on the containment spray and the crosstie valves were replaced. The motor of the RHRSW D pump was refurbished. In addition, crossover piping for the RHRSW pumps (A, B, C and D) were inspected for erosion prior to Maintenance Outage.

Other Activities: Mid-cycle maintenance activities also included replacement/repair of SBLC heat trace and repair of the disk/pilot assembly for MSIVs 1A, 2A, 1C, 2C, and 1D. (Note - radiograph inspections for disk/pilot assembly integrity was performed on the Unit 1 MSIVs during the unit's forced outage in December. Results indicated satisfactory integrity for unit restart.)

Appendix B

Detailed Action Plan

Vibration Plan

1.1 Excerpt from Course of Action

1.2 Excerpt from Management Plan

1.3 Supporting Information

Safety Culture

2.1 Excerpt from Course of Action

2.2 Excerpt from Management Plan Item

2.3 Supporting Information

1.1 Exerpt from Course of Action

3.3. Engineering

3.3.1 Issues

- Engineering Effectiveness and Timeliness

  Engineering actions have not always been effective or timely in:

  - resolving plant problems (e.g., equipment vibration problems, electromatic relief valves);

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3.3.2 Action Plan Summary

The Engineering Organization has established the following objectives, and associated action items, to address the identified issues. These actions will strengthen the safety focus and provide a more comprehensive and rigorous approach in resolving Engineering issues.

Objective 3.3.2.1 Improve Engineering Effectiveness and Timeliness

The following actions will result in improved Engineering support for the plant, as well as, Site organizations (e.g., Operations and Maintenance Departments). Comprehensive and timely technical support, which reduces challenges to the plant and personnel, will support the Station goal of safe, event-free operation.

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- A multi-disciplined Site Vibration Team, led by Engineering, has been established to evaluate equipment/system vibration issues, provide corrective actions, and assess the effectiveness of those corrective actions following implementation. The Site Vibration Team has:
  - developed a charter;
  - determined a work scope; and
  - identified those vibration issues (e.g., Main Steam Line/Electromatic Relief Valve vibration, cavitation induced vibration from the Residual Heat Removal test return and Core Spray test return valves) that will receive priority attention during current and upcoming outages (e.g., Q1R13, Q1M10, Q2R13).

1.2 Excerpt from 1994 Management Plan

OBJECTIVE 1.08:

Correct vibration-related conditions (e.g., MSL/ERV vibration, cavitation induced vibration from the RHR-36 and CS-4 valves, etc.) which challenge safe, event-free plant operation.

Responsible: R. Walsh **Schedule:** December 31, 1994

INTENT:

A multi-disciplined Site Vibration Team has been formed in order to address vibration-related conditions which challenge safe, event-free plant operation. The Site Vibration Team will evaluate equipment/system vibration issues, provide recommended corrective actions for resolution, and assess the effectiveness of those corrective actions following implementation. The Team has reviewed the known vibration issues, and identified the "high priority" issues. Actions on these "high priority" issues will be implemented during the upcoming outage(s) for each unit.

ACTION PLAN:

1. Complete a review and assessment of the known "high priority" vibration issues. Provide recommended corrective actions to the appropriate System Engineers to support any required presentations to the Technical Review Board (TRB) and Site Planning Group (SPG).
   Scheduled Completion: March 1, 1994/Closed
   Responsible: K. Sturtecky

2. Ensure that the corrective actions to address the "high priority" vibration issues on Unit 2 have been chartered for Q2R13.
   Scheduled Completion: June 15, 1994
   Responsible: K. Sturtecky

3. Complete a review and assessment of the remaining known vibration issues (non-priority issues). Prioritize the issues for resolution purposes, and begin developing recommended corrective actions. The recommended actions will ultimately be presented, as necessary, to the TRB and SPG for approval.
   Scheduled Completion: August 31, 1994
   Responsible: K. Sturtecky

4. During Q1R13, implement the scheduled corrective actions to address/resolve "high priority" vibration issues on Unit 1. Following implementation, assess the effectiveness of the corrective actions.
   Scheduled Completion: August 31, 1994
   Responsible: K. Sturtecky

5. During Q1R13, install the HPCI turbine exhaust line sparger modification.
Scheduled Completion: July 31, 1994
Responsible: E. Mendenhall

6. During Q1M10, implement the scheduled corrective actions to address/resolve "high priority" vibration issues on Unit 1. Following implementation, assess the effectiveness of the corrective actions.
Scheduled Completion: December 31, 1994
Responsible: K. Sturtecky

PERFORMANCE MEASURES/EXPECTED RESULTS:

1. Corrective actions (implemented in 1994) were effective in resolving their respective vibration issue.

QUAD CITIES NUCLEAR POWER STATION

VIBRATION ISSUES

STATUS

MARCH 1, 1994

ISSUE/BACKGROUND

Quad Cities has established a Site Working Group to address equipment and piping vibration concerns. There are several issues/background items which define the need for resolution of equipment and piping vibration concerns, which are:

- Response to Vulnerability Assessment Team (VAT) concerns on equipment vibration items,
- Increased focus by the NRC on equipment and piping vibration as a result of Diagnostic Evaluation Team (DET) efforts,
- The 1993 Management Plan includes objectives focused on improved system performance (Management Plan Objective 2.2) and definition of system performance criteria (Objective 2.4). This working group will improve system and component performance through reduction of equipment and piping vibration, and establish vibration performance criteria,
- Provide a cost benefit analysis of the work being performed,
- Extend the current major equipment PMs by performing preventative/predictive maintenance, and
- Improve the System Performance Indicators and System Availability.

SITE WORKING GROUP OBJECTIVE

The objective of the Site Working Group is to identify and resolve equipment/system vibration issues. Identification, analyzing, determination of the 'Root Cause,' and resolution of vibration concerns will be on an ongoing basis. This objective will be achieved when the following activities are complete:

- Current equipment vibrations are identified,
- Vibration criteria are reviewed and established where current criteria exists for equipment and piping systems,
- Current equipment vibration issues are resolved or part of a plan for future resolution, and
- Diagnostic tools and analysis methods available for a vibration program capable of monitoring, resolution and trending of vibration issues by site personnel, will be used as input into predictive maintenance to eliminate failures.

SITE WORKING GROUP SCOPE

In order to meet the stated Objective, the Vibration Issues Site Working Group has identified the following listed activities as their primary work scope:

- Focus on the Station 'Top Equipment Issues' and VAT issues of the station,
- Identify potential vibration issues through the collection of findings from select reports, walkdowns, modifications, and interviews with plant personnel (including operations and maintenance),
- Root Cause Analysis,
- Filter/assess identified potential vibration issues to validate, prioritize and prepare proposed resolutions,
- Assure vibration issues are resolved through planned work (i.e., prepare modifications, work requests, and/or included in the Site Integrated Issue Management System), and
- Acquire additional diagnostic equipment, tools, additional training, and techniques to perform detailed vibration analyses and diagnostics onsite.

Note: Proposed solutions to resolve equipment vibration issues will be routed through the responsible System Engineer, who resides on the Site Working Group. If the solution affects a system that has undergone or is undergoing a System Readiness Review, the proposed solution(s) will be incorporated in the System Performance Improvement Plan.

METHODOLOGY

Resolution of vibration issues will require different solutions based on the type of issue being dealt with. The following is a basic plan which will be used as the model. Portions of the plan may not be applicable depending on the issue. However, this will provide a methodology by which the issues will be resolved. This basic plan will be refined as the team identifies and resolves issues.

Issue Identification:

SESR/PIF
Prioritization of Work

Identification of Participants:

Identify Team

Discussion:

- Modification History
- Maintenance History
- Work Practices Past and Current
- Failure History
- Known Problems
- Lessons Learned
  - Dresden/Edison Stations/GE Fleet Experience/Industry Experience
- Operations Experience
- System Walkdowns

Data:

- Data Presentation
- Analyze for Trends and Indications
- Interpretation
- Past and Present Vibration Information

Root Cause Determination:

- Mock ups if required
- Industry Experience/Review
- Testing

Planning:

- Corrective Action Planning
- Schedule Work Planning/Long Term Planning
- Schedule (short, medium, long)
- Milestones
- Manpower
  - Assign Cognizant
- Budget
- Parts/Hardware
- Designs (Engineering)
- Work Packages
- Feedback Mechanisms
- Base Line Before/After

Physical Implementation:

- Reanalyze
- Interpret results
- Good Work Practices Review
- Update Vibrations Program
- Other Predictive Technologies
- Document Results

MEASUREMENT STANDARDS

Measurement Standards will differ based on the vibration problem being addressed. The following is a basic plan which will be used as the model. Measurements may not be applicable depending on the issue. However, this is a methodology by which effectiveness of the group can be determined. Group status and initiatives will be provided to the station on a monthly basis.

- Vibrations reduced,
- Motor currents reduced,
- Seal Life extended,
- Major Equipment PMs extended, and
- Improved System Performance Indicators.

Q1R13 Action Plan for Vibrations

Main Steam Line Vibrations

Install LISEGA Hydraulic Snubbers
E04-1-94-005 INSTALL LISEGA HYDRAULIC SNUBBERS

Core Spray Pumps

1A Motor inspection/refurbishment
1A Rebuild/Balance/Alignment
E04-1-94-014 1A CORE SPRAY PUMP DISCHARGE LINE STANTION

Core Spray Valves

1402-4A,B Anti-Cavitation Trim
E04-1-93-120 1-1402-4A/B ANTI-CAVITATION TRIM AND REMOVE ORIFICES

RHR Valves

1001-36A,B Anti-Cavitation Trim
E04-1-93-307 1-1001-36A/B ANTI CAVITATION TRIM

RHRSW Pumps

1B/C Motor inspection/refurbishment

P04-1-93-207 ADJUSTABLE STANTIONS

Jet Pumps

Jet Pump Set Screw inspections/tackwelds

Condensate/Condensate Booster Pumps

1C/D Motor inspection/refurbishment
1C&D Rebuilds
Pump Base Reconditioning
Eliminate Pipe Strain

E04-1-93-319 INSTALL ADJ STANTIONS ON SUCTION/DISCHARGE OF COND COND BOOSTERS

E04-1-93-333 C COND BOOSTER PUMP WORK

E04-1-93-334 D COND/COND BOOSTER PUMP WORK

P04-1-91-073-1 COND/COND BOOSTER PUMP SEAL COOLING VENT LINE

Reactor Feed Pumps

1B Motor inspection/refurbishment
1B Rebuild
Eliminate Pipe Strain

E04-1-93-176 INSTALL VENT VALVES IN REACTOR FEED PUMP SEAL COOLING WATER LINES

E04-1-93-255 NEW SUPPORT FOR THE 1B RFP SUCTION VALVE BYPASS LINE

E04-1-94-001 RFP CUTWATER MOD

RHR Pumps

1A/B Motor inspection/refurbishment
1A RHR Pump Rebuilds

N07 Action Plan for Vibrations

RHRSW Pumps

1B/C Cutwater Modifications

Q1M10 Action Plan for Vibrations

Main Steam Line Vibrations

Replace ERVs with Target Rock Valves
M04-1-93-012 ERV/TARGET ROCK VALVE REPLACEMENT

HPCI Pumps

Rebuild Main Pump
Cutwater Modification on the Booster Pump
Pump Base Reconditioning if Required
Eliminate Pipe Strain

M04-1-93-020 HPCI PUMP CUTWATER

E04-1-94-118 INSTALL FLANGES ON THE DISCHARGE OF THE MAIN PUMP AND ON THE STEAM SUPPLY TO THE TURBINE

RHR Valves

1001-5A,B Anti-Cavitation Trim
E04-1-93-306 1-1001-5A/B ANTI CAVITATION TRIM

Condensate/Condensate Booster Pumps

E04-1-93-333 C COND PUMP WORK

Reactor Feed Pumps
1 A&C Motor inspections/refurbishments

E04-1-93-289 RFP FLEX LINES ON BRG OIL SUPPLY AND REPLACE SIGHT GLASSES

E04-1-94-112 1A SUCTION VALVE BYPASS LINE SUPPORT

Q1R14 Action Plan for Vibrations

Condensate/Condensate Booster Pumps

1A&B Rebuilds

E04-1-93-331 A COND/COND BOOSTER PUMP WORK

E04-1-93-332 B COND/COND BOOSTER PUMP WORK

RECIRC Pumps

1A/B Motor inspection/refurbishment API Balancing

RECENT EQUIPMENT PROGRAM IMPROVEMENTS

Main Steam Line Vibrations

Q1M09	Unit 1 Installed Vibration Monitoring Equipment
Q2M11	Unit 2 Installed Vibration Monitoring Equipment

Core Spray Pump

Unit 1B Core Spray Pump
Rebuilt Pump
Balanced Impeller
Shimmed Stantion

Unit 2B Core Spray Pump
Balanced Coupling
Realigned Pump and Motor

Control Rod Drive Pumps
1B CRD Alignment eliminated axial misalignment of gears.

Condensate Demin Hold Pumps
4 out of 14 Cond Demin Holding Pumps now have Precision alignments.

Diesel Generator Cooling Water Pump
1 DGCWP Resupport of Discharge Piping
1 DGCWP Replace Pump

Reactor Water Cleanup Pump
1B RWCU Pump identified root cause of system vibrations
1B RWCU Pump rebuilt

Condensate/Condensate Booster Pumps

Q1M09	1A Motor inspection refurbishment
	1A Condensate Booster Pump rplaced seals
	1B Condensate Booster Pump rplaced seals
Q2M11	2A Motor inspection refurbishment

RHRSW Pumps

Q1M09	1D Motor inspection/refurbishment
	Reduced pipe strain on the suction nozzle
Q2M11	2D Motor inspection/refurbishment

MG Set Oil Pump
1A1 Cause of intermittent viberation identified

High Pressure Core Injection

Identified one potential cause of HPCI viberations in the alert range for Unit 2 Main Pump number 3 bearing. Plans to repair in the Unit 2 refuel outage are underway.

The station has also implemented a precision balancing requirements for all new and refurbished motors over 100 rpm. Smaller motors are already done onsite.

VIBRATION PROJECTS OUTAGE PLAN

NON-OUTAGE N06

CONDENSATE/CONDENSATE BOOSTER SYSTEMS - 3300/3400

The Condensate and Condensate Booster Pumps suction and discharge piping has been modeled. During Outage **Q1R13**, the piping system will be unbolted from the pumps. Additional data gathered from the piping to pump nozzle misalignment, if found, will be input into the piping model to help determine actual nozzle loads.

Acceptable nozzle loads have been determined by interfacing with the pump manufacturer and referring to API standards.

The four Condensate/Condensate Booster Pump bases were "sounded" and drilled in several locations to inspect the interfacing grout. Amplitude vibration measurements were recorded on operating pumps. The inspections and vibration measurements were used to determine that the condensate pump bases are rigid, that is, satisfactorily grouted and reinforced. The analysis has shown that the pump bases are rigid and are not a major component of system vibration. The inspection holes will be filled an/or repaired with grout during Outage **Q1R13**.

Baseline vibration measurements have been performed for the Unit 1 Condensate System. Post work measurements will be obtained and compared to the prework measurements.

Jacking bolts were installed at the base of each of the condensate and condensate booster pumps to aid component alignment.

FEED WATER SYSTEM - 3200

The Feed Water Pumps suction and discharge piping has been modeled. During Outage **Q1R13**, the discharge piping system will be unbolted from the pumps. Additional data gathered from the piping to pump nozzle misalignment, if found, will be input into the piping model to help determine actual nozzle loads.

Acceptable nozzle loads have been determined by interfacing with the pump manufacturer and referring to API standards.

One feed pump base was "sounded" and two sets of amplitude vibration measurements were recorded on two operating feed pumps. The sounding and vibration measurements were used to determine if the feed pump bases are rigid, that is, satisfactorily grouted and reinforced. The analysis has shown that the feed pump bases are rigid and are not a major component of system vibration.

Vibration induced into the Unit 1 Turbine Building mezzanine level from feed water system piping rigid supports has been investigated and recorded. Suggested corrective actions have been presented to the station. Unit 2 is not similarly affected.

A sampling of feed water variable support springs were set to Grinnel for analysis to determined if their load ratings/characteristics have varied due to cold working, fatigue or corrosion. Engineering has performed a review of the results and forwarded recommendations to the station to replace two springs.

Baseline vibration measurements have been performed for the Unit 1 Feed Water System. Post work measurements will be obtained and compared to the prework measurements.

Jacking bolts were installed at the base of each of the feed water pumps to aid component alignment.

MAIN STEAM SYSTEM - 0203/3000

The Main Steam Line High Flow Pressure Switches on the instrument racks in the Unit 1 "B" RHR corner room have been monitored for excessive vibration and a recommendation is being prepared for isolation methods.

RHR/RHRSW SYSTEMS - 1000

The RHR Heat Exchanger Service Water outlet valves MOV-1-1001-05A and MOV-1-1001-05B have been monitored for excessive vibration and a analysis is being performed to determine the vibration levels.

OUTAGE Q1R13

CONDENSATE/CONDENSATE BOOSTER SYSTEMS - 3300/3400

The Condensate and Condensate Booster Pumps suction and discharge piping which was modeled during non-outage **N06**, will be updated with the "as found" piping-to-feed pump nozzle misalignment. The new model will more accurately define the pump nozzle loads and will also be used to determine if the feed water piping system requires rework to minimize excessive nozzle loads.

The piping will be unbolted from all four condensate/condensate booster pumps and the measured cold spring piping to pump nozzle misalignment, along with model information, will determine the induced nozzle loads at the pumps. The system piping will be manipulated and/or adjusted through support loading and pipe/fitting cuts to minimize pump nozzle to piping misalignment. Adjustable supports (stanchions and spring cans) will be installed at the pump nozzle connections per Exempt Change **E04-1-93-319** to aid piping to pump nozzle adjustment. Spring deflection can also be used to determine and/or compensate for load variations caused at the individual pump nozzles as a result of piping system and/or component adjustments. In addition jacking bolts have been installed on all pump bases as a tool to assist pump alignment.

Precise alignment methods will be implemented prior to, and after, unbolting the system piping from the condensate/condensate booster pumps to determine if the system piping has been distorting the pump casings and/or causing shaft misalignment.

The "C" Condensate Booster Pump and the "D" Condensate/Condensate Booster pumps will be disassembled and inspected for routine preventative maintenance and installation of upgraded seals, shaft sleeve o-rings and seal cooling line check valves. While the pumps are being overhauled, Exempt Changes **E04-1-93-333** for the "C" Condensate Booster pump and **E04-1-93-334** for the "D" Condensate/Condensate Booster pumps will be implemented to detail the installation of the cutwater modifications (pump casing volute machining to minimize vibration amplitude), inboard bearing thermocouples and heavier casing wear rings. New rotating elements, which will be balanced and checked for proper run-out, will be installed in both sets of "D" Condensate/Condensate Booster Pumps and the "C" Condensate Booster pump. The "C" Condensate Pump will be worked during outage **Q1M10**.

MPC **P04-1-91-073** will be implemented on the "D" Condensate Booster Pump to adjust seal water flow which will prolong seal life and minimize seal induced vibration.

An insulated coupling will be installed on the "B" booster pump to minimize casing erosion due to current induced into the shaft.

The "C" and "D" Condensate Motors will be sent to GE for refurbishment and reinstalled.

The following Condensate/Condensate Booster Pump suction, discharge and bypass piping valves will be reworked to support pump overhaul and startup activities:

1-3399-2	AOV-3401 Bypass
1-3399-4	Condensate Booster Pump "A" Discharge Valve
1-3399-5	Condensate Booster Pump "A" Check Valve
1-3399-6	Condensate Booster Pump "B" Discharge Valve
1-3399-7	Condensate Booster Pump "B" Check Valve
1-3399-22	Condensate Booster Pump "A" Suction Valve

A suspected source of piping induced vibration, 1-3399-2, will be monitored for vibration at the end of Outage **Q1R13**, before or during startup. Recommendations will be provided to the station after analysis of the data. This valve will also require corrective maintenance before its operation.

The holes drilled in the condensate pump bases and the grout that was removed from the pump bases to perform the base/grout interface inspections during Non-Outage **N06**, will be filled and repaired. The new grout will be flowed in at low pressure so as not to elevate the pump bases. The repairs will be performed prior to final alignment.

CONDENSER SYSTEM - 3301

Install antivibration stakes in the Main Condenser per Exempt Change **E04-1-93-011**.

CORE SPRAY SYSTEM - 1400

The "A" Core Spray Pump is being disassemble for overhaul and inspection. The rotating elements will be checked for excessive run out and balanced. The motor will be removed, shipped to GE for refurbishment and reinstalled.

A shim will be installed under the "A" pump discharge piping stanchion support to suppress piping system induced vibration.

The loop "A" and "B" Full Flow Test Line returns to the Torus will be modified per Exempt Change **E04-1-93-120**. These lines exhibit cavitation induced vibration and erosion. The existing trim will be removed from valves MOV-1-1402-04A and MOV-1-1402-04B and "anti cavitation trim" will be installed. The downstream orifices, RO-1-1402-45A and RO-1-1402-45B will also be removed to minimize cavitation induced vibration and erosion. The new valve trim is intended to accommodate the entire pressure drop, therefore the restricting orifices are no longer required. Post work testing will be performed to demonstrate the improved performance of the test return lines and the acceptability of the new trim.

FEED WATER SYSTEM - 3200

The Feed Water Pumps suction and discharge piping which was modeled during non-outage **N06**, will be updated with the "as found" discharge piping-to-feed pump nozzle misalignment. The new model will more accurately define the pump nozzle loads and will also be used to determine if the feed water piping system requires rework to minimize excessive nozzle loads.

The piping will be unbolted from all three feed pumps discharge connections and the cold spring misalignment will be measured to determine the induced nozzle loads at the feed pumps. The system piping will be manipulated and/or adjusted through spring loading and pipe/fitting cuts to minimize pump nozzle misalignment. Loads on variable supports will be recalculated and the springs adjusted/sized accordingly. Springs will also be analyzed to determined if their useful life had been exceeded and will be replaced as necessary.

Precise alignment methods will be implemented prior to, and after, unbolting the system piping from the feed pumps to determine if the system piping has been distorting the feed pump casings and/or causing shaft misalignment.

A final alignment will be performed on the feed pumps during startup while the piping system is hot to further determine if there is piping system induced distortion into the pumps and to establish baseline measurements for future pump work and monitoring.

The "B" Feed Pump Gear Box will be disassembled and inspected as part of predictive maintenance.

Additional supports will added to the "B" Feed Pump suction valve by-pass line per Exempt Change **E04-1-93-255** to suppress piping system induced vibration.

The "B" Feed Pump will be disassembled and inspected for preventative maintenance. The couplings and rotating elements will be balanced. While the pump is being overhauled, Exempt Change **E04-1-92-014** will be implemented to install upgraded seals, Exempt Change **E04-1-93-176** will be implemented to install vent valves in the seal cooling piping to decrease possibility of air binding of the seals and Exempt Change **E04-1-94-001** will be implemented to minimize pump vibration by installing a design change (referred to as "cutwater") that modifies the pump casing volute slightly.

The "B" feed pump motor will be inspected and bearing oil leaks repaired during Outage **Q1R13**.

HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM - 2300

Baseline vibration measurements have been performed for the Unit 1 and 2 HPCI systems. Post work measurements will be obtained and compared to the prework measurements.

MAIN STEAM SYSTEM - 0203/3000

One branch connection from the 20" "B" Main Steam line to the 6" 3E Electromatic Relief Valve (ERV) will be ultrasonically tested to determine if vortex shedding has caused steam cuts on the sweep-o-let. The results of this examination will determine the need to examine the remaining three branch connections to the 3B, 3C and 3D ERVs.

The mechanical snubbers (22 total) associated with the 20" Unit 1 main steam and the 6" and 8" ERV lines are being replaced with Lisega hydraulic snubbers. The existing mechanical snubbers have experienced an excessive failure rate. The new hydraulic snubbers employ new technology and are considered technically and physically superior to the existing mechanical snubbers. CECo is already using the new Lisega snubbers at other CECo stations.

Design the Main Steam Line Vibration Monitoring System per **Exempt Change E04-1-94-003**. This is a conversion of a Temporary Alteration to a permanent plant installation.

Design the Main Steam Electromatic Relief Valves 3B, 3C, 3D and 3E replacement with Target Rock power operated relief valves per **Modification M04-1-93-012** for Outage **Q1M10**.

Complete evaluation of Units 1 and 2 Main Steam Line/ERV vibration data and formulate root cause analysis. Determine vibration measurement standards.

RECIRCULATION SYSTEM - 0202

Jet Pump Retack/Reset set screws.

RHR/RHRSW SYSTEMS - 1000

The loop "A" and "B" Full Flow Test Line returns to the Torus will be modified per Exempt Change **E04-1-93-307**. These line exhibit cavitation induced vibration and erosion. The existing trim will be removed from valves MOV-1-1001-36A and MOV-1-1001-36B and "anticavitation trim" will be installed. The new valve trim is intended to accommodate the entire pressure drop with minimal cavitation. Post work testing will be performed to demonstrate the improved performance of the test return lines and the acceptability of the new trim.

The RHR Service Water Pump discharge and suction piping will have additional spring supports and/or struts installed to minimize piping vibration per Exempt Change **E04-1-93-207**.

A vibration analysis of the "D" RHR pump discharge line supports and/or piping will be performed.

NON-OUTAGE N07

DIESEL GENERATOR COOLING WATER SYSTEM - 3900

The foundations for the Unit 1, 2 and ½ Diesel Generator Cooling Water pumps will be "sounded" and drilled in several locations to inspect the interfacing grout. Amplitude vibration measurements will be recorded while pumps are operating. The inspections and vibration measurements will be used to determine if the pump bases are rigid, that is, satisfactorily grouted and reinforced. The results of the inspection will be reviewed by engineering and they will provide recommendations to the station.

INSTRUMENT AIR SYSTEM - 4600

Test Sparger ½-4650A(B) per PIF 93-0306.

MAIN STEAM SYSTEM - 0203/3000

Design the Unit 2 snubber replacement Exempt Change E04-2-94-005.

Design the Unit 2 Main Steam Electromatic Relief Valves 3B, 3C, 3D and 3E replacement per **Modification M04-2-93-012**

RHR/RHRSW SYSTEMS - 1000

Install the cutwater modification (pump casing volute machining to minimize vibration amplitude), in the "B" RHRSW Pump per Modification **M04-1-87-002B**.

Perform an inspection of the 1A, 1B, 1C and 1D RHRSW Pumps base to grout interface. Amplitude vibration measurements will be recorded on while the pumps are operating. The inspections and vibration measurements will be used to determine that the pump bases are rigid, that is, satisfactorily grouted and reinforced. The analysis will be used to determine if any permanent repair or modification is required to stiffen the pump bases to minimize vibration.

OUTAGE Q1M10

CONDENSATE/CONDENSATE BOOSTER SYSTEMS - 3300/3400

The motor winding temperature monitoring was scheduled be installed in all four condensate pump motors per Exempt Change **E04-1-93-179** during this outage, but has been placed on hold.

The following condensate pump suction piping valves will be reworked to support pump overhaul activities:

1-3399-29	Condensate Pump "C" Suction Valve
1-3399-24	Condensate Pump "B" Suction Valve

An upgrade similar to that installed on the "D" Condensate Booster Pump during Outage **Q1R13,** will be implemented on the "C" Condensate Booster pump per Exempt Change, **E04-1-93-333.**

DIESEL GENERATOR COOLING WATER SYSTEM - 3900

Repair and/or return Unit 1 Diesel Generator Cooling Water pipe supports in the Turbine Building hallway to their original design condition.

FEED WATER SYSTEM - 3200

Additional supports will added to the "A" feed pump suction valve by-pass line per Exempt Change **E04-1-94-112** to suppress piping system induced vibration similar to those installed by Exempt Change **E04-1-93-255** during Outage **Q1R13**.

Exempt Change **E04-1-93-289** will be implemented on all three feed pump Auxiliary Oil Systems. This change will add and/or replace flexible hoses between the oil system and the feed pump connections at the bearings to make the connections less rigid and less susceptible to vibration induced leakage. The oil sight flow glasses will also be replaced to minimize oil leaks.

The 1A and 1C feed pump motors will be inspected and bearing oil leaks repaired during Outage **Q1M10**.

HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM - 2300

The HPCI Main and Booster Pumps suction and discharge piping which will be modeled during Non-Outage **N07**, will be updated with the "as found" discharge piping-to-pump nozzle misalignment determined during Outage **Q1M10**. The new model will more accurately define the pump nozzle loads and will also be used to determine if the HPCI piping system requires rework to minimize excessive nozzle loads.

The piping will be disconnected from both pumps suction and discharge connections and the cold spring misalignment will be measured to determine the induced nozzle loads at the two pumps. The system piping will be manipulated and/or adjusted through spring loading and pipe/fitting cuts to minimize pump nozzle misalignment. Loads on variable supports will be recalculated and the springs adjusted/sized accordingly if necessary.

Precise alignment methods will be implemented prior to, and after, unbolting the piping system from the HPCI pumps to determine if the piping has been distorting the pump casings and/or causing shaft misalignment.

A final alignment will be performed on the HPCI pumps during startup after steam has been applied to the turbine to further determine if there is piping system induced distortion into the pumps and to establish baseline measurements for future pump work and monitoring.
Pump base grout repair or foundation stiffening, if deemed necessary by base inspections performed during Non-Outage **N07**, will be performed this outage prior to startup.

A set of flanges will be added to the HPCI turbine steam supply piping to facilitate repair and maintenance work on the turbine stop and control valves. Another set of flanges will be added to the high pressure pump discharge piping to facilitate pump alignment and maintenance.

The flanges will also be a point of correction if the piping system requires adjustment to minimize pump nozzle loads. The new flange sets will be added per Exempt Change **E04-1-94-118.**

Install the cutwater modification (pump casing volute machining to minimize vibration amplitude), in the booster pump per Modification **M04-1-93-020**.

The HPCI high pressure pump will be disassembled and inspected for preventive maintenance.

Jacking bolts were installed at the base of the high pressure and pumps to aid component alignment.

MAIN STEAM SYSTEM - 0203/3000

Implement Modification **M04-1-93-012** to replace the 3B, 3C, 3D and 3E Electrostatic Relief Valves with the Target Rock power operated relief valves (PORVs). The new Target Rock PORVs will not be susceptible to the 138 Hz driving frequency or the vortex shedding which is occurring in the steam lines.

RHR/RHRSW SYSTEMS - 1000

Install the cutwater modification (pump casing volute machining to minimize vibration amplitude), in the 1C RHRSW Pump per Modification **M04-1-87-002C**.

The loop 1A and 1B RHR Heat Exchanger Service Water Outlet lines will be modified per Exempt Change **E04-1-93-306**. These lines exhibit cavitation induced vibration and erosion. The existing trim will be removed from valves MOV-1-1001-05A and MOV-1-1001-05B and "anticavitation trim" will be installed. The downstream orifices, RO-1-1001-72A and RO-1-1001-72B will also be removed to minimize cavitation induced vibration and erosion. The new valve trim is intended to accommodate the entire pressure drop, therefore the restricting orifices are no longer required. Post work testing will be performed to demonstrate the improved performance of the test return lines and the acceptability of the new trim.

STANDBY LIQUID CONTROL (SBLC) SYSTEM - 1100

Perform vibration monitoring of the 1A and 1B SBLC pumps.

OUTAGE Q1R14

Upgrades similar to those installed on the "C" Condensate Pump and "D" Condensate/Condensate Booster Pumps, which were implemented during Outage **Q1R13**, will be implemented on the "A" and "B" Condensate/Condensate Booster pumps per Exempt Changes, **E04-1-93-331** and **E04-1-93-332.**

2.1 Excerpt from Course of Action

3.1 Operations

3.1.1 Issues

The Operations Department's performance is best described as inconsistent. In effective implementation of previous improvement initiatives, lack of clear direction for the Department, and ineffective communication and definition of performance standards are indicative of inadequacies in Operations management. The following issues contribute to this situation:

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The roles and responsibilities of the Operations Department are not well-defined. The organization accepted equipment deficiencies.

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Objective 3.1.2.4: Take A Proactive Role in Correcting and Preventing Plant Problems

Quad Cities has held Safety Culture Seminars for All Operations Department personnel. These seminars addressed individual roles and responsibilities in regard to a nuclear safety work ethic and Department practices that will achieve a strong Safety Culture. The aspects of Safety Culture addressed include problem identification and resolution, operator work-arounds, and the importance of control room annunciators.

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2.2 Excerpt from Management Plan

OBJECTIVE 1.16

Establish a personal commitment from all station personnel to maintain (and develop as a habit) a high degree of awareness of the need for a conservative safety culture.

Responsible: S. Childers **Schedule:** September 30, 1994

INTENT:

Promote a high degree of safety culture to ensure that the station has the attitude that "We don't want to Operate with equipment deficiencies and poor personnel performance" in order to achieve safe, event free performance.

ACTION PLAN:

1. All Operations Departments complete their safety culture seminars.
   Scheduled Completion: February 18, 1994/Closed
   Responsible: H. Hentschel

2. Prepare a safety culture outline/synopsis as an aid to individual departments forming their own culture statement.
   Scheduled Completion: February 28, 1994/Closed
   Responsible: H. Hentschel

3. Department Heads establish their individual personnel safety culture philosophy statement and submit to the site Vice-president.
   Scheduled Completion: September 30, 1994
   Responsible: Department Heads

4. Department heads share the philosophy statement (in conjunction with the Code of Ethics) with their departments.
   Scheduled Completion: September 30, 1994
   Responsible: Department Heads

5. Department Heads conduct a safety culture day within their departments.
   Scheduled Completion: September 30, 1994
   Responsible: Department Heads

6. Department Heads obtain the safety culture commitment from their employees and submit to the Site Vice-President.
   Scheduled Completion: September 30, 1994
   Responsible: Department Heads/G. Tietz

7. Establish a semi-annual frequency of holding safety culture meetings within the departments.
Scheduled Completion: September 30, 1994
Responsible: Department Heads

PERFORMANCE MEASURES/EXPECTED RESULTS

1. High degree of safety culture attitude as evidenced by station effectiveness survey result.

2.3 SUPPORTING INFORMATION

Example

OPERATIONS DEPARTMENT
NUCLEAR SAFETY CULTURE WORKSHOP

RECOMMENDED AGENDA
(Day Shift Times)

0700	Coffee/Snacks
0730	Crew Foreman Introduction
0745	Rich Pleniewicz Station VP/Corporate Expectations
0800	Guy Campbell Station Manager Expectations
0830	Spencer Childers Operations Manager Expectations
0845	Dave Cook Department Expectations
0900	Break
0915	Crew Develop Crew Safety Philosophy
1200	Crew and Manager's Lunch
1230	Crew Present Crew Safety Culture Philosophy
1300 to 1530	Crew and Managers Question and Answer Period