U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket No.: 50-293

Report No.: 50-293/88-21

Licensee: Boston Edison Company
Pilgrim Nuclear Power Station
RFD #1, Rocky Hill Road
Plymouth, Massachusetts 02360

Facility: Pilgrim Nuclear Power Station

Location: Plymouth, Massachusetts

Dates of Inspection: August 8-24, 1988

Inspectors: (See Attachment E)

Approved By: Lawrence T. Doerflein for 9/7/88
A. Randy Blough, Chief Date
Reactor Projects Section No. 3B
Division of Reactor Projects

Inspection Summary:

Areas Inspected: Integrated Assessment Team Inspection to assess the degree of readiness of licensee management controls, programs, and personnel to support safe restart and operation of the plant. The scope of the inspection is further detailed in Section 2.2.

Results:

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

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ACRONYMS

ALARA	-	As Low As Reasonably Achievable
ANSI	-	American National Standards Institute
ASME	-	American Society for Mechanical Engineers
BECo	-	Boston Edison Company
BEQAM	-	Boston Edison Quality Assurance Manual
CAS	-	Central Alarm Station
CQI	-	Commercial Quality Item
CS	-	Core Spray (System)
CST	-	Condensate Storage Tank
DC	-	Direct Current
DCRDR	-	Detailed Control Room Design Review
DG	-	Diesel Generator
DR	-	Deficiency Reports
EOP	-	Emergency Operating Procedures
EO	-	Equipment Operator
EPRI	-	Electric Power Research Institute
EQ	-	Environmental Qualification
ESF	-	Engineered Safety Feature
[illegible]	-	Engineering Service Request
F&MR	-	Failure and Malfunction Reports
FYI	-	For Your Information
GET	-	General Employee Training

Acronyms

HP	-	Health Physics
HPES	-	Human Performance Evaluation System
HSA	-	Housekeeping Service Assistance
IATI	-	Integrated Assessment Team Inspection
I&C	-	Instrumentation and Control
ICA	-	Immediate Corrective Actions
INPO	-	Institute of Nuclear Power Operations
IST	-	In-Service Testing
LCO	-	Limiting Condition for Operations
LL/J	-	Lifted Lead/Jumper
LSFT	-	Logic System Functional Test
M&TE	-	Measuring and Test Equipment
MCAR	-	Management Corrective Action Requests
MCIAP	-	Material Condition Improvement Action Plan
MO&AT	-	Management Oversight and Assessment Team
MOP	-	Mission, Organization and Policy Manual
MPC	-	Maximum Permitted Concentration
MR	-	Maintenance Request
MSC	-	Maintenance Summary and Control
MSTP	-	Master Surveillance Tracking Program
MWP	-	Maintenance Work Plan
NCR	-	Nonconformance Report
NED	-	Nuclear Engineering Department
NOP	-	Nuclear Organization Procedures

Acronyms

NRC	-	Nuclear Regulatory Commission
NRR	-	Office of Nuclear Reactor Regulation
NSRAC	-	Nuclear Safety Review and Audit Committee
NWE	-	Nuclear Watch Engineer
OMG	-	Outage Management Group
ORC	-	Operations Review Committee
P&ID	-	Piping and Instrument Diagram
PCAQ	-	Potential Condition Adverse to Quality
PDC	-	Plant Design Change
PI	-	Pressure Indicator
PM	-	Preventive Maintenance
PNPS	-	Pilgrim Nuclear Power Station
PCIS	-	Primary Containment Isolation System
QAD	-	Quality Assurance Department
RCIC	-	Reactor Core Isolation Cooling
RETS	-	Radiological Environmental Technical Specifications
RHR	-	Residual Heat Removal (System)
RO	-	Reactor Operator
ROR	-	Radiological Occurrence Report
RP	-	Radiation Protection
RWP	-	Radiation Work Permits
SAA	-	Simulated Automatic Actuation
SAS	-	Secondary Alarm Station

Acronyms

SBLC	-	Standby Liquid Control (System)
SDR	-	Security Deficiency Reports
SE	-	Safety Evaluations
SEG	-	Systems Engineering Group
SES	-	Senior Executive Service
SFR	-	Supplier Finder Reports
SGI	-	Safeguards Information
SI	-	Station Instruction
SRO	-	Senior Reactor Operator
STA	-	Shift Technical Advisor
SVP-N	-	Senior Vice President - Nuclear
TM	-	Temporary Modification
TS	-	Technical Specifications
VP-NE	-	Vice President - Nuclear Engineering
WIP	-	Workforce Information Program
WPRT	-	Work Prioritization Review Team

1.0 EXECUTIVE SUMMARY

In response to NRC concerns over longstanding issues regarding the management effectiveness of the Boston Edison Company (BECo) in the operation of the Pilgrim facility, the licensee agreed to maintain the plant in a shutdown condition following operational events which occurred on April 11-12, 1986. The NRC confirmed the licensee's agreement in Confirmatory Action Letter (CAL) 86 10. The CAL, as supplemented in an August 27, 1986 letter, also confirmed that the licensee would develop a comprehensive plan to address those concerns and perform an in-depth self-assessment of the effectiveness of that Plan. On June 25, 1988, the licensee reported it had completed these activities to the extent that an NRC review was appropriate. In order to assess the status and results of BECo's corrective actions, the NRC performed an independent review of the effectiveness of the licensee's management controls, programs and personnel during an Integrated Assessment Team Inspection (IATI) conducted August 8-24, 1988.

The Team consisted of an SES-level manager, a Team leader, and members of the NRC Region I and Headquarters staff. The inspection team also included two observers representing and appointed by the Commonwealth of Massachusetts. These observers had access and input to all aspects of the inspection as provided by the established protocol. The areas reviewed during the inspection included operations, maintenance, surveillance, radiation protection, security, training, fire protection and assurance of quality. The Team reported directly to the Regional Administrator of Region I.

Overall, the Team concluded with high confidence that BECo management controls, programs, and personnel were generally ready and performing at a level to support safe startup and operation of the Pilgrim Nuclear Power Station. Further, although the Team identified certain items which require licensee actions or evaluations, there were no fundamental flaws found in the licensee's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

2.0 INTRODUCTION

This report details the findings, conclusions and observations of NRC's Integrated Assessment Team Inspection conducted at the Pilgrim Nuclear Power Station (PNPS) on August 8-24, 1988. The results of this inspection are to be considered during NRC staff's deliberations as it reaches its decision regarding a restart recommendation to the NRC Commissioners.

2.1 Background

The NRC's 1985 Systematic Assessment of Licensee Performance (SALP) found programmatic weaknesses in several functional areas at the Pilgrim Nuclear Power Station and noted that, historically, the licensee could not sustain performance improvements once achieved. A special NRC Region I diagnostic team inspection was subsequently performed in February and March 1986 to evaluate facility performance. This inspection, which included monitoring plant activities on a 24-hour basis, confirmed the 1985 SALP and concluded that poor management control and incomplete staffing contributed to the poor performance.

Following several operational events, Boston Edison Company (BECo) shutdown PNPS on April 11-12, 1986. The NRC subsequently issued a Confirmatory Action Letter (CAL) on April 12, 1986, and a supplement on August 27, 1986, maintaining the plant shutdown and requiring that the licensee obtain NRC approval prior to restart. The central issues in the CAL, as supplemented, involved the effectiveness of licensee management of the facility and technical concerns.

SALP evaluations continued during the shutdown, and improvements were noted during the 1986 SALP period, although the rate of change was slow. Several factors inhibited progress, including continued management changes and prolonged staffing vacancies. Good performance was noted in four areas: emergency planning, outage management, corporate engineering support and licensed operator training. The success in these areas reflected a high level of corporate management attention and substantial resource commitments. The licensee also had made significant plant hardware improvements, including Mark I Containment performance enhancements.

Consistent with the CAL and its supplement, BECo has addressed the specific technical issues, developed and submitted the Pilgrim Nuclear Power Station Restart Plan and performed a detailed self-assessment of readiness for restart. The NRC staff reviews of these items are complete. The licensee has also submitted a Power Ascension Test Program, for which the staff review is ongoing.

NRC subsequently completed a SALP evaluation for Pilgrim covering the period February 1, 1987 to May 15, 1988. It concluded that licensee management initiatives are generally successful in correcting staffing, organization, and material deficiencies. Programmatic performance improvements were evident in areas previously identified as having significant weakness and in areas that the licensee's self-assessment process identified as warranting further management attention.

The NRC Confirmatory Action Letter (CAL) of April 1986 required the NRC to perform a review to assess BECo's corrective actions. In conjunction with an augmented inspection program and as part of a continuing effort to monitor BECo's program improvements, the NRC planned this IATI to independently measure the effectiveness and readiness of the licensee's management controls, programs and personnel to support safe restart of the facility. A Restart Readiness Assessment Report that includes staff assessment results will be prepared by the NRC in conjunction with development of an NRC staff recommendation regarding plant restart.

2.2 Scope of Inspection

The IAT inspection was performed to provide an independent, in-depth assessment of the degree of readiness of licensee management controls, programs, and personnel to support safe restart and operation of the Pilgrim Nuclear Power Station (PNPS). The inspection covered a variety of functional areas, including operations, maintenance, surveillance, radiation protection, security, training, fire protection, and assurance of quality. Particular emphasis was placed on management effectiveness and on the status of the licensee's recent program improvements in maintenance. The inspection consisted of interviews with licensee personnel, plant tours, observations of plant activities, and selective examinations of procedures, records, and documents. The Team also directly observed ongoing plant activities on all shifts from August 10-13, 1988.

The 15-member Team consisted of a senior manager, inspection team leader, five shift inspectors, and several specialist inspectors from both NRC Region I and the NRC Office of Nuclear Reactor Regulation (NRR). Two representatives from the Commonwealth of Massachusetts were also on the Team as observers throughout the inspection. The team roster and member resumes are attached as Appendices E and F to this report.

Onsite IATI preparation, which included site familiarization and plant tours, was conducted during the week of July 18, 1988. The Team was onsite full-time from August 8 through 19, 1988. Some IATI members were on site during the documentation period of August 20-24, 1988. Attendees at the entrance and exit interviews are listed in Appendices A and B, respectively. Senior licensee managers contacted during the course of the inspection are listed in Appendix C. Many other persons at all levels of the organization were also contacted or interviewed.

The licensee was not presented with any written material by the NRC during this inspection. The licensee indicated that no proprietary material was presented for review during this inspection.

2.3 Summary of IATI Results

2.3.1 Overall Summary

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

The inspection generally confirmed the results of the SALP report for February 1, 1987 through May 15, 1988, as well as validating the general SALP conclusion that performance was improving at the end of the SALP period. Further, licensee performance appeared to be consistent or improving in all functional areas examined during the IATI, with the current level of achievement for overall safety performance equal to or better than that described in the SALP. For maintenance and radiation protection, the performance is noticeably improved.

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

The inspection confirmed that important organization and attitudinal changes had occurred since 1986. Of particular concern to NRC during the diagnostic inspection in 1986 were several factors inhibiting progress. These included:

1) Incomplete staffing, especially of operators and key mid-level supervisory personnel;

2) The prevailing licensee view that improvements to date had corrected the problems identified;

3) Reluctance by licensee management to acknowledge some problems identified by NRC; and

4) Dependence on third parties to identify problems rather than implementing an effective licensee program to identify weaknesses.

The Team found these inhibitors to be substantially removed, and noted that a significantly improved nuclear safety ethic exists at management levels and is developing successfully at the worker level.

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

2.3.2 Summary of Results by Functional Area

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

2.3.2.1 Operations

Strengths

-- Experienced and knowledgeable senior licensed operators

-- Effective shift turnover

-- Excellent plant housekeeping

Weakness

-- Lack of thoroughness and attention to detail in validation and training of Emergency Operating satellite procedures

2.3.2.2 Fire Protection

Strengths

-- Effective program staffing and supervision

-- Effective prioritization, control, and tracking of fire protection equipment maintenance

Weaknesses

None

2.3.2.3 Maintenance

Strengths

-- Good organization and structure

-- Thorough program procedures

-- Clear maintenance section internal communications and interactions

-- Good control and support of field activities

Weaknesses

-- Examples of poor implementation of planning for post-work testing

-- Poorly controlled storage of Q-listed items at two locations outside the warehouse

2.3.2.4 Radiological Controls

Strengths

-- Effective use of a maintenance health physics (HP) advisor

-- A well-organized training program

Weaknesses

-- Examples of a lack of continuity and proficiency in certain highly specialized jobs because of frequent technician rotation

-- Indications of weak vertical communications within the HP group

2.3.2.5 Surveillance

Strength

-- Management commitment to improve an already satisfactory program

Weakness

-- Incomplete resolution of proper frequency and scheduling of once-per-refueling outage tests

2.3.2.6 Security

Strength

-- Overall management attention

Weaknesses

None

2.3.2.7 Training

Strengths

-- Excellent management support for operator training programs

-- Strong relations between the plant operations and training departments

Weakness

-- Lack of a defined process to assure timely identification and implementation of training needs resulting from newly approved or revised procedures

2.3.2.8 Engineering Support

-- Not directly reviewed. No specific strengths or weaknesses identified

2.3.2.9 Safety Assessment/Quality Verification

Strengths

-- Nuclear Safety Review and Audit Committee (NSRAC) composition, plant tour program, frequency and location of meetings, open forum, and focus of reviews

-- Attitude and performance toward identifying problems

-- Effective, meaningful communications between the Quality Assurance and plant Operations departments

Weaknesses

-- Operations Review Committee does not perform an effective independent group review of operations and Technical Specification violations

-- Multiplicity of corrective action programs without centralized tracking

-- Poor tracking of Potential Condition Adverse to Quality (PCAQ) reports

2.3.2.10 Management Oversight

Strengths

-- Well-defined organization, incorporating appropriate span-of-control and including highly qualified, experienced managers in key positions

-- Well-defined and well-conceived corporate goals

Weaknesses

None

2.4 Licensee Commitments

During the IAT inspection, the licensee made certain commitments to the inspection Team. These commitments relate to licensee corrective or enhancement actions planned in response to Team findings or concerns. These commitments, summarized below, are discussed in more detail in subsequent sections of this report, shown in parentheses. Commitments were confirmed during the exit interview. The status of these issues will be reviewed by the NRC prior to any restart of the plant (88-21-01).

2.4.1 Procedure Validation and Training (Section 3.2.4)

By restart, the licensee will confirm effective implementation of all off-normal and EOP satellite procedures that have been substantively revised during this outage.

2.4.2 Identifying Procedure Changes Requiring Training (Section 3.7.2.1)

Before restart, the licensee will implement a process to allow more timely identification of new procedures and procedure changes which require training.

2.4.3 Temporary Modifications (Section 3.2.5)

By restart, the licensee will either prepare a justification for operation for each active temporary modification or apply the temporary modification extension request process to all temporary modifications, including those with outstanding engineering service requests.

2.4.4 Operations Review Committee (ORC) (Section 3.10.3)

Prior to restart, in order to strengthen its operational focus, the ORC will begin to: (1) review plant incident critiques; (2) review licensee event reports before their issuance to NRC; (3) review failure and malfunction reports on a regular basis; and, (4) provide for a monthly presentation and discussion of plant operations as a specific agenda item.

2.4.5 Maintenance

-- Before restart, the licensee will re-evaluate all priority 3 maintenance requests to ensure that they have been properly scheduled. (Section 3.3.2.4)

-- The licensee will complete training addressing the revised post-work testing program by September 9, 1988. (Section 3.3.2.6)

-- The licensee will resolve the inability to align valves in the Torus Water Makeup Line in accordance with current operating procedures and drawings prior to restart. (Section 3.3.2.4)

-- The licensee will issue a procedure to provide appropriate controls for the "Q" oil storage facility by September 7, 1988, and perform an evaluation of the possible addition of "non-Q" oil to "Q" equipment and its potential effect. (Section 3.3.2.3)

-- The licensee will complete, before restart, the disposition of a Potential Condition Adverse to Quality (PCAQ) identifying the need for a review of Commercial Quality Item procurement documents for consistency with approved engineering specifications. (Section 3.3.2.3)

2.4.6 Surveillance

-- Before restart, the licensee will review and evaluate the once-per-refueling-outage surveillance tests to determine if they should be repeated to enhance the assurance of system operability and document the basis for its decision. (Section 3.4.2.1)

-- Before restart, the licensee will provide the technical basis for the current test frequency of the Reactor Core Isolation Cooling (RCIC) System Logic System Functional Test (LSFT) on the initiation logic. (Section 3.4.2.2)

2.4.7 Formalizing Personnel Qualification Reviews

The licensee will verify before restart the qualifications of all personnel within the organization required to meet ANSI 18.1-1971; and, prior to completion of the power ascension program, will have a formalized process in-place to ensure future auditability. (Section 3.1.4)

2.4.8 Mission, Organization and Policy (MOP) Manual

The licensee will issue MOP policy instructions prior to restart and the organizational position descriptions prior to completion of power ascension. (Section 3.1.5)

2.4.9 Familiarizing Workers with Expected Radiological Conditions

Before restart, the licensee will provide training and briefings to the appropriate plant staff regarding expected radiological conditions resulting from plant operation and hydrogen addition. (Section 3.5.2.14)

2.4.10 Control Room Human Factors

The licensee will evaluate control room human factors during the power ascension program and include an update regarding the schedule and scope of "Paint, Label and Tape" items in their report to the NRC at the completion of the Power Ascension Program. (Section 3.9.2)

3.0 DETAILS OF INSPECTION

The following sections contain the scope of inspection, the detailed findings, and the conclusions for each functional area the Team assessed.

3.1 Management Oversight

3.1.1 Scope of Review

The IATI assessed the organizational structure currently in place at the Pilgrim Nuclear Power Station (PNPS). The assessment also included the administrative processes in place to control and coordinate the activities and actions affecting safe and reliable operation of the PNPS. Other areas inspected included the adequacy of staffing, qualifications of personnel, and mechanisms to enhance and promote stability in the organization's technical and managerial staff.

Several management meetings were observed by Team members to assess the interactions of managers and the effectiveness of the policies and procedures being implemented. Continual observations were made and shared by Team members to augment findings and conclusions in the effectiveness of the organization, management controls, and communications throughout the functional areas. The Team members interviewed a cross-section of personnel at all levels of the organization to determine if the overall attitude toward performance of safety-related activities has improved. These observations and interviews also provided the Team with insight into the worker perception of management policies, involvement, effectiveness and its resulting impact on safety.

3.1.2 Organization

The NRC staff noted in the most recent SALP report No. 50-293/87-99 for February 1, 1987 through May 15, 1988, that an organizational transition had taken place. The report also noted that several temporary changes, including numerous changes in personnel, had been made to strengthen planning, control and performance at PNPS. Many of these temporary changes were incorporated into a permanent reorganization in February 1988. The licensee continued to refine the new organziation and control process through

July 1988, notified NRC of the reorganization, and subsequently requested an amendment in August 1988 to the administrative section of its Technical Specifications (TS) to reflect the new organization. The notification and request were in accordance with the PNPS TS, Section 6.2.C, "Changes to the Organization," which allows organizational changes to be implemented without prior NRC approval, provided notification is made and a subsequent license amendment request is submitted for NRC review and approval.

The organization assessed during this inspection is the subject of the licensee's amendment request dated August 1, 1988, and approved by the Senior Vice President - Nuclear (SVP-N) on August 4, 1988. The discussion that follows does not describe in complete detail the entire organization, focusing instead on that portion that affects the functional areas being evaluated during this inspection (See Figure 1). The results of this inspection will be considered in NRC's review of the licensee's amendment request.

The Team noted that the licensee has incorporated a balance between the number of management levels from the first-line supervisors to the SVP-N and the span of control for each functional unit. The SVP-N has the Station Director, Vice President - Nuclear Engineering (VP-NE), Emergency Preparedness Department manager and Quality Assurance Department manager reporting directly to him. The two department managers report directly to the SVP-N to assure that independence and appropriate management attention are provided based on their functional requirements and responsibilities.

The committee charged with offsite safety, the Nuclear Safety Review and Audit Committee (NSRAC), reports directly to the SVP-N. The committee for onsite safety review, the Operations Review Committee (ORC), reports directly to the Station Director. The reporting of the offsite committee to the SVP-N and the onsite committee to the Station Director are appropriate based on their responsibilities. Details on these standing committees, their functional requirements, responsibilities and accountabilities, are contained in Section 3.10 of this report.

The VP-NE has two department-level managers reporting directly to him. These departments are the Nuclear Engineering Department and the Management Services Department both of which are located offsite. The Station Director has four department-level managers reporting directly to him: the Plant Support Department, Plant Manager (Operations), Planning and Outage Department, and the Nuclear Training Department.

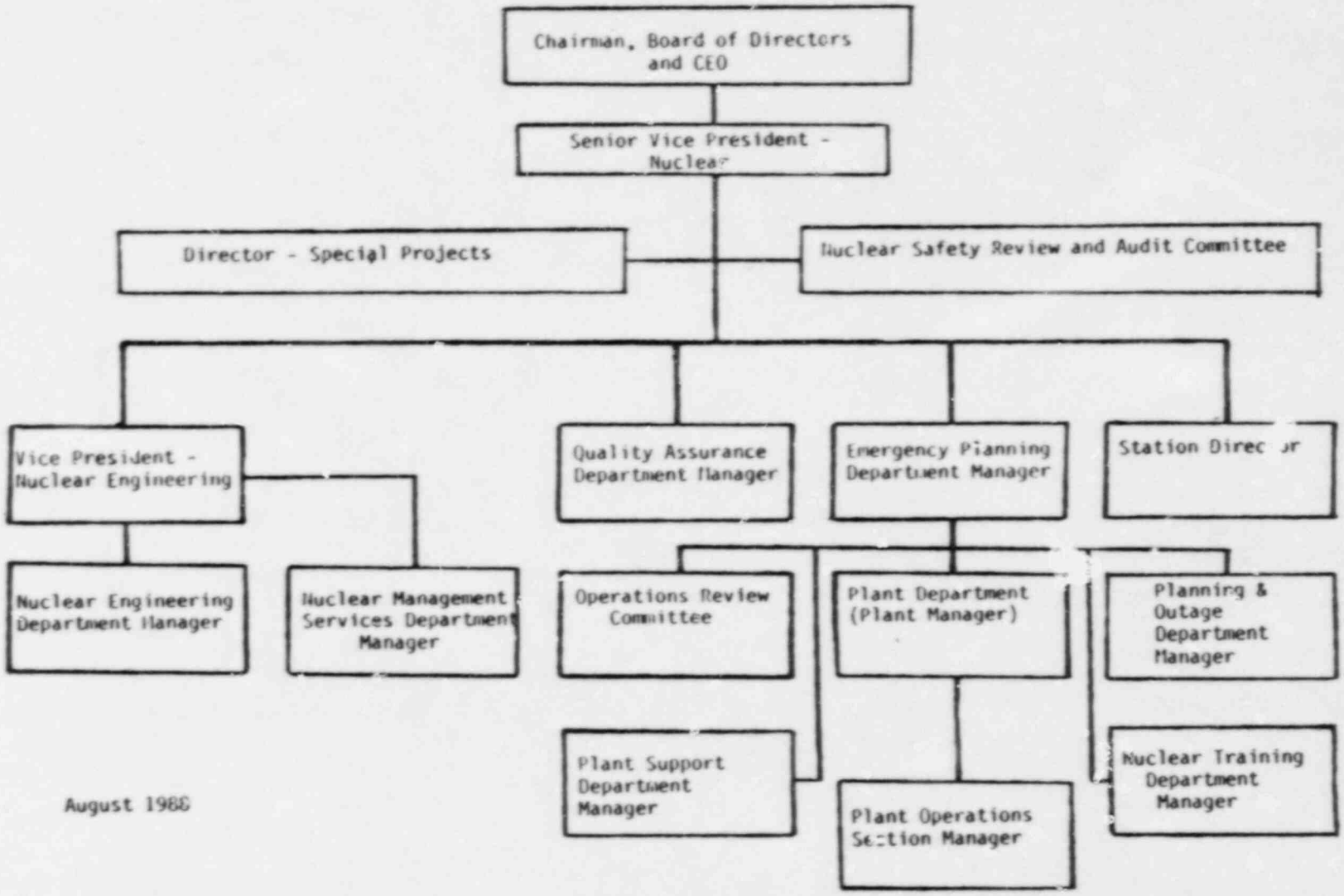

Figure 1. BOSTON EDISON COMPANY - PILGRIM ORGANIZATION

The senior manager of the functional areas is at the department level, which is then subdivided into section levels and division levels. The first-line supervisors, in some cases senior supervisors, report to the division managers.

The station organization, now under a Station Director who has no direct corporate (i.e., off-site) responsibilities, represents a substantial change from previous organizations. The current structure was instituted to strengthen management attention to plant activities. The narrowing of the span of direct control and responsibility of the Plant Manager allows a more focused management and control of operational activities, which should result in the enhancement of safe and reliable operation. The departments reporting to the VP-NE have been restructured for a more even distribution of responsibilities.

The Team concluded that the current organizational structure provides for an appropriate distribution (span) of responsibilities and accountabilities for the activities being performed by the functional units within it. The depth (number) of managers in the functional areas should contribute to improved performance and organizational stability by providing managers with increased opportunities to participate in professional technical and management development programs and by increasing the framework for career growth.

The Team also concluded that the redistribution of functional responsibilities and increased depth in management provides the framework necessary to enhance stability and support safe and reliable operation at PNPS. The evidence for these changes thus far has been management's effectiveness in creating a much-improved nuclear safety ethic and in improving the functional areas described in the subsequent sections of this report.

3.1.3 Staffing

The most recent SALP Report (No. 50-293/87-99) indicated that the allocated staffing levels were significantly higher than in the past. The Nuclear Organization is currently authorized a staffing level of 985. Approximately 90% of the authorized positions are filled, of which 86% are licensee personnel; the remaining 4% comprise contract personnel. Licensee personnel fill all key positions from Section Managers and above, with less than 15% of the remaining managers and first-line supervisor positions filled by contractors or licensee personnel in acting capacities.

Increased staffing in all levels of the Radiological and Maintenance Sections are examples of how the licensee has provided the necessary management attention and resources to areas that need them. The increased staffing, specifically at the craft and technician level, appears sufficient to allow for a planned and controlled preventive maintenance program that should result in overall safety enhancement. The increased staffing levels also allow for training on a routine schedule.

The Team concluded that the authorized staffing has been filled to a level acceptable for the licensee to perform all the necessary functions for all plant conditions, including operations. This finding is reinforced by the evidence of improvements in the functional areas described in the subsequent portions of this report.

3.1.4 Qualifications

The PNPS TS, Section 6.3, "Facility Staff Qualifications," requires that PNPS personnel meet the requirements of the American National Standards Institute (ANSI) N18.1-1971, "Selection and Training of Personnel for Nuclear Power Plants." The TS also requires that the Radiation Protection Manager shall meet or exceed the qualifications of Regulatory Guide 1.8, "Qualification and Training for Personnel at Nuclear Power Plants," September 1975.

The Team audited resumes and position descriptions of key managers and other selected personnel throughout the organization. Their educational and experience backgrounds were compared with the requirements delineated in ANSI N18.1-1971, with special attention on the management experience of key personnel. No deficiencies were identified relating to the qualification requirements of the ANSI standard. More significantly, the Team noted the staffing of key management positions with personnel having extensive and successful management experience.

During its review, the Team found that some resumes needed updating, and that no formal, detailed instructions or guidance in establishing qualifications were available. The Team reviewed a Quality Assurance Department (QAD) audit report of the organization's administrative controls which was conducted June 22 through July 22, 1988 and which resulted in similar findings. The report, Audit Report 88-25, "Administrative Controls," dated August 18, 1988,

indicated that personnel qualifications were audited by the QAD to determine compliance with the ANSI N18.1 requirements for the organizational positions held. No deficiencies were identified as the result of the QAD audit. The report did, however, provide a recommendation consistent with the NRC inspector's finding. Specifically, Recommendation No. 88-25-03, notes the need to update resumes, develop guidelines and procedures for documenting qualification status, and maintain retrievable files.

The licensee has committed to the Team to reverify the qualifications of all personnel within the organization to confirm they comply with ANSI N18.1-1971 prior to restart and to have a process in place prior to completion of the Power Ascension Program to ensure future auditability of personnel qualifications.

Within the scope of the NRC review, the Team determined that the licensee's personnel are generally well qualified for the positions held within the organization. The licensee's commitment to reverification of all personnel qualifications prior to restart will provide additional assurance of full compliance relating to personnel qualifications.

The results of the IATI effort in assessing the adequacy of the staffing and qualifications of the PNPS organization is consistent with the overall facility evaluation in the most recent SALP report (No. 50-293/87-99). It noted the addition of management personnel who lack extensive commercial nuclear power plant operating experience. However, as noted above, recent changes have resulted in the addition of personnel in key management positions with extensive and successful management experience, much of which is in nuclear areas. Also, many mid-level management positions are held by individuals who have extensive Pilgrim NPS (or other boiling water reactor) experience. The Team concluded that the combination of commercial nuclear power plant operating experience in the organization with the increased management capability provides the qualifications necessary to support safe and reliable operation at PNPS. In the event of a restart authorization, licensee safety performance will be closely monitored by the NRC during the Power Ascension Program.

3.1.5 Administrative Policy and Procedures

The licensee has a variety of procedures to provide policy, control and coordination of organization activities. Corporate policy is provided in the form of company Bulletins maintained in a Boston Edison Company Organizational Manual. The manual includes information about the corporate organization, its policy statements, corporate instructions, and committees which affect the entire company, including the Nuclear Organization. The corporate level policy specifically affecting the Nuclear Organization is contained in a Mission, Organization and Policy (MOP) manual.

The Nuclear Organization Procedures (NOPs) provide guidance for the control and coordination of the Nuclear Organization. They include administrative procedures affecting the entire organization, as well as procedures affecting functional portions of the organization. Each department also has procedures in place specifically for its functional areas. The Team reviewed several NOPs to assure that the guidance provided was current, reflected the organization in place, and addressed coordinating activities within the organization. The Team also reviewed department-level procedures to assure they included the current organization, goals, department function, position descriptions, qualifications required, responsibilities, and accountabilities.

The Team concluded that the procedures are, for the most part, current. They adequately identify corporate policy, organization, coordination, functional requirements, responsibilities, accountabilities, and qualifications necessary for the control and coordination of actions within the organization.

The Mission, Organization and Policy Manual (MOP) is not fully up to date; however, and is currently being revised to accurately reflect current policy and to include all the position descriptions within the organization. The licensee has identified additional refinements in the organizational position descriptions to assure consistency and to provide accurate definitions of responsibilities necessary to assure accountability. The licensee was previously aware of this and has been working to finalize the updates. The licensee committed to issue the revised MOP which

includes updated policy prior to restart and to complete the organizational position description refinements before the end of the Power Ascension Program. This commitment is acceptable, based on the status of the other procedures previously discussed which assure adequate administrative controls.

3.1.6 Communications and Observations

Corporate policy for the Nuclear Organization in the MOP manual includes, among its goals, the need to strive to raise standards of performance, for dedication to protecting the environment and public, and for rigorous adherence to procedures. The Team, through its observations and interviews, noted a positive change in the attitude toward nuclear safety throughout PNPS. This change is evident in improved performance of safety-related activities. These improvements are indicated in the most recent SALP Report (No. 50-293/87-99), and progress in the other functional areas is addressed in this inspection report. The Team also noted during interviews that the corporate goal of adherence to procedures has been conveyed to all levels of the organization. These observations attest to management's effectiveness in communicating corporate goals and management's oversight in assuring that the goals are being pursued.

The Team noted that the licensee established several mechanisms to assure adequate communications within the organization. Meetings at all levels of the organization are held on a routine basis. Plant meetings are held every morning to discuss plant status and to coordinate daily activities. Several of these meetings were observed by the Team to assess the interaction of the managers and the resulting effectiveness. The Team concluded that the meetings were effective and that safety-related activities are being planned, scheduled, and prioritized in accordance with their safety significance and plant status. These and other observations by the Team indicate that teamwork at the site is evident. There are programs in place, such as the Workforce Information Program (WIP), For Your Information (FYI), and Management Oversight and Assessment Team (MO&AT) to enhance management involvement, overall communications, and management visibility in the plant.

The licensee has also established a set of performance indicators to track performance issues, restart issues, plant condition reports, and activity status. These performance indicators are used as a management tool to measure the effectiveness and results of established programs.

The Team concluded, based on its evaluation of programs in-place, that communications throughout the organization have improved, that teamwork is evident, and that corporate goals are being conveyed to all levels of the organization.

3.1.7 Conclusions

The Team concluded that the licensee has an acceptable organization and administrative process in place with adequate management and technical resources to assure that PNPS can operate in a safe and reliable manner during normal and abnormal conditions. This conclusion is based on the details discussed above, the performance-based inspection in the functional areas covered by the IATI, the overall consistency in the findings of this inspection with the most recent SALP (No. 50-293/87-99), and the plan for a structured and controlled power ascension program prior to operation.

This performance-based inspection of a wide range of functional areas provided an integrated look at overall management effectiveness in ensuring high standards of nuclear safety. The overall conclusions of this inspection confirm facility management effectiveness, especially with respect to management's ability to perform self-assessment functions, to make performance improvements, and to raise nuclear safety awareness and attitudes within the organization.

3.2 Operations

3.2.1 Scope of Review

The Team evaluated operations by observing how supervisors, operators and staff performed in the control room and throughout the plant. The Team observed plant operations during backshifts from August 10 through August 13, 1988, and reviewed staffing levels to determine if they were sufficient to support restart with minimal reliance on overtime. The ability to implement recently written EOP satellite procedures and the quality of these procedures were evaluated through a field walkdown of a procedure. The implementation of administrative controls for operations was evaluated through inspections of overtime controls, temporary modification controls, operator-required reading, logkeeping, tagouts, and operator aids. The lineup of two safety systems was independently verified by the inspectors. Housekeeping was observed during frequent plant tours.

3.2.2 Conduct of Operations

The Team observed control room operations on all shifts. They were conducted in a formal manner, with effective communications between the operators and supervisors, including repeat backs for certain functions. There was no unnecessary traffic in the control room. Supervisors briefed shift personnel on significant functions before they occurred. Prior to energizing the recirculating pump heaters, which could have produced smoke in the drywell, the watch engineer thoroughly briefed to the reactor operator, equipment operator, and fire brigade leader.

The watch engineers, shift supervisors, and reactor operators were knowledgeable about plant conditions and ongoing work in the plant. Shift turnover briefings were thorough and were followed by control room panel walkdowns. Attendance at these briefings was inconsistent in that not all watch engineers include other shift personnel, such as health physics shift workers in the pre-shift briefing. The Team observed that the health physics shift workers receive separate briefings. The Team discussed this practice with plant management, which stated that it was their intent to include non-operations shift workers in the preshift briefing and that they would review its implementation.

Control room operators received good support from the shift technical advisors (STA), administrative assistants, and other departments. The STA's were used in developing failure and malfunction reports (F&MR), and in the initial followup of an EOP satellite procedure issue. The administrative assistants do much of the administrative paperwork and help to lessen traffic in the control room. There was very good support of operations from other departments in understanding and deciding the proper course of action in response to F&MR events.

The Team accompanied several non-licensed equipment operators (EO's) on their tours. The EO's performed their plant tours in accordance with Procedure 2.1.16, "Nuclear Power Operator Tour." Readings were taken and recorded, as required. The operators also checked for abnormal conditions, such as vibrations, noise, leakage, odors, and inadequate ventilation. The EO's commented that they now have more time to check general plant conditions on their rounds because the rounds are assigned to two EO's per shift. Previously, only one EO made the plant tour. The EO's showed good regard for radiological protection and ALARA practices. The operators were very familiar with the plant, systems, and components, and were knowledgeable about their duties and responsibilities. The performance by these operators demonstrated the effectiveness of the non-licensed training program.

Watch engineers or operating supervisors accompany EO's on plant tours at least once per week. Operations management, including the chief operating engineer and operations manager, were observed touring the control room frequently and discussing plant status and evolutions with the watch engineer.

The Team discussed the licensee's use of NRC's NUREG-1275, "Operating Experience Feedback Report-New Plants" and verified that licensee management had reviewed NUREG-1275 recommendations for applicability. BECo had independently initiated a number of improvements related to NUREG-1275 recommendations before they reviewed the report. This action was considered by the Team as a positive example of the quality of BECo self-improvement efforts. Some self-identified improvement items include operator communications training, seminars to improve attention to detail, splitting tours and revising tour sheets to improve equipment operator performance, and doing dry run training on

the power ascension and alternate safe shutdown evolutions. Some improvement items resulting from the NUREG review include seeking a more positive method of performing on-shift instructions, repeating all logic system functional tests, and performing a comprehensive review of inadvertent emergency safety feature (ESF) actuations. The ESF actuation review has resulted in several corrective actions.

In summary, the licensee conducted operations in a professional manner. Operators are knowledgeable about their duties and plant conditions and management keeps an active and effective oversight of operations.

3.2.3 Shift Staffing and Overtime Controls

The licensee's Senior Reactor Operators (SRO) are very experienced and strengthen the operations organization. To take advantage of this experience, an extra SRO will be assigned to each shift during the Power Ascension Test Program. Only 8 Reactor Operators (RO) have unrestricted licenses because the 14 newly licensed RO's are limited pending on-watch training and reactivity manipulations during the Power Ascension Program. Therefore, the licensee will initially staff a four-shift rotation during plant restart. At an appropriate point after restart, the licensee will go to a six-shift rotation of two SRO's and two RO's per shift. There are also sufficient non-licensed equipment operators to staff six shifts. STA's will work a five-shift rotation for at least the next year. These staffing levels are considered adequate.

It should not be necessary to work operators in excess of the overtime guidelines of NRC Generic Letter 82-12. Senior plant management has been active in restricting overtime. Procedure 1.3.6.7, "Use and Control of Overtime at PNPS," adopts NRC guidelines, provides procedural controls for overtime hours, and requires advance approval of overtime. The inspector reviewed Operations Department overtime records for the period of July 6, 1988 to August 16, 1988. During this period, there were only three occasions when staff worked greater than 56 hours in a 7-day period. During this period, there was one instance of overtime in excess of NRC guidelines. This occurred August 1 and 2 when a radwaste worker worked 28 hours in a 48-hour period. This worker had approval to work up to 60 hours that week but did not have approval to exceed the 48-hour guideline. This worker is not a licensed operator and was not doing safety-related work. The licensee identified this incident and counseled the individual on overtime requirements.

3.2.4 Procedure Validation

The Team walked down Procedure 5.3.26, "Reactor Pressure Vessel Injection During Emergencies," with a non-licensed equipment operator who had been trained in the procedure. The procedure involved connecting a fire water crosstie to the residual heat removal (RHR) system. Minor procedure errors were found. A drain valve labeled 1-DR-122 in the field is referred to as 1-DR-121 and the fire water storage tank low level alarm is referred to as annunciator B-7, whereas it is actually D-3. Also, the procedure instructs the operator to "connect the local flow meter" without specifying the instrument number. The procedure was actually referring to a strainer differential pressure indicator, instrument number 33-PID-4610. The operator did not simulate connecting this instrument and when questioned by the Team, he stated that the step referred to flow meter FI 4609 which was already connected. Of more significance was confusion caused by step IV.B.2.b, which instructs the operator to install jumpers to defeat LPCI initiation and PCIS isolation signals and operate LPCI injection valves 28 and 29. The equipment operator requested the assistance of the watch engineer and the STA. These watchstanders initially felt the jumper was not needed. The jumper is not directly related to LPCI valves 28 and 29, but is needed to provide a flow path for a fire pump and to prepare for contingencies in the EOPs.

Procedure 5.3.26 was one of eight new procedures written by contractors and validated by contractors. All eight of these procedures are therefore suspect and will be revalidated by licensee operations staff before restart. All other EOP satellite procedures and other abnormal operating procedures substantially changed during this outage will also be revalidated before restart.

The licensee did not perform any QA audits or surveillances on the writing of procedures by contractors. However, the licensee has performed surveillances of the procedure validation process used on procedures other than the EOP satellite procedures. Surveillances #87-9.3-9 and #88-1.1-56 found that half of the procedures being revised and implemented in April and May 1988 were not being validated. As a result of this finding, procedure 1.3.4-4, "Procedure Validation," was issued August 15, 1988.

There were also some training aspects to this procedure issue. The equipment operator was trained on Rev. 0 of 5.3.26 which did not include the instruction to connect the local flow meter, whereas the inspector used Rev. 1. Licensed operators were trained on the control room portion of the EOP satellite procedures and equipment operators were trained in the procedural steps outside the control room. The problem with the jumpers occurred at the interface between these operators. Following the procedures revalidation discussed above, the licensee will provide additional training as needed.

During a NSRAC meeting conducted on August 2, 1988, the committee discussed an open concern on the validation and upgrade of plant procedures. NSRAC concluded that they were concerned that all of the routine operating procedures had not been validated by one of the validation processes. Following the meeting, the committee forwarded a concern to the SVP-N concerning the operating procedures necessary for long-term operation of the plant. The plant staff is scheduled to respond to NSRAC on September 14, 1988. The NRC will review this response during a subsequent inspection.

3.2.5 Temporary Modification Controls

The Team observed that current logs show that about 15 temporary modifications (TMs) are in effect, some of which date back to 1983. Fifteen is not an unusual or unmanageable number of TM's, and represents a significant reduction from previous conditions.

The Team reviewed nine TM's initiated 1987 and prior years and noted (1) only three of the nine modifications affected safety-related systems; (2) licensee safety evaluations (SE) were filed in the TM package, which demonstrated the interim configurations created were acceptable; and, (3) licensee actions to address the TM's by conversion to permanent modifications were apparently based on engineering service requests and plant design changes referenced in the TM packages. Team review of the SE's on a sampling basis did not identify any inadequacies. Further, the Team noted that reduction of the TM backlog has been a licensee priority.

Plant Procedure 1.5.9, "Temporary Modifications," allows temporary modifications to be open for six months and provides a mechanism for active TM's to be extended. However, this mechanism is typically not used. Procedure 1.5.9 does not require a review of the TM for extension of the expiration date if an engineering service request (ESR) for a permanent design change is in effect for the TM. Of seven TM's reviewed, six had ESR's and therefore did not have a current approved extension date. The inspector indicated that good engineering practice would dictate continuance of the periodic reviews for all TM's, and licensee management agreed. The licensee committed to either prepare a justification for operation for every TM that is still open prior to startup or to revise the procedure to apply the TM extension request process to all TM's, including those with outstanding ESR's.

TM 84-77 was selected for detailed followup review to assess the technical adequacy of the change on a temporary basis and to evaluate the extent and timeliness of licensee followup actions to either remove the temporary modification or convert it to a permanent change to the facility. The modification involved the replacement of an FCR-type relay in cubical 72-754 of the DC motor control center for the RCIC 1301-22 valve. The valve is in the suction path from the condensate storage tank (CST), is normally open for RCIC standby and initial operation, and will cycle closed on low level in the CST. After failure of the existing FCR relay (an open circuit coil), an HFA-type relay was installed on December 17, 1984 and made electrically equivalent to the original circuit. An HFA was used because an FCR relay was not available onsite. The change did not affect the normal function of the valve.

Engineering Service Request (ESR) 85-368, dated July 22, 1985, requested engineering to convert the change to a permanent modification, with a completion date of November 22, 1985. ESR response memorandum NED 86-1275, dated December 31, 1986, rejected the ESR request to make the change permanent because of two concerns involving the need to keep the wiring in the 72-754 cubical consistent with other DC motor control centers (MCC) and the assumed differences in the inrush and coil holding currents between the two types of relays. In rejecting the request, engineering found that the change was acceptable on a temporary basis, but recommended restoration of the original design.

A Potential Condition Adverse to Quality (PCAQ) Report (No. NED 86-110) was issued to assess the deviations. Further engineering evaluation was requested by ESR 88-080, dated January 27, 1988, with action requested by May 1, 1988. Further engineering review determined that the change would be acceptable as a permanent modification, which was made by FRN 87-80-52 to PDC 87-80 dated June 14, 1988.

The plant design change (PDC) modified the drawing to permanently document the change and addressed the seismic adequacy of the HFA relay installation. The HFA relay was not certified to be environmentally qualified since the 1301-22 valve is not on the EQ master list and environmental qualification (EQ) is not required. The PDC also addressed the adequacy of the inrush and holding current characteristics of the HFA relay. The second engineering review found the HFA current characteristics to be better than those of the FCR relay.

The Team discussed the bases for the original and final engineering determinations via telephone on August 17, 1988 with engineering (NED) . The Team noted that engineering initially rejected the proposed design change based on information indicating larger power consumption by the HFA relays, and based on a concern that, if replacement of the FCRs with HFAs became a general practice, a problem could result in the increase in DC loads. Those concerns were not realized since the FCR failure was a random one, and the operating current characteristics of the HFAs are better than initially assumed.

Based on the above, the Team identified no technical concerns with the licensee's dispositioning of the adequacy of the modification.

The Team noted that licensee action on the original 1985 ESR was not timely in either the preparation of the original ESR or the followup actions by NED in response to the site request. However, the actions to respond to ESR 88-80 and disposition the issue in 1988 were greatly improved.

The Team audited the six tag outs for TM 84-22 and found that MCC B25 was missing two TM tags. Since this is a non safety-related modification which is about to be withdrawn, this was not considered by the Team to be of safety significance. It does indicate; however, the need to periodically recheck TM tagouts.

An additional concern is that in the following example the licensee performed a TM without implementing the formal review and approval process. During a tour of the reactor building on August 8, 1988, the Team noted that reactor pressure boundary leak detection system monitors C-19A and C-19B had their doors propped open, and each monitor had a large fan tied to the opening. Investigation identified that no temporary modification had been processed to evaluate and authorize this alteration. The licensee stated that elevated temperatures in the cabinets result in failure of the monitor electronics and have been a long-standing problem. Engineering response to Engineering Service Request (ESR) 85-462 implemented a reduction in system heat-tracing temperature. This alteration did not resolve the problem, and on August 6, 1988, the licensee initiated ESR 88-558 requesting further engineering review. Monitors C-19A and C-19B are required to be operable by Technical Specifications during power operations so that some short-term action and long-term resolution are needed. Since the monitors are not currently required to be operable, the licensee has de-energized them and removed the fans pending evaluation.

In summary, even though the licensee has been aggressive in reducing the number of TM's, there have been some lapses in their control of temporary modifications. This indicates a need for continued licensee management attention to this area.

3.2.6 Required Reading Books

The Team reviewed the "Required Reading" books in the control room. The books consist of three large binders that contain procedure changes. They provide a method for promptly updating operators on plant and procedure changes. Each piece of information in the book had a sign-off sheet to ensure that all operations personnel read the material. The Team noted that information in the books dated back to April 1988 and many of the procedure changes had not been signed off as read by all personnel. This appears to indicate that the program is not being monitored routinely by operations management. Material remaining in the book for long periods defeats the purpose of providing timely information on changes to the operators. Conversely, if the changes are not important to operations personnel, it may not be necessary to put them in the books.

The Team discussed these observations with the Plant Operations Section Manager. Some improvement was noted later during the IAT inspection, as a result.

3.2.7 Logs

The Team reviewed the implementation of the Technical Specification Limiting Condition for Operations (LCO) log, the Disabled Annunciator Alarm Log, and the operations supervisor log procedures. The LCO log was implemented August 18, 1988, by Procedure SI-OP.0008, "Limiting Conditions for Operations Log," dated July 25, 1988, and was being used on a trial basis from August 8 to August 18, 1988. The only LCO entered after the log was implemented, LCO A-88-002, was properly entered, tracked, and cleared. Procedure SI-OP.008 is being revised to incorporate lessons learned in its initial implementation.

The Disabled Annunciators Alarm Log is controlled by Procedure 2.3.1, General Action Alarm Procedures, Item VII. The inspector observed eight disabled annunciator tags on control room annunciators. All eight were properly logged. However, only two of the eight annunciators had a maintenance request (MR) issued. The shift supervisor informed the Team that disabled annunciators without MRs occurred due to plant conditions and will be returned to service before startup. The licensee audits disabled annunciators monthly under preventive maintenance (PM) Procedure 9.A.24, "Audit of Control Room Annunciators and Instruments," which should assure that these annunciators are returned to service before startup.

There was little activity in the control room during this inspection, but the Team did observe the following items properly logged in the operations supervisor's log: LCO's, Failure and Malfunction Reports, a fire drill, and spent fuel pool temperatures while the fuel pool pumps were out of service for maintenance. However, as discussed in Section 3.2.8 below, changes in jumpers or lifted leads were not logged in the operations supervisor's log.

The Team concluded that log keeping practices are generally adequate.

3.2.8 Timely Update of Lifted Lead/Jumper Log

During a review of the Lifted Lead/Jumper (LL/J) procedure and program implementation on August 16, 1988, the Team identified that the log was not being maintained completely up-to-date. Eight entries in the LL/J log involved lifted leads or jumpers installed on July 14, 1988, to perform main station battery work and testing per Maintenance Work Plan (MWP) 87-46-173. All eight requests were associated with the same MWP. All log entries showed the LL/J request

was still active on August 16, 1988. The Team found that the batteries had been returned to normal and LL/J request was closed out on July 29,1988, and that Maintenance Request 87-46-173 was completed on August 1, 1988, inclusive of the post-work testing. Step 5.3.1.5 of Station Procedure 1.5.9.1, "Lifted Leads and Jumpers," states that the person performing the LL/J request is to notify the Watch Engineer when the system is returned to normal by removing the jumpers or landing the lifted leads. The Watch Engineer is responsible for updating the LL/J log. The findings were referred to operations personnel on August 16, 1988 for followup.

Licensee followup review confirmed that the work had been completed and the log should have been updated. The log was updated to show the correct status on August 16, 1988. In response to the inspector's findings, the licensee conducted an audit of the log. The licensee's audit identified (1) two instances where the log had not been updated, and (2) that operations personnel were not making entries in the Operation's Supervisor log when LL/J log entries were made. These matters were referred to the Operations Section for followup and corrective action. QA followup and trending will be covered by QA Surveillance Report 88-94-61.

The licensee reported that the cause of the discrepancy was the failure of maintenance personnel to inform operations that the jumpers and lifted leads were cleared when the systems were returned to normal. Inspector interviews with the Maintenance Supervisor responsible for MR 87-46-173 noted that he failed to discuss the closeout action on the LL/J request as a result of a misunderstanding on the status of the work package closeout during shift turnover with another maintenance supervisor.

Team review concluded the inaccurate LL/J log had minimal significance and no impact on safe plant operations for these cases. There was no loss of control of the physical plant configuration. Plant operators would have reviewed the LL/J log as a prerequisite to plant restoration and startup. This review would have identified the open log entries and the completed closeout actions. Further, licensee followup to the discrepancies identified by the Team were prompt and appropriate. Based on the above, and in recognition that the jumper and lifted lead log is a new tracking system, no further NRC action is warranted at this time. This area will receive further review during subsequent routine NRC inspections.

3.2.9 Tagouts and Operator Aids

The Team reviewed the licensee's administrative controls for use of protective tagging at PNPS. The Team reviewed Procedure No. 1.4.5, "PNPS Tagging Procedure," Revision 23, which is to be implemented September 1, 1988, and noted that this procedure was revised to address concerns with tag controls identified during the licensee's self-assessment. Specifically, the procedure limits the use of Nuclear Watch Engineer (NWE) tags; prohibits the use of danger (red) tags for identification purposes on lifted leads; and requires documented monthly reviews, including field verification, of NWE, Caution and Master Danger tags and tagout sheets. The Team reviewed the NWE and caution tag logs and independently verified that several NWE, caution, danger, and master danger tags were properly filled out, properly hung, and positioned as required on the components. No discrepancies were identified. Based on this review, the Team concluded that the licensee's control of protective tagging was adequate and properly implemented.

The Team also reviewed the licensee's control of operator aids as established by Procedure No. 1.3.34, "Conduct of Operations." An operator aid is information in the form of sketches, notes, graphs, instructions, or drawings used by personnel authorized to operate plant equipment. The Team reviewed the operations and chemistry operator aid log and determined that it was maintained in accordance with the procedure. The Team noted that periodic licensee reviews and verification of the need for and placement of operator aids were documented. The Team independently verified proper posting of selected operator aids, and no unauthorized aids were identified during the Team's plant tours. Based on this review, the Team concluded that the licensee's control of operator aids was adequate.

3.2.10 Plant Tours and System Walkdowns

3.2.10.1 Miscellaneous Tour Observations

The IATI Team made frequent plant tours. The overall material condition of rooms and equipment was excellent. Particularly notable was cleanliness, fresh paint, and obvious decontamination efforts to make major portions of plant and equipment accessible. Component labeling and tagging was very good.

The Team observed activities in progress. Persons interviewed on tour (HP, security, operations contractor) had experience in their positions and were knowledgeable about their work and duties. HPs were cognizant of work activities in progress. Housekeeping controls were being maintained during work in progress.

The Team reviewed the status of indicators and controls on selected local panels. Controls and indications were operable and no deficiencies were noted. Operating procedures required to be posted at the local panels were available and adequate, based on Team review.

The Team observed loose cable tray covers including one that was laying on top of an in-place cover. The licensee reviewed this finding and documented the review and corrective actions in an engineering "white paper." This review determined that loose covers do not compromise the design but that covers laying on top of in-place cable tray covers could be a seismic concern. The misplaced cover found by the Team was determined to not be needed. The licensee surveyed cable trays throughout the process buildings and found additional loose covers but no more that were completely unfastened and laying on top of other covers. Corrective actions completed include refastening the loose covers, removing the misplaced cover, revising procedure SI-SG.1010, "Systems Group System Walkdown Inspection Guideline," to use periodic walkdowns by the system engineering division to identify seismic concerns, such as misplaced tray covers, and preparing F&MR No. 88-200, which will be used to determine how to keep future maintenance and modification work from creating loose or misplaced covers. The Team concluded that the licensee's response to this issue was thorough and adequate. The Team considers this issue resolved.

3.2.10.2 Diesel Generator Walkdown

A walkdown of the 'A' diesel generator (DG) was completed on August 15, 1988, to verify operability and standby readiness of the emergency power supply, and to observe the general conditions in the DG area. The valve checkoff lists of Procedure 2.2.8, "Standby AC Power System (Diesel Generators)," were used as acceptable criteria to establish the proper system valve

positions. The procedure checklists were also reviewed for adequacy against Drawings M219 and M224, and by comparison with the physical plant during a walkdown of the diesel skid and room. Proper valve lineup was verified for the DG fuel oil and air start systems. This review confirmed that the 'A' DG was operable in the standby mode.

Cleanliness and the general condition of equipment and components in the diesel rooms were excellent. Valve and component identification (tags) and labeling were very good and showed significant improvement in performance in comparison to past reviews. Several minor discrepancies were noted, as follows: (1) identification tags were missing on valves 104C and 118, and the tag was loose on valve 105C; (2) valve 118 was required to be locked in the closed position and a chain and padlock were provided for this purpose; however, the chain was sufficiently loose that the Team would have been able to defeat the lock and thereby move the valve; (3) the inner fire door granting access to the 'A' DG skid had worn and damaged gaskets along the closing surface and the door latching mechanisms (dogs) were misaligned with the position indicators; (4) no permanent lighting was installed in the 'A' and 'B' diesel day tank rooms -- lighting, if installed, would aid operator reviews during plant tours; and, (5) two isolation valves for pressure switches 4555A and 4556A were not labeled with an ID tag in the plant and were not identified on system drawings or procedures. The valves were properly positioned. Additionally, proper valve position is demonstrated indirectly during the monthly functional test of the diesel air start system.

These discrepancies were noted by the Nuclear Plant Operator accompanying the Team and were discussed with the duty Watch Engineer. Actions were taken to document and correct the discrepancies, including the issuance of Maintenance Request 88-61-83 for the fire door. Inspector followup review on August 16, 1988 confirmed that actions were in progress and had been completed to correct the tag on valve 105C and to properly lock valve 118. Licensee response to the Team's findings was appropriate and timely. No other inadequacies were noted.

3.2.10.3 Standby Liquid Control System Walkdown

The Team walked down the standby liquid control (SBLC) system using the valve checklist in Procedure No. 2.2.24, "Valve Lineup for Standby Liquid Control System," and piping and instrument diagram (P&ID) M-249. This review was performed to verify the adequacy of the procedure checklist and P&ID, evaluate the valve labeling, evaluate the control of locked valves, verify the operability of instrument and support systems, and assess the overall material condition of the system and general cleanliness of the area. The Team noted that the checklist control of vent and drain capped connections differed from other safety system procedures, such as those for the residual heat removal (RHR) and core spray (CS) systems. For example, an outboard vent valve on the CS checklist would be "locked, closed and capped." The SBLC procedure only checks "locked, closed." No deficiencies with capped connections were noted, however. The Team also noted that the vent valve for pressure indicator (PI) 1159 was not on the valve checklist. The licensee agreed to review these observations to determine if the procedure needed to be revised. No other deficiencies or concerns were noted.

Overall, the Team found the valve labeling, material condition, and general cleanliness to be excellent.

3.2.11 Conclusions

The operations staff conducted their activities in a professional manner. Operators were knowledgeable about their duties and about plant status. The depth of experience and knowledge of senior licensed operators is a strength and will be a major asset during restart. Shift turnover briefings by individual operators and for the shift are thorough; however, non-operations shift workers do not routinely attend these briefings. Site management involvement in operations was evident by their frequent presence in the control room. Shift staffing levels are adequate and plant housekeeping was excellent

A weakness was noted in the validation and/or training of EOP satellite procedures. The licensee's commitment to confirm effective implementation of EOP satellite and off-normal procedures before restart is responsive to NRC concerns. Administrative controls and log-keeping practices are generally adequate, although required reading materials are not being reviewed by all personnel on a timely basis. There are lapses in the licensee's control of temporary modifications, particularly the absence of periodic reviews and scheduled completion dates for temporary modifications covered by an engineering services request.

3.3 Maintenance

3.3.1 Scope of Review

The licensee's maintenance program has undergone significant change during the past several months. Weaknesses had been identified during the SALP period ending May 15, 1988, and by Special NRC Maintenance Team Inspection 50-293/88-17. During the present inspection, the licensee's maintenance policies and program procedures were reviewed. Maintenance activities were evaluated during the planning, implementation, post-work testing and closeout stages. Emphasis was placed on direct observation of ongoing work in the field. Interviews were conducted with personnel at each level within the maintenance department to determine their depth of understanding of program goals. The Team also assessed the size and significance of the licensee's maintenance backlog, and reviewed established licensee performance indicators.

3.3.2 Observations and Findings

3.3.2.1 Management Policies and Goals

The Team reviewed the licensee's Mission Organization and Policy Manual, Nuclear Operations Procedures Manual, and Maintenance Section Manual. These documents describe the licensee's policy and performance goals for the maintenance program. The licensee has also established the Material Condition Improvement Action Plan (MCIAP). The MCIAP, which is described in the licensee's Restart Plan, is designed to achieve long-term improvement in the maintenance program. In addition, maintenance performance indicators are being used by the licensee to evaluate the success of recent program changes and the allocated maintenance staff has been increased significantly. Interviews with maintenance personnel at various levels within the department indicate that the organization and management policies are generally well understood.

3.3.2.2 Organization and Staffing

The maintenance organization and staffing levels were reviewed. Interviews were conducted with division supervisors and staff personnel to determine whether organizational relationships were well understood. The current staffing status was evaluated, particularly in the supervisor, maintenance engineer, and planning positions, to determine whether staffing levels were adequate, responsibilities clearly defined, and resources effectively used.

The maintenance section consists of three production divisions (electrical, instrumentation and control and mechanical), plus a planning division and an engineering group. All division manager positions and all first-line supervisor positions in the production divisions are filled with licensee employees, except for two positions in the equipment tool room, which are presently filled by contractors. Increased staffing at the craft level in the production divisions has been authorized. Instrumentation and Control (I&C) will increase from 22 to 30 positions; Electrical Maintenance will increase from 14 to 18 positions; and Mechanical Maintenance will increase from 27 to 33 positions. Staffing of the planning division has not been completed. Twelve contractor personnel are presently being used to perform the planning function, with assistance from the licensee's outage management group. This arrangement is performing acceptably, as described in Section 3.3.2.4.

Team interviews with supervisors and craft employees showed that personnel clearly understand the new program and their area of responsibility. The interviews covered personnel with a wide range of experience in their positions, including those newly assigned. The Team noted; however, that the recently revised job descriptions for the section have not been disseminated to the staff. The Maintenance Manager stated that they would be issued in the near future.

Two positions in the new maintenance section organization, the Deputy Manager and the Radiological Advisor, are effectively being used. The Radiological Advisor is a permanent staff position and provides a focus for interface with the Radiological Protection Group. Team observations indicated that the Deputy Manager was effective in scheduling and coordinating activities through his interface with other sections.

The Team's review indicated that licensee staffing is ample to meet targeted production goals without reliance on the use of excessive overtime. While some variations occur, the percent of overtime worked has been at or slightly above the operating goal of 20%, which equals a 48-hour work week. Work schedules for craft and supervisory personnel provide 1 day off in a 7-day period. The maintenance staff is working primarily on the day shift, with night shift coverage provided for certain critical jobs in progress. The licensee plans to provide around-the-clock 8-hour shifts that will match the Operations Section rotating shift schedule, beginning with plant startup. Maintenance shift coverage will continue through the power escalation sequence and on a reduced scale afterwards. Licensee staffing is sufficient to staff the shift schedule without reliance on excessive overtime.

New personnel assigned to the division manager and production supervisor positions have adequate prior experience in related assignments. The Team's observations of the first- and second-line supervisors in conducting their daily activities showed that the supervisory, oversight, and control functions were effectively performed. Based on these observations, the Team concluded that the newly hired supervisory staff does not have a negative impact on the quality of control over maintenance activities.

In summary, identified strengths in the present maintenance section organization include the use of the Deputy Manager and the Radiological Advisor. The increase in supervisory positions in the production divisions has been effective in increasing oversight and control of work activities. While temporary staffing of the planning division with contractors is sufficient and provides for an effective planning function (as measured by the quantity and quality of maintenance packages produced), plans to staff these positions with permanent licensee employees by October 1988 should remain a management priority to assure timely integration of the planning and scheduling functions. Management has controlled overtime for the craft and supervisory positions. Plans to provide for maintenance staffing during and after restart on an 8-hour rotating shift basis should provide continued effective overtime control.

3.3.2.3 Communications and Interfaces

Communication between the maintenance department and other portions of the organization, particularly operations and radiation protection, had previously been a weakness. The licensee has taken successful steps towards improving communication, both internal to the maintenance department and with other station groups.

The Team attended a variety of maintenance department status and turnover meetings. Based on observation of these meetings and interviews with maintenance personnel at each level of the organization, the Team concluded that communications internal to the maintenance staff are effective. Maintenance department managers were cognizant of the status of activities and of emerging problems.

The licensee has initiated several programs directly addressing the past weaknesses in interdepartment communications. In an effort to improve the interface with radiation protection and to raise worker sensitivity to health physics issues, the licensee created and staffed the maintenance Radiological Advisor position. Interviews with a spectrum of individuals indicated that this effort has had a positive impact on

day-to-day working relationships and performance. The licensee also formed the Work Prioritization Review Team (WPRT), composed of representatives of various station departments. The WPRT provides a forum for discussion of the relative importance of each maintenance item as it arises. The WPRT has been effective in improving operation's department involvement with the maintenance process. The maintenance department is also involved in daily and weekly meetings intended to ensure coordination between station groups. Meetings attended by the Team were generally effective.

The need for continued efforts to improve communications and interfaces were noted in some areas. The licensee's Stores Department practices are not always fully supportive of specific maintenance department needs. For example, lubricating oil can only be withdrawn in bulk quantities, such as a 55-gallon drum. Typical maintenance activities require use of only a fraction of this amount. Similar restrictions apply to materials routinely used by the I&C, electrical, and mechanical maintenance divisions. This policy places the burden for control and storage of unused material on the individual requesting the withdrawal. The Team noted that maintenance personnel were routinely using a cabinet in the maintenance shop to store unused "Q" materials. No procedure existed to specify the appropriate controls for the storage area. The need for establishment of the storage cabinet had been discussed previously between the Quality Assurance Department (QAD) and maintenance. QAD believed that the cabinet was not currently in use, while maintenance personnel believed that QAD had concurred in its creation, demonstrating a lapse in interdepartment communications. The licensee subsequently performed an inventory of the materials in the cabinet, and removed all non-Q and suspect materials. Procedure 3.M.1-32, "Control of 'Q' Hold Area," was subsequently issued to provide appropriate controls and surveillance of the cabinet.

The Team also noted that partially used drums of both Q and non-Q lubricating oil and grease were being kept in a storage shed outside the process building. Several of the drums were not properly sealed. No procedure addressing this storage area existed. Discussions with operations personnel indicated that the difference between Q and non-Q drums of material was not clearly understood. Routine withdrawals and their equipment application were not recorded. In response, the licensee removed all non-Q materials and committed to issue a procedure to establish appropriate controls by September 7, 1988, including provisions to ensure that the lubricants are traceable to their application in the field. In addition, the licensee committed to evaluate the possible addition of non-Q oil to Q equipment and its potential significance.

During followup to this issue, the Team reviewed Engineering Specification M-547, which documents the procurement and receipt inspection requirements for the purchase of lubricants as a Commercial Quality Item (CQI). The Team noted that M-547 requires sampling and testing of each batch of material purchased as a CQI. At the Team's request, the licensee reviewed records and identified two cases in which a CQI procurement order had been issued which did not invoke this sampling requirement. The licensee subsequently issued a Potential Condition Adverse to Quality (PCAQ) to initiate a review of CQIs issued for consistency with approved engineering specifications. The licensee committed to disposition this PCAQ prior to restart.

Overall communications between the maintenance department and other groups within the organization are effective. However, the interface problems discussed above, among the Stores Department, QAD, and the Maintenance Department, indicate that continued attention is needed.

3.3.2.4 Maintenance Planning and Prioritization

The licensee has established a Maintenance Planning Division within the Maintenance Department. The role of the Planning Division is clearly delineated in approved maintenance procedures and the licensee's Maintenance Section Manual. The Planning Division Manager position has been filled and the licensee is actively pursuing candidates for the eight allocated staff positions. When staffing efforts are complete, the division will consist of a work package planning group and a scheduling group. In the interim, the licensee is utilizing twelve contractor personnel to perform the package planning function. The licensee's Outage Management Group (OMG) is currently providing scheduling guidance. The licensee expects to complete the staffing effort by October 1988. Team reviews indicate that the present staff of contractors, in conjunction with OMG assistance, is functioning well.

Implementation of the revised maintenance work process, particularly the need to generate detailed job-specific maintenance work plans (MWP) for each maintenance request (MR), has resulted in a heavy emphasis on the planning function. The Team reviewed a large sample of completed MWP's, and MWP's in the field. Interviews with craft personnel and first-line supervisors indicated that these individuals were knowledgeable about the new maintenance process requirements and considered MWP's issued by Planning to be of generally good quality. One weakness was noted in the area of post-work testing specification, as discussed in Section 3.3.2.6.

The Team noted that the completion of job planning, and approval of the MWP are typically restraints to commencement of the activity. This results in the need to expedite the review process, making scheduling difficult. It appears that this is primarily attributable to the newness of both the program and the Planning staff. Other factors also contribute. For example, the licensee's procedures currently do not provide a simplified process for non-intent changes to the

MWP after issuance. MWP's require a complete re-review to incorporate minor changes. The licensee stated that a revision to the program to include provisions for non-intent changes is planned for the future. The licensee's engineering department is presently reviewing each MR/MWP and approving the use of any replacement materials. This practice provides positive control of all materials, but delays issuance of the MWP and is a significant drain on engineering resources. While these factors inhibit efficient planning, no instance of inadequate planning was identified.

The licensee has created a WPRT to assist in the assignment of the proper priority to each MR. The WPRT meets daily and is composed of representatives of various station groups, including maintenance, operations, outage management, construction management, and fire protection. It performs a multi-disciplined review of new maintenance items to identify potential plant impact. The IATI Team attended a WPRT meeting and observed that discussions were properly focused and priorities were assigned appropriately.

The Team also independently reviewed outstanding maintenance requests for the RHR system and the electrical distribution system. This review focused on MR's not designated for completion before restart. The Team noted that MR 88-10-105 documented electrical ground and potential cable insulation damage in the circuit for pressure switch PS-1001-93A. This switch is environmentally qualified (EQ) and provides a safety-related interlock function for the automatic depressurization system. The MR had been scheduled for work after restart, leaving the switch EQ in an indeterminate state. In response to the Team's question, the licensee rescheduled the MR for completion prior to restart.

The Team also noted that MR 88-10-26 documents that valve AO-8001 is currently open and cannot be closed using the hand switch. AO-8001 is installed in series with a check valve in the torus fill line. The check valve satisfies the primary containment isolation function for the line. While AO-8001 is not required for containment isolation operability, it does serve as a redundant isolation valve immediately adjacent to the check valve. AO-8001 was originally designed to receive an automatic open signal on sensed low torus level. Because normal torus level is now maintained below the instrument low level setpoint, the valve continuously receives an open signal, thus preventing manual closure. This condition has existed for at least several years. The licensee has relied on closure of a manual block valve located in the turbine building to compensate for the problem. The Team expressed concern that the distance between the containment isolation check valve and the redundant isolation valve have been unnecessarily extended outside the reactor building. In addition, a lineup that is inconsistent with the design drawings and operating procedures resulted. The WPRT had designated this MR as post-restart. In response to the Team's concerns, the licensee initiated an Engineering Service Request (ESR) to identify an acceptable repair. The licensee committed to resolve this item prior to restart.

These two examples of misscheduled MR's were discussed by licensee management with the WPRT. In addition, the licensee committed to re-evaluate all priority 3 MR's before restart. The licensee's process for review and prioritization of MR's is thorough, and with the exception of the two instances described above, appears well implemented. The effectiveness of the licensee's planning and prioritization program is demonstrated by the overall decrease in the number of outstanding maintenance tasks, their average age, and their significance.

The licensee tracks several maintenance performance indicators which are indicative of backlog status. Those performance indicators generally display a favorable trend. The Performance Indicator Report for August 9, 1988, shows a total backlog of 2177 open MR's, of which 746 are in a test/turnover status. Of these, 220 cannot be tested until the plant system becomes operable during startup. Of the 1431 remaining open MR's, the licensee has identified 652 required for restart. The physical work had yet to be done for 145 of these 652 MR's. Based on the above, and an average closeout rate of about 25 packages per week, elimination of the restart backlog within 6 to 7 weeks appears to be manageable effort. The licensee's goal, in addition to addressing the restart MR's, is to reduce the total number of open MR's from 1431 to less than 1000 by plant restart. The Team noted that this would constitute an acceptable open MR backlog for an operating plant, and that the licensee's goal was reasonable.

3.3.2.5 Control and Performance of Maintenance

Inspection in this area was performed to determine whether maintenance activities are being properly controlled through established procedures, and the use of approved technical manuals, drawings and job-specific instructions. Maintenance activities were observed to determine how well the new program was being implemented.

The new maintenance program is primarily defined in Procedures 1.5.3, "Maintenance Requests," and 1.5.3.1, "Maintenance Work Plan," which were implemented on June 20, 1988. The procedures were reviewed and found to provide strong controls for identification, planning, performance, and closeout of maintenance tasks. Issuance and control of materials used for replacement/repair assure that requisite quality requirements are maintained. Supervisory oversight of work in progress and the final review of work packages for completeness is a strength. Based on its review of the above procedures and observations of work in progress, the Team concluded that the newly defined program provides excellent control and documentation of activities.

The new program and procedures formalize controls that were previously in place, but inconsistently applied and not recognized by procedures. The procedures now require better documentation of the initial problem description, the repairs made, and the post-work test requirements. They require detailed work instructions, which should provide for consistent high quality in maintenance work packages. An additional improvement in the maintenance procedures is that the maintenance work plan now provides for detailed documentation of installation and removal of lifted leads and jumpers (LL/J). This documentation assures proper performance of the task and is supplemented by the tracking provided in the LL/J Log initiated by the Operations Department per Procedure 1.5.9.1.

To eliminate a previously identified weakness, the licensee has stopped using Procedure 3.M.1-11, "Routine Maintenance," which was found to be too general to adequately control work activities. Instead, detailed work instructions are provided by the work plans prepared in accordance with Procedure 1.5.3.1. Further, the licensee has stopped using the Maintenance Summary and Control (MSC) form. The documentation provided by the form has been replaced by the detailed work plans, maintenance logs, and special process control sheets now required by Procedures 1.5.3 and 1.5.3.1.

The maintenance activities and packages listed in Appendix D of this report were reviewed to verify proper implementation of program requirements. The Team found that detailed work packages were prepared and in use in the field with adequate job specific instructions to accomplish the assigned tasks. No ad-hoc changes of the work scope were observed. Pre-job briefings were conducted and were appropriate to outline the activities planned. Coordination and in-process communications with operations personnel were proper and assured good control of plant equipment.

Maintenance personnel, including contractors, have been trained in and were knowledgeable about the new program and procedure requirements. Although the new controls were deemed cumbersome by some, overall worker attitudes about the new procedures were positive. There is a general acceptance of the present program and a desire to "do the work right." Personnel performing the work were qualified, as verified by the training and qualification status board maintained in the maintenance shop.

The licensee has made progress in filling vacancies in the first-line supervisor positions with personnel having the requisite experience and expertise in the associated disciplines. The present supervisory staffing is adequate to cover work production schedules and provides adequate oversight. In an additional program improvement, supervisor review of work packages is now required by procedure to assure management review of packages for completeness. First-line supervisors were routinely observed in the field directing work in progress. Supervisory involvement was effective to assure completion of work correctly, to help resolve technical problems, and to coordinate engineering support, as required. The oversight function has been enhanced by the larger number of first-line supervisors who have been relieved of the excessive administrative burden associated with planning and package preparation.

The effectiveness of maintenance staff engineers and system engineers in supporting field activities was particularly noted in the repairs for the fuel pool cooling pump and the repair of RHR discharge valve 28B. The engineers are also used in the root cause analysis of component failures. The repair of valves 28A and B involved the fabrication of new valve yokes, which resulted in a large and complicated work control process that was appropriately broken down into several work packages. Oversight and control of these jobs, which spanned several weeks, were notable. The quality of the final product was evident, as was the welding of the yoke subparts. Good inprocess

controls resulted in an acceptable root weld on the first attempt for valve 28B. Although a problem was encountered in the fabrication of the yokes (short by 3/8 inches), this item, considered minor, was properly dispositioned by the licensee through Nonconformance Report (NCR) 88-99.

3.3.2.6 Post-Maintenance Testing Program

The licensee's program for identification and implementation of post-maintenance testing was considered weak during previous inspections. During the current period, the Team reviewed the licensee's post-maintenance testing program procedures and other approved test technical guidance. A sample of maintenance tasks was reviewed to determine if planned testing adequately demonstrated correction of the cited deficiency. Testing was observed in the field, and completed test documentation was reviewed for thoroughness.

The licensee recently implemented a major revision to Procedure 3.M.1-30, "Post-Work Testing Guidance." The current revision establishes a conservative philosophy designed to ensure that prescribed testing verifies correction of the original deficiency, as well as potential problems which could have resulted from performance of the task. Organizational and individual responsibilities are clearly defined. Procedure 3.M.1-30 incorporates by reference Station Instruction SI-MT.0501, "Post-Work Test Matrices and Guidelines." SI-MT.0501 serves to further define the method by which post-work testing is to be specified and documented. It includes an individual matrix for each type of component describing the possible maintenance tasks and the corresponding post-work test requirement. Each matrix references an appropriate data sheet which provides more detailed testing guidance. Procedure 3.M.1-30, in conjunction with SI-MT.0501, is to be used by the Maintenance Planning Division, with needed technical input from other maintenance department and systems engineering department personnel, to establish comprehensive testing requirements for each maintenance request. The testing program as described in these documents is well conceived and is considered a strength.

The Team reviewed a sample of ongoing maintenance tasks and evaluated the technical adequacy of prescribed testing. In three of the examples reviewed, the planned testing was not adequate to ensure proper performance of the task and complete correction of the problem:

(1) Testing identified for the replacement of the fuel pool cooling pump and motor under MR 86-109, included only motor current and vibration monitoring. No pump head/flow test was specified.

(2) The package for replacement of a safety-related 4160-VAC bus lockout relay under MR-88-110 initially contained only the general guidance which should have been used for development of detailed testing. Subsequently, suggested testing verified only a portion of the lockout relay functions.

(3) Post-maintenance testing following repair of a motor operated valve limit switch under MR 88-10-179 was also not adequate to ensure that the problem had been completely corrected.

In response to the Team's findings, the licensee Maintenance Section Manager audited task-ready MR packages and identified one additional case of inadequately specified testing. In each of the above instances, the licensee subsequently developed and performed adequate post-work tests. Discussion with the personnel involved and maintenance department management revealed that no training on the newly developed post-work testing procedures and guidance had been corducted. The licensee immediately briefed appropriate supervisors and workers on the program, and committed to complete formal training in this area by September 9, 1988. A second potential contributor to the problem in planning post-work tests is the press of business, particularly in the planning area, in that the planners are currently just able to keep pace with the schedule for field activities. Licensee management appeared to be sensitive to this issue. The Team reviewed an additional sample of in-process and completed MR's and did not identify any further problems.

Overall, the Team concluded that the licensee has established a thorough post-work testing program demonstrating a sound safety perspective. Although the program is generally well implemented, some problems were noted. The newness of the program, the current press of business, and some weakness in personnel training appear to be affecting its implementation. Therefore, this area requires continued licensee attention.

3.3.3 Conclusions

The licensee has established a viable maintenance organization. Allocated staffing levels have been substantially increased and are sufficient to support routine maintenance activities. Of particular significance is the addition of first-line supervisory positions, and the creation of an expanded maintenance planning and scheduling division. The licensee has been largely successful in filling previously vacant positions. One exception is the staffing of the maintenance planning division. While none of the permanent staff in this area is in place, the licensee is effectively utilizing contractors to perform the function. Full staffing and training of the planning division is important to improving its overall effectiveness. Aggregate management and supervisory qualifications were also found to be adequate.

Newly revised maintenance and post-work testing program procedures provide significantly improved control and documentation of field activities. They also result in an increased emphasis on detailed job planning. Observations by the Team indicate that implementation of the program is generally effective. Some implementation problems are evident; however, the problems affect production and not the quality of completed work. Additional attention to post-work test program application by the licensee is needed.

The licensee appears to have identified and properly prioritized outstanding maintenance tasks, with only minor exceptions noted. A process to ensure continued proper prioritization has been established. Both licensee senior management and maintenance section management are using a set of indicators to monitor performance.

In summary, the licensee's current maintenance staff and program are adequate to support plant operations. Continued close licensee management monitoring of the newly implemented program will be required until additional experience is gained. The long-term support programs, such as preventive maintenance, will require licensee enhancement to further strengthen performance.

3.4 Surveillance Testing and Calibration Control

3.4.1 Scope of Review

The Team reviewed the licensee's administrative controls and implementation of the surveillance testing and calibration control program to assess its adequacy. As part of this review, the Team examined the licensee's corrective action to address past problems which included: effectiveness of test scheduling; the technical adequacy of procedures; and lack of centralized control of the program. The inspection consisted of a review of various procedures, drawings, and records; observations of testing in progress; and personnel interviews.

3.4.2 Observations and Findings

3.4.2.1 Master Surveillance Tracking Program

The Team reviewed the licensee's program for the control and evaluation of surveillance testing and calibration required by the Technical Specifications (TS), inservice testing (IST) of pumps and valves required by 10 CFR 50.55.a(g), and calibration of other safety related instrumentation not specified in TS. The program is prescribed by Procedure No. 1.8, "Master Surveillance Tracking Program." The Systems Engineering Division Manager has overall adminsitrative responsibility for the Master Surveillance Tracking Program (MSTP). A plant Surveillance Coordinator has been assigned within the Systems Engineering Division to implement the program, which includes reviewing and approving the various lists, schedules, and reports generated by the MSTP, and maintaining the MSTP data base. Each division has appointed a Division Surveillance Coordinator to interface with the plant Surveillance Coordinator. The plant Surveillance Coordinator meets weekly with the Plant Manager to review the status of the surveillance program.

The purpose of the MSTP is to ensure the timely performance of all surveillance testing. The MSTP data base contains information such as: commitment reference (TS, preventive maintenance, regulatory commitment, etc.); the applicable procedure number and title; scheduler interval and basis; the group responsible for performing

the test/calibration; and the date last performed, the next due date, and the last date by which the surveillance test must be completed (plus 25% date). Completed tests are rescheduled to ensure the combined grace period for any three consecutive tests does not exceed 3.25 times the specified surveillance interval. The accuracy of the data base was verified by a contractor during the current outage. Procedure No. 1.8 contains specific controls on changing any of the data fields in the MSTP data base to maintain its accuracy. In addition, a second contractor verification of the MSTP data base is scheduled to be performed in the near future. The Team selected several TS-required surveillance tests to ensure that they are in the MSTP data base, that approved procedures existed, and that the test frequency was proper. No discrepancies were identified with the data base during the Team's review; however, the Team was concerned with a potential problem involving the scheduling of once-per-operating-cycle versus once-per-refueling-outage tests, as discussed below.

As part of its review, the Team examined the process established by Procedure No. 1.8 to determine its adequacy in ensuring that surveillance tests were properly scheduled and performed within the required time period. A "Division List" is issued to each division and to the Control Room Annex each Friday which provides a schedule of tests due for performance the following week. A "Monthly Forecast" is also issued weekly to assist the Section Managers in planning and scheduling resources. When a surveillance test is satisfactorily completed, the Control Room Annex copy of the Division List is signed off. Daily, the Planning and Scheduling Division transcribes the completion dates and updates the MSTP data base. A "Surveillance Day File Report" is issued daily to identify all changes made to the MSTP data base since the last time the report was issued. This report is reviewed by the Plant Surveillance Coordinator and used to verify proper transcription and data entry. "Variance Reports" are issued weekly to Section Managers to

identify those surveillance tests that were scheduled, but not performed. A written explanation as to why the tests were not performed within the required time and why it's acceptable not to perform the test is sent to the surveillance coordinator within 24 hours of receipt of the Variance Report. A "Priority Notice" is issued for any surveillance test that has reached its deadline date (plus 25% date) and that has not been performed by that date to assist in the prevention of TS violations. Failure to perform a TS-required surveillance test on the deadline date requires submission of a Failure and Malfunction Report. The Team reviewed samples of each of the above reports, and their responses, and concluded that the program was adequate and contained sufficient checks to ensure that surveillance tests were completed within the required time.

Although the Team found the administrative control and implementation of the MSTP to be adequate, it noted a commitment by licensee management to improve the program. These improvements include: replacing the Division Lists with task cards to reduce the potential for transcription errors; adding an alert notice when a scheduled test is not performed; improving the scheduling of conditional surveillances; planning for the addition of a full-time surveillance engineer; and instituting an equipment history computer program capable of trending surveillance/calibration results on individual components.

The Team identified one concern during its review related to the scheduling of once-per-operating-cycle versus once-per-refueling-outage surveillance tests. The Pilgrim Technical Specifications define an operating cycle as the interval between the end of one refueling outage and the end of the next subsequent refueling outage. A refueling outage is the period of time between the shutdown of the unit prior to refueling and the startup of the plant after that refueling. The TS contains some surveillance requirements that are specified to be performed once per operating cycle, while there are others, such as testing the drywell-to-suppression-chamber vacuum breakers, which are to be performed during each

refueling outage. Also, all the safety-related instruments not specified in the TS are calibrated once per refueling outage. As part of a previously identified issue, the licensee has defined once-per-operating-cycle to be 18 months; however, no clarification has been provided for once-per-refueling-outage. As a result, there are several once-per-refueling-outage tests/calibrations which were performed in 1986 and 1987 which are currently scheduled on the MSTP for the "next refueling outage," which is projected for some time in 1991.

Therefore, by strictly interpreting the definitions, the interval for some of the once-per-refueling-outage surveillance tests could be as long as four or five years. The Team pointed out that this appears to be beyond the intent of the TS. The Team also noted that a licensee task force established to determine system operability prior to restart had also identified this issue and recommended that evaluations be performed on the once-per-refueling-outage surveillance tests to determine if and when they should be reperformed. The licensee committed to evaluate the status of the once-per-refueling-surveillance tests and provide justification for those tests not rescheduled, prior to restart.

3.4.2.2 Logic System Functional Test and Simulated Automatic Actuation Procedures

The Team reviewed the procedures listed in Appendix D of this report to determine the adequacy of the licensee's performance of logic system functional tests (LSFT) and simulated automatic actuations (SAA). The review consisted of the indicated channel/train of the primary containment isolation system (PCIS) and the reactor core isolation cooling (RCIC) system LSFT and SAA, and the diesel generator (DG) initiation LSFT. The procedures were reviewed against the system drawings to ensure that they were technically adequate, that all relays and contacts were tested, that the procedures were properly approved, and that the tests were performed at the required frequency. The licensee uses a series of overlapping tests to satisfy the LSFT

and SAA. The Team noted that the licensee had a contractor review the adequacy of the LSFT and SAA tests during this outage. The contractor identified several deficiencies, which were corrected. The Team found that each procedure reviewed was technically adequate and that the testing sequence satisfied the Technical Specification LSFT and SAA frequency and scope requirements. The Team also noted that the format of the procedures was adequate and included: environmental qualification quality control (QC) witness points on transmitter calibrations; double verification on lifting and landing leads; fuse holder fit checks; and I&C management review upon test completion prior to the NWE review.

During the review of the RCIC isolation subsystem LSFT, the Team questioned why there was no LSFT on initiation logic. The Team acknowledged that it was not required by TS Table 4.2.B, nor was credit taken for it in the FSAR. However, TS 3.5.D.1 requires RCIC be operable (with reactor pressure greater than 150 psig and coolant temperature greater than 365 degrees F) and the TS definition of system operability requires that all subsystems also be operable. This would include the RCIC initiation logic. Also, the guidance provided by the Standard Technical Specifications indicates that an LSFT on the RCIC initiation logic should be performed every six months. The Team noted that Procedure No. 8.M.2-2.6.7, "RCIC Simulated Automatic Actuation," actually performs an initiation logic LFST; however, it is scheduled at a once-per-18-month frequency, while TS-required LSFT's have a frequency of once per 6 months. This item is unresolved pending a licensee evaluation of the adequacy of the RCIC initiation logic LSFT frequency (88-21-02). The licensee committed to provide, before restart, the technical basis for the surveillance frequency.

3.4.2.3 Calibration Procedures

The Team noted that the licensee established a series of procedures, known as the 8.E series, to calibrate the safety-related instrumentation not specified in the Technical Specifications. This

instrumentation is normally used to record data necessary to complete TS-required surveillance tests or inservice testing of pumps and valves. The 8.E procedures are scheduled on a once-per-refueling-outage interval.

The Team performed a detailed review of Procedures No. 8.E.11, "Standby Liquid Control System Instrument Calibration," and 8.E.13, "RCIC System Instrument Calibration." Overall, the Team found the technical content and format to be adequate; however, two discrepancies were identified. Procedure No. 8.E.11 does not calibrate pressure indicator (PI) 1159. This PI was installed during the current outage and is used in the performance of Procedure No. 8.4.1, "Standby Liquid Control Pump Operability and Flow Rate Test." The Team also noted that Procedure No. 8.E.13 does not calibrate PI 1340-2. This PI is used in the performance of Procedure No. 8.5.5.1, "RCIC Pump Operability Flow Rate and Valve Test @ 1,000 psig." PI 1340-2 was installed and last calibrated during the 1984 outage when pressure transmitter 1360-19 was replaced with a Rosemount Transmitter. The licensee indicated that the procedures would be revised to correct the deficiencies.

3.4.2.4 Surveillance Test Observations

On August 16, 1988, the Team observed a portion of the performance of Procedure No. 8.M.2-2.10.1-5, "Core Spray System 'B' Logic Functional Test," Revision 13. The test was performed as part of the restoration of the "B" Core Spray System and as post work testing of relay 14A-K20B. The test was observed to ensure it was performed in accordance with a properly approved and adequate procedure. During the test, the Team noted that the technicians' performance was adequate. They conducted the test in a slow and deliberate manner and stopped when questions arose concerning mislabelled nameplates and the identification of some relay coil leads. In both cases, the questions were resolved before they proceeded. The Team noted that the I&C first-line supervisor monitored portions of the test. The test was also monitored by QA personnel as part of the surveillance monitoring program. QA personnel indicated that they observe approximately one surveillance test a week.

The test was stopped at Step 25 when the test results did not agree with the expected results delineated in the procedure. The step was supposed to verify the instantaneous pickup of the core spray pump start relay 14A-K12B. Subsequent licensee investigation revealed that the instantaneous pickup was removed as part of the degraded grid voltage modification (Plant Design Change (PDC) 88-07). The Team noted that PDC 88-07 had not yet been closed; however, an impact review performed prior to installing the modification failed to identify Procedure 8.M.2-2.10.1-5 as being affected by the PDC.

The Team noted that one of the licensee's self-assessment action items was to review the impact of PDC's (installed since October 1987) on LSFT's. The licensee's review began on October 1987 because this was the completion date of the contractor review noted above which verified the adequacy of LSFT/SAA tests. The Team noted that the contractor review produced an LSFT/SAA data base which cross references the safety-related components tested to the applicable LSFT/SAA test. This data was being used during the licensee's review. Four of the five PDC's involved in the licensee's review of impact on LSFT's have been completed. The remaining PDC (88-07) was under review when the problem with the core spray LSFT was noted. Twenty-one procedures have been identified as possibly being affected by the PDC and are currently under review. The CS functional test appears to be the only affected test run prior to completion of the PDC-procedure review.

The licensee indicated that a possible future improvement will be to use the LSFT/SAA data base to determine the impact of a PDC on procedures before implementing the modification.

3.4.2.5 Measuring and Test Equipment

The Team reviewed records, interviewed personnel, and toured storage areas to determine the adequacy of the licensee's program for control of measuring and test equipment (M&TE). Administrative control of the program is established by Procedure No. 1.3.36, "Measurement and Test Equipment."

The licensee has implemented a computerized system to issue and track M&TE. This system will only allow issuance equipment to authorized personnel, will limit the checkout period to only 24 hours, and will not issue M&TE if the sticker calibration date does not match the calibration date in the computer. The system also issues a M&TE traveler form to the user to identify usage on each plant device tested and each M&TE range used. This data is later entered into the computer to assist in evaluations if and when a piece of M&TE is found to be out of calibration. The Team reviewed two cases where M&TE was out of calibration and noted that the evaluations performed were documented in accordance with procedures and appeared thorough. Thus far, only electrical I&C and electrical M&TE are on the new computerized system; however, similar controls are being manually implemented for mechanical equipment until it is incorporated into the new system.

The licensee currently has two storage areas for M&TE: one for electrical/I&C and one for mechanical equipment. The Team toured each area and noted that the equipment was identified by a unique number and indicated calibration status. The Team found that the equipment was properly stored and that M&TE out-of-calibration, on hold for repairs, or new equipment not yet in the system, were properly identified and segregated. The licensee indicated plans to go to only one storage area and to increase the number of staff issuing and controlling the M&TE.

The Team also reviewed the system for recalling equipment for calibration. The recall tracking is performed in accordance with Procedure No. 1.8.2, "PM Tracking Program." The Team reviewed several equipment calibration stickers during its tour of the storage areas and during observations of ongoing surveillance and maintenance activities. No equipment past its calibration due date was identified.

The Team found the licensee's control of measuring and test equipment to be adequate.

3.4.2.6 Inservice Testing of Pumps and Valves

The Team reviewed the status of the licensee's program for inservice testing of pumps and valves in accordance with the ASME Boiler and Pressure Vessel Code, Section XI.

The licensee submitted Revision 1A to the inservice test (IST) program on October 24, 1985. A meeting was held between BECo and the NRC on January 14, 1988, to discuss the licensee's proposed Revision 2 to the IST program. To minimize impact on the NRC review cycle, the licensee submitted an interim IST program, Revision 1B, on March 14, 1988, to address concerns identified by the NRC during review of Revision 1A. The licensee plans to submit Revision 2 after the Safety Evaluation Report on Revision 1B is issued. Revision 2 is to maintain the upgrades made to the program in Revision 1B and increase the program scope by adding more components (e.g., relief valves).

Control of the IST Program is established by Procedure No. 8.I.1, "Administration of Inservice Pump and Valve Testing." The Team reviewed the procedure and noted that while it defines the methodology for compliance to the IST program for pumps and valves, including analysis of test data, direction on corrective action, and establishment of reference values (additional guidance is contained in Procedure No. 8.I.3, "Inservice Test Analysis and Documentation Methods"), the organizational responsibilities and referenced IST program revision need to be updated. For example, the pump and valve testing is now scheduled through the MSTP instead of the compliance group, and a Senior ASME Test Engineer has been hired to implement the program. The licensee acknowledged the Team's comments and showed it a draft revision to Procedure 8.I, which is scheduled to be implemented when Revision 2 is submitted. The Team reviewed the draft procedure and noted that it provided additional detail on:

responsibilities, definitions, test requirements, compliance requirements, evaluation, disposition, post-maintenance testing, and administration and records maintenance. The draft procedure also provides a listing of the pumps and valves currently within the testing program and includes a cross-reference for individual test requirements to the approved PNPS procedure.

The Team noted that other improvements (planned or in progress) to the IST program include revising all the implementing procedures to upgrade them to Revision 2 and creating a position for a second ASME test engineer.

The Team reviewed several pump and valve test results for the standby liquid control, core spray, salt service water and low pressure coolant injection systems to verify that the acceptance criteria were met, that the results were properly evaluated and trended, and that the frequency of testing was increased when required. The Team noted that Procedure No. 8.I contains controls to change the MSTP data base test frequency when the deviations fall within the alert range. The Team reviewed changes to various pump reference values to ensure that they were justified and documented. The Team also checked the reactor building closed cooling water, salt service water, and standby liquid control system pumps to ensure that the IST vibration data point was properly marked. No deficiencies were identified during this review.

3.4.3 Conclusions

Based on observations, personnel interviews, and the review of procedures and records noted above, the Team concluded that:

1. The licensee has established and is implementing an adequate and effective program to control all surveillance activities at PNPS.

2. Responsibility for implementing the MSTP has been placed in a centralized, strong, forward-looking division.

3. The licensee was adequately implementing the IST program for pumps and valves. The Team noted that there are several planned improvements to the program involving administrative and implementing procedures and staffing to upgrade the IST program.

4. Licensee management is committed to improve the surveillance program, as evidenced by the upgrades planned or in progress in each area examined. These include: contractor data base reviews; increasing the scope of the IST program, increasing staffing; improved control over issuing and tracking M&TE; establishing an equipment history computer program; replacing the MSTP division lists with task cards; and improving conditional test scheduling.

5. With the exception of the few deficiencies noted above, the procedures were technically adequate.

6. The one concern identified was the licensee's need to resolve the once-per-refueling-outage scheduling deficiency.

3.5 Radiation Protection (RP)

3.5.1 Scope of Review

The Team reviewed various aspects of the radiation protection program during the inspection, with emphasis on the licensee's ability to safely support plant startup. Performance was determined from: observation of work in progress; periodic tours of plant areas; interviews with managers, supervisors, and technicians; and review of selected documents. The areas reviewed are as follows:

1) Organization and staffing;

2) Training, qualification and continuing education of RP technicians;

3) General employee training;

4) ALARA programs;

5) Control and oversight of work in radiological areas;

6) Control of locked high radiation areas;

7) Adequacy of laboratory (count room) equipment;

8) Availability and adequacy of portable RP survey equipment;

9) Adequacy of gaseous and liquid release monitoring systems;

10) Clarity and consistency of RP policies and procedures;

11) Audits.

3.5.2 Observations and Findings

3.5.2.1 Organization and Staffing

The organization of the radiation protection (RP) department has remained stable since the significant changes which were made early in 1988. The staffing level has remained constant and is adequate to support plant operations. The RP section marager described various enhancements

planned for the supervisory staff. An outline for qualification as Radiation Protection Manager, per Regulatory Guide 1.8, has been approved. One or two division managers within the RP section will be expected to qualify as Radiation Protection Manager to provide depth in the organization. Incentives have been approved for achieving this qualification. In addition, the three division managers will rotate assignments for cross-training purposes, and all will be encouraged to pursue advanced scholastic degrees. These efforts are expected to begin in the near future.

The Team observed some indications of isolated morale problems at the technician and first-line supervisor level which were attributed to several causes. Contributors include personnel and assignment changes within the organization resulting from rotation of radiation protection shift supervisors, an influx of new technicians, impending implementation of a new rotating work schedule, and a perceived lack of management presence in the field. In addition, weaknesses may exist in communications within the RP organization as evidenced by technician perceptions of a lack of technician input or review during the development or revision of RP policies and procedures. In summary, and in spite of these difficulties, the Team observed that the technicians and supervisors were generally enthusiastic and competent.

Another potential weakness results from the practice of rotating technicians through job assignments each three to six months. Although this practice may have merit for familiarization and job exposure purposes it may prevent or significantly delay the development of a high proficiency level in certain specialized technical areas, a concern particularly evident in the instrument repair and calibration facility. Here the RP technician is assigned to repair and calibrate a wide range of instrumentation, including gas flow detector cells, sophisticated computer-controlled automatic friskers, air pumps, and all alpha, beta, gamma and neutron survey meters. The area supervisor stated that he was attempting to resolve this problem by requesting an extension of the rotation cycle.

The RP section has 42 technicians, of whom 36 are ANSI 18.1 qualified. Only 21 have commercial experience. The section manager provided a shift staffing schedule for power ascension testing that will ensure that the experience will be adequately distributed among the individual shift crews.

3.5.2.2 RP Technician Training

The RP technician training and qualification program is certified by the Institute of Nuclear Plant Operations (INPO), uses INPO guidelines for development of instructional material, and uses the INPO exam question bank. The training is conducted in three phases over a period of two years or less, depending on experience. Upon completion of Phase 2, the technician is considered to be ANSI qualified and can issue radiation work permits. The third phase includes specialty tasks such as operation of the whole body counter and respirator fit testing.

Classroom training is provided at the offsite facility. The training facilities were adequate, well lighted, comfortable and equipped with practice equipment. The Team observed that most of the basic survey instruments were available, but laboratory-type gamma spectroscopy equipment, as well as ALARA mock-ups, were not available. This is typical of a single unit station. Most presentations appeared to rely on lectures with minimal use of audio-visual equipment. A review of selected lesson plans showed adequate technical content.

Classroom training is followed by an in-plant phase where the technician receives on-the-job training and demonstrates proficiency at various tasks. This is documented in a qualification folder. Qualified technicians will be provided with ongoing training on a six-week schedule. This will be contingent on implementation of a new six-section rotating work schedule. The

training department has begun drafting lesson plans which will cover a broad range of topics, including interpersonal skills training. The instructors must also complete formal qualifications. They were recently required to begin spending a certain number of hours in-plant between training cycles. This keeps them abreast of changes occurring in the plant.

The Team concluded that this program is well-controlled and documented and is aided by a dynamic first-line supervisor. The implementation and effectiveness of cycle training will be evaluated in the future. The licensee's current efforts are directed at completing initial qualification for the entire staff.

3.5.2.3 General Employee Training (GET)

All general employee training and in-processing is conducted at the on-site training center over a three-day period. Classrooms were spacious, comfortable, and well equipped. Ample training aids, as well as audio-visual equipment, were in evidence. A comprehensive student manual is given to each trainee along with copies of appropriate regulations and regulatory guides. Basic training involves 20 contact hours, while radiation workers receive an additional 3 hours. Respirator fit testing is also provided.

The two instructors associated with GET had completed the formal Staff Development program. Both have extensive experience and are well qualified. Although their teaching techniques could not be observed since no classes were in session during the week of this review, the Team concluded that the training content provided adequate direction to attendees. Both instructors spend time in the plant weekly to assess staff training needs.

The GET training is INPO certified. In addition, the training center offers five courses to all new supervisors. A new industrial safety training program is under development. An instructor has been hired and will begin providing training in occupational safety during the first quarter of 1989.

The Team concluded that management support of GET training was good, that the training was effectively conducted, and that it made a positive contribution to safety.

3.5.2.4 ALARA Programs

ALARA performance at this station had been a persistent weakness over several past SALP report periods.

The Team noted recent apparent improvement in upper management support for ALARA programs. Examples of this support are reflected in the re-evaluation of the 1988 ALARA goal from 600 to 390 manrem and formulation of several plans to reduce exposures. Also, the licensee is assigning an experienced manager to survey INPO, Electric Power Research Institute (EPRI), and several other nuclear stations to make a list of cost-effective exposure source term reduction techniques. The Station Director will then formulate a long-term program based on the findings of this survey. Another plan is to begin removal of abandoned in-place systems in 1989 which should remove unnecessary sources of exposure. A third project is underway to identify hot spots in plant piping and determine which of these could be reduced by flushing.

The ALARA staff also has plans to attend a training course and visit other stations to observe effective techniques. This staff is in the process of filling its final vacancy.

ALARA performance at the working level remains mixed. Licensing personnel developed a technique for conducting remote inspections of fire barrier penetrations using a flashlight mounted on a telescope. This concept may be applied in numerous situations and has the potential for significant dose savings. On the other hand, instances of failure to effectively use low-dose waiting areas were observed during work. The ALARA division manager is working to increase the sensitivity of all workers and technicians to ALARA practices.

The Team concluded that licensee attention to ALARA programs has significantly improved in recent months. The effectiveness and implementation of ALARA plans will be assessed in future NRC inspections.

3.5.2.5 Control of Work

During closure of a Confirmatory Order in the fall of 1987, NRC noted some improvement in the relations between the RP section and the other sections performing work. However, poor planning and lack of work control continued to be observed. During this assessment, further improvement in resolving these weaknesses was observed.

One indicator of poor planning is the number of radiation work permits (RWP) issued but not used. A review found that only a small fraction of RWP's issued are now unused. In addition, the use of "A" priority maintenance work requests by the Operations Department to expedite work has decreased significantly.

The use of a Radiation Protection Advisor assigned to the Maintenance department continues to be effective. This position was recently assumed by an experienced RP technician. He has introduced innovations, including frequent work group training sessions and installation of permanently situated boxes in the plant for contaminated tools.

The Planning Division is developing improved procedures for planning work. This section is responsible for coordinating with the RP and ALARA groups during the early phases of work planning. This allows adequate time for RWP preparation and ALARA review. Responsible section managers stated that [illegible] early maintenance-HP contact will be practiced in September 1988.

The Team observed that on-the-job cooperation between workers and RP technicians was good. A minor problem was noted in that RP technicians in the controlled area appeared unprepared to deal with a minor first-aid injury. Technicians were

uncertain in dealing with a worker with abrasions to his nose that caused bleeding. This was attributed by the Team to a lack of training and clear policies. On the other hand, technicians appeared well prepared to handle more serious emergencies.

3.5.2.6 Control of Locked High Radiation Areas

The licensee has previously incurred several violations for failure to properly control locked high radiation areas. This issue has been tracked as a NRC outstanding item (87-57-01). The licensee organized a task force to determine which lasting corrective actions would prevent a recurrence of these problems. Based on the findings of the task force, the control procedures were revised to place basic responsibility on the RP technician who signs out the door key. Further controls are provided by shift tours of all locked areas and by upgrading locking devices. Based on these actions, the Team concluded the licensee had appropriately addressed concerns in this area.

3.5.2.7 Laboratory Equipment

The adequacy and availability of RP laboratory equipment to support plant startup was reviewed. The licensee has available two multichannel analyzers (Nuclear Data 6700), several beta counters (BC4), and several alpha counters (SAC 4). The radiochemistry laboratory has redundant equipment for backup. This equipment is required to perform isotopic analysis of air samples for maximum permitted concentration (MPC) calculations, detection of degraded fuel conditions, and to support radwaste analysis. Procedures for the use of the equipment are available in the laboratory.

The Team noted that, at the time of the inspection, several pieces of laboratory equipment were awaiting repair or calibration. Only one BC-4 and one SAC-4 were operational in the lab. Both multichannel analyzers were awaiting repair parts. The supervisor in charge attributed this to the lack of proficiency of the technicians due to the rotating work assignment policy. This issue was discussed in Section 3.5.2.1.

3.5.2.8 Survey Equipment

The availability of properly calibrated survey equipment was reviewed. Survey equipment is used by RP technicians to measure dose rates, and surface and airborne contamination levels. Included in the review were the automatic personnel contamination detectors.

All equipment is calibrated and repaired in a facility on site, except for neutron survey meters. RP technicians are trained to perform all functions in the facility. The facility appeared to be adequately equipped to perform its task.

Stocks of equipment ready for issuance appeared ample and the calibration/repair backlog was minimal. This readiness may have been aided somewhat by reduced outage activity. The Team noted an improvement in that the new manager of the group has recently implemented a computer program that shows the status of each piece of equipment, the data base for which is updated each time an instrument is issued. Information that is captured includes users of the meter, calibration due date, and failure mode if placed out of service.

The Team concluded that an adequate supply of calibrated instruments is on hand to support routine operations and abnormal conditions.

3.5.2.9 Monitoring Environmental Releases

The operability of the environmental release monitors was verified. The two paths for a gaseous release are the main stack and the reactor building vent. The monitors were found to be operational and properly calibrated, with approved procedures available. The equipment is maintained by the Chemistry Group while the calculations of offsite doses required by the revised Radiological Environmental Technical Specifications (RETS) are performed by the RP section.

The single liquid release path monitor was operational. Due to elevated background radiation levels at the sodium iodide monitor, a new system has been installed parallel to the old system. The new system will offer increased sensitivity and will be brought on line in the near future.

3.5.2.10 Policies and Procedures

A sampling of RP procedures indicates that they are generally clear. The number of procedures controlling the RP department activities is extensive. However, the format varies from step-by-step instructions to a more general format. The RWP procedure is currently being revised to make the process less cumbersome and more useful. In general, the RP technicians did not feel adequately consulted during the revision of procedures. This issue was discussed in Section 3.5.2.1.

The Team concluded that the RP procedures were adequate to support startup.

3.5.2.11 Audits

Previous inspections found the licensee's internal audits and asssessments of the RP program were primarily compliance-oriented. Currently, these audits are completed in several ways. Several peer evaluators were trained to make on-the-job observations. A Radiological Assessor is permanently assigned to the staff reporting to the Senior Vice President. The Management Oversight and Assessment Team (MO&AT) does monthly plant tours. Also, the QA Department recently transferred in two experienc RP personnel. In addition to the above audits and reviews, the Radiological Occurrence Report (ROR) system provides a method to capture input from workers and RP technicians.

A review of these efforts shows that a moderate level of success has been achieved in finding program weaknesses. However, the results have not been commensurate with the effort involved. The RP section manager stated that an effort is

underway to shift the emphasis of these audits to performance rather than compliance. The audit performed by QA in November 1987 is being used as a model. Licensee efforts in this regard are expected to be long term and are adequate at this time to support plant startup.

3.5.2.12 Control of Radiological Shielding

The Team reviewed the licensee's program for the installation, control, and removal of radiation shielding. This review concluded that the licensee's program for control of radiation shielding is well documented and that implementation is good.

The program guidelines are contained in PNPS Procedure 6.10-008, "Installation and Removal of Shielding." Responsibility for implementation of the procedural requirements fall under the auspices of the Radiological Technical Support Division. The procedural requirements for controlling this process appear well defined and comprehensive. Licensee personnel responsible for implementation of the procedure were well versed on procedural requirements and current field installations. Licensee records of field installations were current, had been reviewed at the required intervals, and were accurate.

3.5.2.13 Health Physics Training

The Team observed licensee personnel during a contamination control training exercise. The exercise simulated a spill of highly radioactive (3 Rem on contact) resin during transfer operations. The scenerio document was well defined and included detailed timelines and instructions to the exercise controllers. The entire exercise was videotaped and replayed during the debriefing of participants. The exercise was well controlled and interviews with participants indicated that the individuals involved considered it to be an effective training device. Lessons learned and feedback from participants appeared to be well disseminated.

3.5.2.14 Hydrogen Water Chemistry System

The licensee has installed a system to inject hydrogen gas into the feedwater to reduce the potential for corrosion of reactor internal piping. This process will result in increased radiation levels onsite from increased radioactive nitrogen isotope levels in the system. A review of the impact analysis showed that a comprehensive plan to control exposures has been developed. A test run in 1985 resulted in the installation of a 16-foot high 20-inch thick concrete shield around the turbine. Moreover, special controls are programmed into the computer that controls the hydrogen injection. The cognizant engineer stated that these controls are designed to prevent increased exposure either onsite or offsite. Team review of these calculations showed that doses may in fact be lowered.

The Training Department is developing a training program for the RP technicians to review the change in radiation levels that occur with operations. This program was developed to refresh the RP technicians because of the extended shutdown and the increased levels of radiation in the shielded areas resulting from the addition of hydrogen. The RP section manager stated that a condensed revision of these presentations will also be given to all maintenance and operations personnel prior to startup.

3.5.3 Conclusions

The Team determined that progress has been made, that adequate staff and management oversight is in-place to achieve further progress, and that performance is adequate to support plant startup.

Licensee strengths include a well-controlled and well-organized training program for general employees and RP technicians. The use of an RP Advisor in the Maintenance Section, which had been effective in improving working relationships, has led to further initiatives in training and control of contaminated tools. The addition of this position has also resulted in improved planning and control of work.

Notable progress was observed regarding upper management support and emphasis on ALARA. This attention is expected to result in improving levels of performance over the next few years. Staff development programs for all levels of personnel, from technicians through managers, should considerably improve their level of performance. Control of technical problems, such as the radiological impact of hydrogen water chemistry and calibration status of survey meters, has improved.

A weakness was observed as a result of the rotational assignment of RP technicians that may affect their proficiency in performing certain highly specialized jobs. An additional weakness concerns the perception of poor vertical communications between management and RP technicians and workers. Although this issue has led to some incomplete understanding of policies and some morale problems, it has not significantly affected safety performance.

Additionally, vertical communications within the RP organization appeared somewhat weak. The Team detected a perception on the part of technicians that they have not been adequately involved in the changes being made in the RP Department policies and procedures. This perception apparently has resulted from RP management not effectively communicating the bases for these changes to the staff. There is also a perception that RP management is remote and not easily accessible. However, the Team determined that, despite this weakness, the attitude and safety approach of the RP Department staff has significantly improved and is adequate to support plant operations.

The licensee advised that a training program is being developed to refresh RP technicians concerning the change in radiological conditions on plant startup and the unique conditions to be created by the addition of hydrogen. A condensed version of this training will be provided to other radiation workers. Completion of this effort will be reviewed in a future NRC inspection.

3.6 Security and Safeguards

3.6.1 Scope of Review

Prior to the plant shutdown in April 1986, NRC had identified serious concerns regarding the implementation and management support of the security program at Pilgrim. The licensee has been aggressively pursuing a comprehensive course of action to identify and correct the root causes of the programmatic weaknesses in physical security. The most recent SALP (50-293/87-99) covering the period February 1, 1987 to May 15, 1988, determined that the licensee has demonstrated a commitment to implement an effective security program. The licensee's security organization has been expanded with the addition of experienced personnel in key positions, significant capital resources have been expend i to upgrade security hardware, and equipment and progr.m plans have been improved.

During the IAT inspection, all phases of the security program, including management support, staffing, organization, and hardware maintenance, have been reviewed to assess the efiectiveness of the program implementation. The results of the review are described below in general terms to exclude any safeguards information.

3.6.2 Observations and Findings

3.6.2.1 Review of Security Program Upgrades

The Team reviewed the progress made to date on the security program improvements committed to by the licensee as a result of previous NRC enforcement action. The licensee was advised by the Team that progress on these improvements will continue to be monitored during future NRC inspections. Those commitments and their status are as follows.

Project	Status
Protected Area Perimeter	The upgrades of the perimeter barrier, intrusion detection system, and assessment aid system are complete.

Project	Status
Protected Area and Perimeter Lighting	Installation of upgraded lighting is approximately 95% complete. Four light stanchions remain to be installed. The lighting system as installed meets regulatory requirements.
Main and Alternate Access Control Points	The designs for the new (upgraded) access control points are complete and new package search equipment is on site. Installation of new package and personnel search equipment and full length turnstiles is scheduled for completion on September 28, 1988, in the site's main access point. Installation of new package search equipment in the site's alternate access point is also scheduled for September 28, 1988.
Vital Area Analysis	The vital area analysis, including walkdown of all vital areas to verify barrier integrity, and issuance of the report, is complete.
New Security Computer	The selection of the new computer has been made and a purchase order for the computer has been issued. The licensee is currently working with the vendor on software options. The delivery of the new computer is scheduled for the first quarter of 1989, with installation to follow.

3.6.2.2 Followup on Previously Unresolved Item

(Closed) Unresolved Item (50-293/87-44-01): Neighborhood checks for licensee employees being assigned to the site were not being consistently conducted as part of the access control program. The neighborhood checks were not a regulatory requirement and it is a licensee-identified issue. During this inspection, the Team verified that the licensee has conducted a review and identified all site personnel who had not been subjected to neighborhood checks. For those employees with less than three years of service with the licensee, neighborhood checks were subsequently conducted. For employees with more than three years with the company, a review of the personnel file was conducted and a memorandum was put into the file to indicate that the review was being made in lieu of the neighborhood check. The acceptability of this alternative to the neighborhood checks was reviewed by NRC prior to its implementation and was found satisfactory.

3.6.2.3 Security Plan and Implementing Procedures

The Team met with licensee representatives and discussed the NRC-approved Security Plan (the Plan). As a result of these discussions, and a review of the Plan and its implementing procedures, the Team found that the implementing procedures adequately addressed the Plan's commitments. In addition, all security personnel interviewed demonstrated familiarity with the Plan, implementing procedures, an NRC's security program performance objectives.

3.6.2.4 Management Effectiveness - Security Programs

An in-depth review of the licensees management effectiveness was conducted by NRC in April and May 1988 and documented in Inspection Report No. 50-293/88-18. During that inspection, the Team concluded that the licensee has continued with its initiatives and taken significant actions to further improve the effectiveness of the security organization. It was also concluded that the existing organization should provide the capability to monitor the program properly.

During its inspection, the Team independently concluded that there is a strong management team in place based on the experience of the expanded proprietary security organization, the effective interaction both between members of the security organization and with other departments, and the effective oversight of the contract security organization.

3.6.2.5 Security Organization

On August 16, 1988, at 10:00 p.m., the security contractor for PNPS was changed from Globe Security Systems to the Wackenhut Corporation. The Team reviewed the licensee's and the contractor's transition plans, and interviewed numerous management and union security personnel prior to the transition. Also, the Team was onsite during the transition for direct observations. The transition was somewhat simplified by the fact that all Globe employees that applied for positions were retained by Wackenhut. The Team determined that, because of comprehensive transition planning, the change in the contract security force was accomplished without any compromise of security and with minimal disruption to security operations.

3.6.2.6 Security Program Audit

The Team reviewed the monthly corporate audit reports. These audit reports were of good quality and were generated as a result of corporate oversight of the site security program. The findings in these reports were minor and not indicative of any major programmatic problems. The corrective actions were appropriate for the findings.

3.6.2.7 Records and Reports

The Team reviewed various security records, logs, and reports, including patrol logs, central alarm station (CAS) logs, visitor control logs, and testing and maintenance records. All records, logs, and reports reviewed were complete and maintained as committed to in the Plan.

3.6.2.8 Testing and Maintenance

The Team reviewed the testing and maintenance records and procedures. The review disclosed that the preventive maintenance procedures were comprehensive and that the licensee now has in-place a program that provides for prioritization of security maintenance by the security department. The maintenance support to the security department has improved as a result of the security department assigning priority to the maintenance work. The use of compensatory measures for inoperative equipment is minimal.

3.6.2.9 Locks, Keys and Combinations

The Team reviewed the installation, storage, rotation and related records for all locks, keys and combinations and determined that the licensee was meeting the commitments in the Plan and its implementing procedures.

3.6.2.10 Physical Barriers - Protected Areas

The Team physically inspected the protected area barriers. It was determined by observations that the barriers were installed and maintained as described in the Plan. Progress on upgrading the barriers is addressed in Section 3.6.2.1 of this section.

3.6.2.11 Physical Barriers - Vital Areas

The Team physically inspected the vital area barriers and determined that the barriers were installed and maintained as described in the Plan.

3.6.2.12 Security System Power Supply

The Team reviewed the security system power supply system and determined that it was in accordance with Plan requirements. The Team noted that as a result of the approval of a recent Plan revision, improvements for protecting the security power supply are underway, with work expected to be completed by September 28, 1988.

3.6.2.13 Lighting

The Team observed lighting within the protected area. All areas were lighted in accordance with commitments in the Plan. Progress on upgrading the lighting is addressed in Section 3.6.2.1.

3.6.2.14 Compensatory Measures

The Team reviewed the licensee's compensatory measures and determined that their use to be consistent with the commitments in the Plan. As a result of the security program upgrades addressed in Section 3.6.2.1, the need for compensatory measures for degraded security equipment has been dramatically reduced. Further reductions in the use of compensatory measures will occur as project upgrades are completed.

3.6.2.15 Assessment Aids

The Team reviewed the licensee's use of assessment aids and determined by observation that the assessment aids are installed, functioning and maintained as committed to in the Plan. Progress on upgrading the assessment aids is addressed in Section 3.6.2.1.

3.6.2.16 Access Control - Personnel and Packages

The Team reviewed the access control procedures for personnel and packages and determined that they are consistent with commitments in the Plan. This determination was made by observing personnel access processing during shift changes, visitor access processing, and by interviewing security personnel about package access procedures. The status of upgrades in the access control points is addressed in Section 3.6.2.1.

3.6.2.17 Access Control - Vehicles

The Team reviewed vehicle access control procedures and observed vehicle searches at the Main Vehicle Gate. It was determined that vehicle searches were being conducted consistent with commitments in the Plan.

3.6.2.18 Detection Aids - Protected Area

The Team observed penetration tests of approximately 25% of the licensee's intrusion detection system on August 17, 1988. The remaining 75% was not tested during this inspection; however, previous test records were reviewed and the records indicated that the system was operating as described in the Plan and implementing procedures.

3.6.2.19 Detection Aids - Vital Area

The Team observed the testing of intrusion detection aids in selected vital areas and determined that they were installed and functioning as committed to in the Plan.

3.6.2.20 Alarm Stations

The Team observed the operation of both the Central Alarm Station (CAS) and the Secondary Alarm Station (SAS) and found them to be in accordance with Plan commitments. During the previous inspection (50-293/88-16), a concern was identified that the licensee was diverting an alarm station monitor from security duty to respond to fire protection system and health physics alarms. During the IAT inspection, the Team noted improvements in that there is a marked decrease in the number of nuisance alarms, as a result of the removal of the fire door and health physics doors from the security alarm system.

3.6.2.21 Communications

The Team observed tests of all communication capabilities in both the CAS and the SAS. The Team also reviewed testing records for the various means of communications available to security force members and found them to be as committed to in the Plan.

3.6.2.22 Training and Qualification - General Requirements

The Team reviewed the licensee's Training and Qualification Plan and implementing procedures and determined that they were being implemented as committed to in the Plan.

3.6.2.23 Safeguards Contingency Plan Implementation Review

The Team reviewed the licensee's Contingency Plan and implementing procedures and determined that all exercises were being performed by the security organization as committed to in the Plan.

3.6.2.24 Protection of Safeguards Information

The Team reviewed the protection and handling procedures for Safeguards Information (SGI) and determined that the licensee had completed an inspection of each office onsite that handled and stored SGI. The inspection results indicated that the SGI assigned to each office was accounted for and was being stored in accordance with established licensee procedures.

3.6.3 Conclusions

A comprehensive review of the licensee's security program determined that the licensee has established and is implementing a significantly improved security program over that which existed when the station was shutdown in April 1986. Upgrades to the security program include a greatly expanded proprietary security organization, major installation of state-of-the-art equipment, improved security maintenance support, and upgrades to plans and procedures.

3.7 Training

3.7.1 Scope of Review

The Team assessed the scope, quality, and effectiveness of the licensee's training programs. Included in this review were the licensed and non-licensed operator training programs and the programs for technical and general training of the plant staff.

3.7.2 Observations and Findings

3.7.2.1 Operations Training

Operations Training Programs are outlined in PNPS Nuclear Training Manual, T-001, Part 3, and have received INPO accreditation. The Operations Training Programs include initial and requalification training for licensed operators, initial and continuing training for non-licensed operators, Shift Technical Advisor (STA) training, and SRO certification training. The Team reviewed these programs and discussed various aspects of the programs with members of the licensee's training and operation's staff. The Team reviewed eight Operator and Senior Reactor Operator training records to verify compliance with Section 3.5.5 of the Training Manual. To evaluate the effectiveness of the training programs, the Team observed classroom and simulator training; interviewed licensed operators and senior operators, non-licensed operators and STAs; reviewed several training evaluation and feedback forms from classroom and simulator training conducted during the current requalification cycle; and observed ongoing operations in the plant.

Overall, the Team determined that the Operations Training Programs are adequate and effective. Classroom and simulator training observed appeared to be effective. Instructor preparation was good and the lesson plan content was complete. During observations of classroom training for PDC 88-07 involving the degraded voltage modification, the Team noted that the depth of knowledge being presented was adequate and student participation was encouraged. After observing the conduct of the annual simulator operating exam, the Team noted improved communications

between members of the operating crew. In addition, the team noted the simulator examination was also being observed by licensee upper management. Discussions with training and operations personnel confirmed that strong upper management attention and support for all aspects of the licensed training programs is evident. Interviews with licensed operators indicated that overall they are very satisfied that training programs are well-suited to their needs, and that the programs are responsive to their feedback. Operators indicated that the training program has greatly improved over the past year with the incorporation of simulator training into the requalification program.

Discussions with Operations Training staff indicated sufficient staffing to conduct training programs. Thirteen instructors are currently receiving Senior Reactor Operator (SRO) certification training and are expected to be fully certified by the end of 1988. The use of experienced PNPS instructors instead of contractors for the operations training programs should enhance the quality of the licensee's programs as well as contribute to the depth of in-house operational expertise.

Recent additions to the licensed requalification program include the incorporation of Emergency Operating Procedure (EOP) proficiency training. This includes at least 4 hours devoted to EOP review in the classroom and/or simulator during each 32-hour segment of the program. (Each operator normally receives one segment of requalification training every five weeks.) Also, the exam structure at the end of each session has been modified to include written and simulator operating exams, which will aid the training staff in determining the effectiveness of the programs on a more frequent basis. In addition, the training staff appears to carefully track attendance in requalification training to assure that everyone required to attend is trained in each module of the requalification program.

The operation's training staff appears to have a very effective working relationship with the operations department. They meet to discuss training needs on a frequent basis. Through these meetings, the training department appears able to sufficiently track and schedule the licensed training either required or requested to be completed prior to restart. In addition, the operation's department often provided support during simulator examinations.

The Team reviewed the licensee's special training program for the sixteen licensed operators (14 RO's and 2 SRO's) who currently hold NRC licenses which are limited pending on-watch training during the Power Ascension Program. The Team discussed various aspects of the program with members of the licensee's training and operations staff. The Team noted that the licensee has established a structured and supervised program to assure completion of NRC requirements to allow removal of the individuals' license limitations. Following a discussion with the Team regarding plans for ensuring that each operator performs a sufficient number of reactivity manipulations, the licensee representative stated that an attachment to the special program would be added to further clarify what constitutes an acceptable manipulation.

The Team observed the operations department staff on four days of consecutive shift rotation. These observations verified the overall effectiveness of training. For example, on-shift communications, an area of emphasis in simulator training, was formal and effective. However, during a walk-through with an equipment operator (non-licensed) of EOP Satellite Procedure 5.3.26, the Team noted several discrepancies in the procedure. It also noted that the EO and an SRO misunderstood a step in the procedure. Upon investigation of these problems, the licensee determined that a decision to train only the EO's and not the licensed operators on the field portion of the satellite procedures contributed to the misunderstanding. These issues are discussed in detail in Section 3.2.4.

Additional Team followup of the problems found during the above-mentioned procedure walk-through identified a weakness in the licensee's method of determining the need for additional training on new procedures and procedure changes. The licensee's current method incorporates review of ORC meeting minutes to determine newly approved procedures or procedure changes requiring training. However, a delay of 30 to 45 days is not unusual between the meeting and the distribution of formal minutes. For example, Procedure 5.3.26 had been revised since equipment operator training was conducted in March and April 1988. The ORC meeting minutes which addressed this procedure change had not been received by the training department as of August 19, 1988, 42 days after the ORC meeting on July 6, 1988.

The Team discussed the issue with a licensee training department representative who stated that the department recognized this concern and was preparing to implement, in October 1988, a more timely method for determining the needed training.

During the inspection, the licensee committed to accelerate implementation of certain features of the improved program, such that the training department will become aware of procedure changes within approximately one day following the ORC meeting. This will allow the training staff the opportunity to review the procedure changes and determine the need for training prior to issuance of the approved procedure. If the training department determines that training is required prior to issuance of the procedure, the department will have the ability to delay the procedure issuance. The licensee representative stated that an internal work instruction detailing this process was being written and would be approved by ORC within about a week. In addition, the training staff will review their backlog of ORC meeting minutes to determine which procedure changes have not been addressed and will take appropriate action. These actions planned by the licensee appeared very responsive to the Team's concerns.

3.7.2.2 Technical and General Training

Nuclear Training Manual, T-001, Parts 4 and 5, outline the licensee's technical and general training programs. Included are training programs in maintenance, health physics, chemistry, fire brigade, emergency plan, supervision, and technical training for staff and managers. The Team reviewed these programs and discussed various aspects of them with members of the licensee's training, technical, and supervisory staff. To evaluate the effectiveness of the training programs, the Team observed classroom instruction; interviewed radiological controls and radiological chemistry (radchem) technicians, QA engineers and first-line supervision; reviewed classroom training evaluation and feedback forms; and observed ongoing work in the plant.

Overall, the licensee's training programs were found to be adequate. Classroom training observed appeared to be effective and student participation was strongly encouraged. In-house staffing for those training programs appeared more than sufficient. The following relatively new training programs are indicative of licensee initiatives to develop employee skills:

-- apprentice programs for maintenance, health physics, and rad chem technicians; and,

-- technical training for newly assigned supervisors.

Additional training programs currently being developed in industrial safety and safety awareness, along with the licensee's CPR program, show the licensee's positive attitude in those areas.

The Team's observations of work in the plant during this inspection verified the overall training effectiveness. However, inadequacies in maintenance post-work testing appeared to be the result of lack of training for the maintenance planning group and first-line supervisors on the post-work testing portion of the new maintenance program (See Section 3.3.2.6).

3.7.3 Conclusions

The licensee's training programs appear to be very good. Team findings in all functional areas indicated overall effectiveness of the training implemented. Examples of areas where training may have needed to be conducted sooner include EOP satellite procedures and the post-work testing program. A weakness was identified in the licensee's method of determining training needed for new procedures and procedure changes.

The licensee appears to have made a strong commitment in the area of licensed operator training, as exemplified by increased staffing, simulator use in requalification training, strong interface between training and operations management, and increased attention and support from upper management. In addition, the creation of new programs for supervisors and apprentices reflects an effort by the licensee to effectively promote employee development.

3.8 Fire Protection

3.8.1 Scope of Review

The Team's evaluation of the fire protection program focused on the maintenance of fire protection equipment, the reliance on compensatory measures for degraded equipment, and the performance of personnel on the fire brigade and standing fire watches.

3.8.2 Observations and Findings

Licensee senior management established a station goal of reducing the number of open fire protection corrective maintenance requests (MR's) to 40 from a high of 300. This goal was reached in June 1988. This reduction is indicative of the overall improvement of the material condition of fire protection equipment and systems. The number of MR's began climbing two weeks before the IAT inspection, and reached 63 during the second week of this inspection. The increase was mainly for low-priority MR's.

Fire protection MR's are tracked as a station performance indicator and this increasing trend received prompt senior management attention. The licensee is currently contracting to bring in additional fire protection maintenance support by the end of August 1988. The fire protection manager meets daily with operations, maintenance and planning sections to schedule MR's and develop the station's work plan. The Team concluded that the licensee is giving proper management attention to fire protection MR's.

There are over 5,000 fire barrier penetration seals at PNPS. The licensee's tagging system has been effective in identifying these penetrations, with no untagged penetrations or degraded penetration seals observed by the Team.

The number of fire watch postings has been reduced from 145 a year ago to 45 prior to this inspection. Fifteen of these remaining postings will be eliminated by changes to the fire protection program which are currently being reviewed by NRC. Another twelve will be eliminated when the licensee completes Engineering Services Request (ESR) 88-339, "Alarm delays on non-vital CAS alarms." This ESR will provide a means to electronically monitor fire doors without undue distraction of security personnel from their primary function. The remaining 18 fire watch postings are due to degraded equipment for which repairs are currently being planned.

Because TS's allow one individual to rove and cover more than one fire watch posting, the number of people on shift committed to fire watch activities is substantially lower than 45. Two personnel per shift are assigned to cover these fire watches. In discussions with the Team, the fire watches appeared knowledgeable about their duties. The Team reviewed several fire watch postings in the plant and identified no concerns. All fire watch rounds were completed on schedule.

The Team observed the on-shift fire brigade respond to an unannounced fire drill. The drill scenario was a simulated main transformer fire with a concurrent failure of the deluge system. The brigade leader developed a successful fire fighting strategy. The brigade members responded promptly in full fire fighting gear. Communications between the brigade and the control room appeared to be adequate. The fire brigade's first-line supervisors observed the drill on their own initiative. The fire protection training instructor was also found to be knowledgeable and enthusiastic about the training program.

3.8.3 Conclusions

Effective management by the fire protection manager and support by senior management are shown by the attention given to the material condition of fire protection equipment and reduced reliance on compensatory measures for degraded equipment. Completion of licensing actions and an ESR will further reduce the number of fire watch postings. There is good identification and control of fire barriers. Personnel assigned fire watch and fire brigade duties are knowledgeable about their duties and perform them properly. The fire protection division is well staffed to meet program needs.

3.9 Engineering Support

3.9.1 Scope of Review

NRC found licensee engineering support to be strong in the past two SALP reports. Because of this history of good performance, engineering support was not selected as a specific area of focus for this inspection. Instead, observations relative to engineering support were made by the Team while it inspected the other functional areas.

3.9.2 Observations and Findings

The Team found that engineering support to the facility is generally very effective. In particular, the Systems Engineering Division functions well to meet plant needs. Also, engineering support to maintenance has improved and is enhanced by the improved maintenance work process and the effective performance of the maintenance engineers.

The Team noted that a number of technical issues, including some NRC open items, as well as licensee-identified items, require NED resolution before plant restart. They are being tracked and pursued for resolution by NED.

During tours of the control room, the Team noted the minimal use of certain human engineering features, such as color-codes, meter "banding" (e.g., marking of normal, alert, and fail positions on meter and gauge faces), and system lineup memory aids. Based on discussions with NED personnel, the Team determined that the licensee performed a detailed control room design review (DCRDR) and received comments on it from the NRC Office of Nuclear Reactor Regulation. A supplemental licensee DCRDR report is required four months after the end of the current outage.

Currently, the licensee's DCRDR project has identified about 140 proposed human engineering improvements which are being evaluated and prioritized. A few were incorporated into design changes this outage. The Team noted that some of the remaining improvements were relatively simple, from an engineering perspective, but could significantly enhance control room human factors. The Team asked whether implementation of some of these items could be accelerated relative to the other, more complex items which may require more detailed engineering and a plant outage to install.

The licensee indicated that these simple improvements, categorized by the licensee as "Paint-Label-Tape," are included in the current 1989 budget. The licensee also committed to evaluate control room human factors during the Power Ascension Program and to include an update regarding the schedule and scope of these "Paint-Label-Tape" items in their report to NRC at the completion of the Power Ascension Program. The licensee was very responsive on this issue. The Team noted that (1) licensee personnel have performed well in the simulator under NRC observation, and (2) there has not been any pattern of performance problems traceable to control room human factors. Thus, the Team concluded that the licensee's approach to this issue is acceptable.

The Team reviewed the licensee's program for the control of transient materials. This review included the licensee's methods for identifying, tracking and removing non-permanent equipment such as tools, gas bottles, and scaffolding located in plant areas where safety-related equipment is housed. The licensee currently assigns responsibility in this area to the Systems Engineering Group (SEG). Station Instruction SI-SG.1010, "Systems Group Systems Walkdown and Area Inspection Guidelines," details the licensee's program for controlling transient materials. Materials so identified during weekly walkdowns by system engineers are documented and are either removed or their presence justified in writing. If the material is allowed to remain in the process building, a seismic missile hazard analysis is performed under Station Instruction SI-SG.1015, "Potential Seismic Missile Hazard," and appropriate measures are implemented to ensure that the materials are properly secured. The licensee is compiling a data base which identifies transient materials which must be removed prior to startup. The program appears to be comprehensive and adequate.

During plant tours, the Team questioned the licensee concerning the installation of splash shields and personnel barriers in the areas of safety-related instrumentation. Specifically, the Team questioned the seismic response of the structures and the effect they may have on safety-related structures.

The fire water spray shield was installed during the current outage. This plant design change was processed under current licensee procedures which require a seismic response analysis prior to modification approval. Personnel barriers installed during the mid-1970's recently had seismic analyses performed on their current configurations. These analyses found them satisfactory.

Based on this information and on a review of licensee documentation, the Team had no further questions.

3.9.3 Conclusions

The Team concluded that engineering support continues to be effective and identified no weaknesses. The licensee has committed to evaluate potential near-term improvements in control room human engineering during power ascension testing.

3.10 Safety Assessment/Quality Verification

3.10.1 Scope of Review

The objective of this inspection was to evaluate the effectiveness of the licensee's [illegible] assessment programs. The inspection focused on determining whether these programs contribute to the prevention of problems by monitoring and evaluating plant performance, providing assessments and findings, and communicating and following up on corrective action recommendations. The inspection consisted of a documentation review, personnel interviews, and observations of meetings and work.

3.10.2 Nuclear Safety Review and Audit Committee

The Nuclear Safety Review and Audit Committee (NSRAC) is an independent body responsible for performing senior-management-directed reviews of activities affecting nuclear safety. The NSRAC reports to the Senior Vice President - Nuclear (SVP-N). Membership on the committee is composed of senior licensee management personnel augmented by consultants.

The Team reviewed the NSRAC procedures manual, Technical Specification 6.5.B, meeting minutes, audit reports, and associated NSRAC reports and correspondence. The Team also attended a full NSRAC meeting at the station on August 2, 1988.

A review of the committee meeting minutes for the period between January 1987 and June 1988 verified that Technical Specification requirements have been met with respect to the composition, duties, meeting frequencies, and responsibilities of the committee. The composition and charter of the committee was significantly revised in February 1988.

The selection process for members was designed to assure a broad-based, independent review of facility activities and to minimize the potential for cost and schedule pressures to influence the committee's reviews and findings. The current committee is made up of ten members appointed by the SVP-N Of the ten members, five are consultants, including the Committee Chairman. Only two members of the committee hold line responsibility for operation of the plant. Only one member, also a consultant, belonged a year ago. To enhance the perspective of the new members, the licensee implemented an annual training program. The Team was provided with a matrix indicating the experience of

current committee members relative to Technical Specification requirements and verified the committee collectively possesses a broad based level of experience and competence. The committee charter, as detailed in NSRAC Procedure 101-1, also does not allow the use of alternate members, although these are allowed by the Technical Specifications. After a review of recent membership changes, and discussions with the NSRAC Coordinator, the Team verified that the collective competence of the committee membership has been maintained as changes were made.

NSRAC currently conducts meetings approximately once a month. Since the beginning of 1988, seven meetings have been conducted, six of which were held at the site. This is significantly more than the once-per-six-months minimum required by the Technical Specifications. Three additional meetings are scheduled for 1988. In addition, individual subcommittees may hold additional meetings at the site. NSRAC also intends to meet at the site in September with several key members of station management to review restart preparations and plans to provide its own independent recommendations for restart readiness.

NSRAC uses subcommittees effectively to review specific areas of interest. Currently, six subcommittees are established: (1) safety evaluations; (2) operations/maintenance; (3) training/security/fire protection; (4) radiation control/chemistry/emergency preparedness; (5) quality overview; and, (6) engineering/technical. Each subcommittee is chaired by a NSRAC member, and is composed of additional personnel appointed by the committee. The subcommittees provide reports to the full committee during their scheduled meetings. The subcommittees are especially useful in performing documentation review to allow more time for open discussions at the meetings.

A stronger NSRAC involvement in station activities is evident not only in the recent site meetings and effective use of subcommittees, but also in scheduled site tours and audit participation. The NSRAC has established a schedule for individual committee members to perform station tours and report the results to the full committee. NSRAC has also designated individual members to participate in selected QA audits throughout the year.

The Team reviewed selected audits conducted under the cognizance of NSRAC, which are required by Technical Specifications. The audits reviewed were thorough, timely, and the noted deficiencies have been corrected or are being tracked. The audit reports reviewed included a third party assessment of the adequacy of the QA program, and QA audits

of Technical Specifications, administrative controls, operations, chemistry, radiation protection, and inservice testing. In addition, special audits were recently conducted concerning shutdown from outside the control room, the salt service water system, and NSRAC activities.

The current committee has an effective formal tracking system for all "concerns" forwarded to management and committee followup items. The "concerns" reviewed were clearly transmitted to the SVP-N. However, review of recent meeting minutes by NRC revealed that a number of "recommendations" had been forwarded to the SVP-N, but a formal response had not been received. The committee also did not formally track resolution of these recommendations. Further investigation by the NSRAC Coordinator determined that although the items had not been tracked, the specific recommendations had been implemented, or were incorporated into another corrective action process.

During NSRAC Meeting 88-04, conducted on May 24, 1988, the Operations and Maintenance Subcommittee presented a report on the conduct of the Operations Review Committee (ORC). NSRAC raised concerns over whether the ORC was fully meeting the intent of its duties required in the Technical Specifications. The report identified four specific findings of deficiency. They included:

- Inadequate method of reviewing changes to safety-related procedures;

- Lack of ORC-prepared reports resulting from ORC investigation of a Technical Specifications violations;

- Lack of specific review and reports of facility operations by ORC; and,

- Lack of formality in the conduct of ORC meetings.

After the discussion, NSRAC concurred that the ORC performance issues should be formally raised as a concern to the SVP-N. The NSRAC concern (88-04-01) was transmitted to the SVP-N on May 27, 1988. The concern stated that NSRAC's overall assessment was that ORC's conduct and administration needed substantial improvement. Specifically, the concern stated that the established process did not appear to foster adequate depth and discipline for substantive independent reviews. In addition, NSRAC noted that of the 40 meetings conducted in 1988 prior to the review, neither the Station Director nor the Plant Manager had attended, based on its review of the meeting minutes.

The NSRAC concern was responded to on June 22, 1988. In response, the Station Director initiated revisions to the ORC Charter and Procedure 1.3.4, "Procedures," to accurately describe the specific methods by which ORC met the procedure and operations review requirements. In addition, the Station Director attended an ORC meeting on June 22, 1988, and is considering additional initiatives to improve the conduct and administration of ORC activities. NSRAC closed the concern at the August 2, 1988 meeting, but initiated a followup item to continue to monitor ORC performance. In addition, NSRAC members were encouraged to attend ORC meetings as observers. NRC's review of ORC performance identified similar deficiencies and concluded that additional actions to strengthen some ORC functions were warranted (See Section 3.10.3).

Based on meeting attendance and review of recent meeting minutes, the Team noted that the NSRAC reviews have been thorough and focused on improving performance in areas important to safety. During the August 2, 1988 NSRAC meeting, the Team noted that the discussions were frank and open, with the reviews concentrated on recurring and emerging issues. The areas of emphasis have included 50.59 reviews, ORC performance, corrective action programs, procedure adequacy, and management depth.

Due to the limited number of "concerns" issued by NSRAC since revision of the committee in February 1988, the Team could not reach a conclusion on the responsiveness of the station organization to NSRAC. It appears at least in one case pertaining to ORC performance, that the response was not comprehensive. However, all other "concerns" reviewed were responded to adequately.

3.10.3 Operations Review Committee

The function, composition, and responsibilities of the Operations Review Committee (ORC) are described in PNPS Technical Specification 6.5.A. In addition, PNPS Procedure 1.2.1, "Operations Review Committee," describes in greater detail the authority and responsibility of the ORC at the Pilgrim Station. For this inspection, the Team reviewed the minutes of ORC meetings 88-40 through 88-63 (April 1, 1988 through July 5, 1988) and observed the conduct of three regularly scheduled and two special ORC meetings (ORC Meetings 88-80, 81, 82, 83 and 86). In addition, the Team interviewed various ORC members and alternates.

The inspection focused on whether ORC operations satisfied current Technical Specification requirements; whether the ORC was meeting its responsibilities identified in PNPS Procedure 1.2.1, and whether the ORC was responsive to recommendations for improvements identified during NSRAC and QA audits of its operations.

3.10.3.1 Compliance with Technical Specifications and Procedures

By reviewing existing documentation, and through direct observation of ORC meetings, the Team has determined that the Technical Specification requirements for the ORC composition, quorum, meeting frequency, authority, and records are being satisfied. During the period reviewed, the Team noted that the ORC reviewed plant procedure changes, plant design changes (PDCs), Field Revision Notices (FRNs), and Licensee Event Reports (LERs), as well as proposed revisions to the security plan, to the inservice inspection program, to the emergency plan and to fire protection program implementing procedures. The ORC members and alternates are appointed by memorandum from the Station Director and cannot serve on the committee until they have successfully completed the station ORC training course. There is also a required reading review program used by the Training Department as a retraining program for ORC members and alternates. The Team reviewed the training course material and determined that it had an appropriate emphasis on assuring safe operation as well as on regulatory requirements.

The ORC at Pilgrim Station has been meeting regularly every Wednesday and has a scheduled "special" meeting every Friday on an as-needed basis. The ORC met an average of about twice a week, which is well above Technical Specification requirements.

While there was evidence in the minutes of discussions about LERs, PDCs or FRNs, the preponderence of the minutes described changes to procedures. The Team saw no reference of ORC reviews of Failure and Malfunction Reports. The ORC has a system for following issues identified during discussions which requires a formal response to the ORC and a review of the response by the ORC to assure that the response resolved the initial concerns.

The Team reviewed the closeout process for ORC followup items and determined that, in one case, an item (88-58-01) may have been closed prematurely. During a discussion among the Team, the ORC Chairman, the Design Section Manager, and the Construction Division Manager, the ORC Chairman agreed that the item should be reopened for additional review. During ORC Meeting 88-82, the item was reopened.

By observing the ORC, the Team concluded that the committee members and alternates are concerned with assuring the safe operation of the facility. Discussions focused on the impact of items on safety systems, as well as whether the items being discussed met regulatory requirements or constituted unreviewed safety questions. The Station Director also attended one of the regularly scheduled ORC meetings during the inspection period.

- During its review, the Team identified two weaknesses in the operation of the ORC. They are the Technical Specification (TS) review of plant operations (T.S. 6.5.A.6.e) and the TS requirement to investigate violations and prepare a report covering the evaluation and recommendations to prevent a recurrence (T.S. 6.5.A.6.i). TS 6.5.A.6.e states that the ORC is responsible for the review of facility operations to detect potential safety hazards while TS 6.5.A.6.i states that the ORC is responsible for investigating all TS violations and for preparing a report covering the evaluation and recommendations to prevent a recurrence.

  The Team noted that ORC routinely uses the review of LERs and Failure and Malfunction Reports (F&MRs) to satisfy the TS required review of plant operations and TS violations. The Team also noted that the ORC has appointed the Compliance Division as a subcommittee to the ORC and assigned it the responsibility of presenting selected Failure and Malfunction Reports as well as the preparation of all LERs, including any

involving TS violations. Copies of all LERs are provided to the ORC as a means of satisfying the TS requirements. Further, PNPS Procedure 1.2.1 permits the ORC Chairman to set the timeliness of subcommittee reports to the full ORC.

While the use of subcommittees to support ORC activities is acceptable, the Team believes that the method used by ORC in fulfilling its responsibilities as defined by TS 6.5.A.6.e and i needs improvement. In particular, the Compliance Division has been issuing all LERs, including those discussing TS violations, prior to any ORC review of the product prepared. A review of 10 LERs disclosed that ORC review of the LER occurs usually a week to two weeks after the LER was formally sent to the NRC. While this may satisfy the timeliness requirements of PNPS Procedure 1 2.1, it does not appear that the corrective actions proposed to prevent recurrence receives the full benefit of a timely multi-disciplinary review, as is intended by the composition and responsibilities of the ORC. The formal release of the LER involving a TS violation by the ORC subcommittee without a formal review by the complete ORC is a weakness in meeting the requirements of TS 6.5.A.6.i.

During a review of F&MRs, which had not yet been reviewed by ORC, the Team noted that F&MR 86-266, which discussed a TS violation, had not yet been reviewed by ORC.

In this case, the violation was against an administrative requirement in TS Section 6.8, and was not reportable as an LER. Therefore, the F&MR did not result in an LER or a special report. The event occurred in September 1986, and no reports have yet been submitted to ORC as required by the TS. The licensee stated that the F&MR was still open pending completion of the remaining corrective action, and that then a report would be issued.

Both of these findings indicate that the ORC is not actively participating in the timely review of plant operations and does not appear to provide meaningful input into the process.

3.10.3.2 Responsiveness to Audit Recommendations

The Team reviewed both quality assurance (QA) audit findings and NSRAC recommendations to determine ORC responsiveness to recommendations for improvements to its operations. In QA Audit Report 87-37, QA listed two recommendations accepted by the ORC. PNPS Procedure 1.2.1 was reviewed and the Team determined that PNPS Procedure 1.2.1, Revision 21, contained the QA recommendations. The ORC was also audited by QA from May 22 through June 22, 1988. The audit generated one recommendation concerning the cross-referencing of ORC meetings with document references. Based upon discussions between the QA auditor and the Team, ORC has also accepted this recommendation.

In May 1988, the ORC received a list of four concerns from NSRAC based upon an audit review of the ORC. While the nature of the specific concerns are discussed in detail in Section 3.10.3 above, they are summarized here. Specifically, the NSRAC expressed concerns about the following areas: (1) the ORC review of changes to safety-related procedures, (2) ORC investigation of TS violations, (3) ORC review of facility operations, and (4) conduct of ORC meetings.

The concerns related to the ORC's investigation of TS violations and its review of plant operations are paralleled by the Team's findings discussed in Section 3.10.3.1 above.

The NSRAC concern with ORC procedure reviews is being evaluated for long-term improvements but no definitive action is currently planned by the licensee. As for NSRAC concern #4, the meetings observed by the Team, were conducted in a manner permitting formal and informal discussions of specific issues. A meeting agenda for regular ORC meetings was prepared and followed. The Team concluded that the meetings were conducted acceptably.

Based on the above, the Team has determined that, in general, the ORC has been receptive to recommendations for improvement. However, the fact that the NSRAC concerns remain unresolved suggests that the ORC may have difficulty addressing more complex recommendations.

The Team also observed that the quality of the meeting minutes could be improved by providing more discussion of the issues by the various ORC members as opposed to providing abstracts of the documents discussed.

Based upon a review of the ORC activities, the Team determined that there are weaknesses in the implementation of responsibilities assigned to the ORC. In particular, the Team determined that weaknesses exist in the review of plant operations and the investigation of TS violations. The Team has concluded that improvements in these two specific areas would result in a more effective ORC. In response to the Team's concerns, the licensee agreed to take certain actions prior to restart to strengthen the operational focus of ORC. These actions are: (1) to review plant incident critiques; (2) to review LER's prior to their submittal to NRC; (3) to review F&MR's on a regular basis; and, (4) to provide for a monthly presentation and discussion of plant operations as a specific agenda item. The Team found these licensee commitments responsive to its concerns.

3.10.4 Quality Assurance Audit and Surveillance Programs

The Team reviewed selected QA audit and surveillance reports, selecting specific findings, discrepancies, and observations for followup of the licensee's corrective action process. QA personnel, including the QA Department (QAD) manager, and other station managers and engineers, were interviewed regarding the audit and surveillance program objectives and overall conclusions which can be drawn from the audit and surveillance findings. The Team also reviewed the quarterly QAD Trend Analysis report, and attended several QA interface meetings. Portions of the Boston Edison Company Quality Assurance Manual (BEQAM) and applicable station procedures were also reviewed.

The technical content and quality of the issues raised in the selected audit reports were excellent. The conduct of a performance-based radiological controls audit by outside consultants was noteworthy. Specifically, the Team reviewed audits required under the cognizance of NSRAC, in accordance with the TS, and found that they are being performed as required. The Team determined that all deficiencies identified in the audits were either closed or adequately tracked by a formal system.

During the conduct of audits and surveillances, deficiency reports (DR) are issued by QA for conditions contrary to management policies and procedures, regulatory requirements, or licensee commitments. A DR which reports a deficiency identified during a QA audit is issued at the time of the audit exit interview. The licensee has an effective system of requiring a written response to the DR within a specified period, dependent on its significance, and for subsequent followup of corrective action. A system also exists for granting extensions through an escalation process to upper management.

QA prepares a monthly status report, including DR status, which is forwarded to senior management for appropriate actions. Review of the most recent QA trend report indicated a decline in the DR backlog, an increase in the number of DR's completed on time, and few extensions needed for DR closeout. The number of deficiencies reported by QA remained fairly constant. These are all indicators that licensee management attention to the corrective action process has had a positive impact.

The licensee also effectively trends Immediate Corrective Actions (ICA), which are identified in audit and surveillance reports. These report conditions which could lead to a DR, but which are corrected prior to the end of the audit or surveillance. They also are tracked along with the DR's. The Team also found the tracking of recommendations from the audits and surveillances to be effective.

Approximately 45 QA surveillance reports concerning observations of surveillance testing were reviewed. The reports were well planned, well documented, and thorough. Again, the tracking and followup of identified deficiencies were adequate. A minor concern of the Team involved QA followup to identified procedural inadequacies during surveillances. In ten of the surveillance activites reviewed by NRC, technical procedure deficiencies were identified by QA, but since the technicians being observed halted the test and pursued a procedure change, no deficiency reports were issued. Further review found that the majority of the procedure deficiencies were identified prior to implementation of new procedure validation program, and that QAD has an open DR on the procedure validation process. QAD is continuing to monitor the process. The Team had no further concerns.

Two QA Interface meetings were attended during the inspection. The meeting attendees include representatives from QA, plant staff, and engineering. They meet weekly to review the status of various corrective action items, including DR's, Management Corrective Action Requests (MCARs) and Potential Conditions Adverse to Quality Reports (PCAQ's). The meetings have improved communications among the organizations and have contributed to the more timely resolution of corrective action items.

3.10.5 Corrective Action Process and Program

The Team reviewed the licensee's programs currently in place to identify, follow, and correct safety-related problems. A newly formulated Corrective Action Program "Clearinghouse," and proposed revisions to corrective action process procedures were also evaluated with respect to the current objectives and planned initiatives to improve corrective action program effectiveness. Samples were chosen from each of the programmatic areas where problem identification is routine and implementation of corrective measures is required. Each of these programs is discussed below. The Team interviewed licensee personnel responsible for individual program management and implementation, as well as the technical personnel accountable for problem disposition and corrective action adequacy.

For all of the areas evaluated, the Team sought to determine the effectiveness of the licensee's process for root cause analysis of problems, investigation of problems and causes for their generic applicability, and trending of findings to prevent their recurrence. Selected issues were analyzed to understand the technical problems, check how they were programmatically handled, and to determine whether the corrective measures were appropriate to the specific cases. The examples are cited in the following subparagraphs not only to illustrate the scope of licensee activities inspected, but also to support the conclusions reached regarding the corrective action program effectiveness.

3.10.5.1 Failure and Malfunction Reports

The Failure and Malfunction Report (F&MR) is a process by which failures, malfunctions, and abnormal operating events are reported, evaluated and corrected to preclude repetition. The process is described in: Nuclear Organization

Procedure (NOP) 8305, the "Failure and Malfunction Report Process;" PNPS Procedure Number 1.3.24, "Failure and Malfunction Reports;" and PNPS Work Instruction N8-3.2.12, "F&MR Trend Analysis."

Team review of licensee procedures verified that responsibilities are established for the F&MR process; reports are prioritized by safety significance; underlying root causes are evaluated; reports are tracked for completion of corrective action; and, trending for repetitive problems is performed. A report may be initiated by any licensee staff member for failures, malfunctions, and abnormal operating events identified during station operation. The Nuclear Watch Engineer ensures that adequate compensatory measures are implemented and the required notifications are performed. The Compliance Division Manager then recommends a lead group to perform the investigation and performs a reportability review. The appropriate department manager is responsible to ensure that the identified deviations are properly resolved and that corrective actions are planned and effectively implemented in a timely manner. The department manager is also responsible for the review and approval of the reportability, root cause analysis, corrective action plans, disposition, and final closeout. A root cause analysis is performed for those F&MR's determined to be significant. The term "significant" applies to a condition adverse to quality which merits further evaluation for cause and requires management attention to preclude recurrence. The nonsignificant deviations are evaluated in a periodic trend analysis.

The Team identified several discrepancies in the administration of the F&MR process. Procedure 1.3.24 states that the Compliance Division Manager is responsible to present F&MR's that are designated significant or important to ORC. As discussed in Section 3.10.2, the Team noted that the ORC meeting minutes for the previous six months did not record the review of any F&MR's. Further Team review found that a backlog of over

existed, and that no F&MRs had been submitted to ORC since February 3, 1988, except for those associated with an LER. Some of the F&MR's involved events which occurred in 1986. The licensee stated this was caused by personnel resource constraints. The Team also found two closed F&MR's which appeared to meet the criteria established in Procedure 1.3.24 for being submitted to ORC, but which had not been submitted prior to closure. F&MR's 88-127 and 88-76 were not reviewed by ORC, but involved recurring conditions, which is a criterion for ORC review. In addition, many of the closed safety-related F&MRs were denoted not safety-related by the Watch Engineer during the initial review process. This mis-classification; however, did not affect the processing and evaluation of the associated events for those F&MR's inspected.

The Team reviewed a listing of open and closed F&MR's and evaluated a sampling of closed reports to determine the completeness and effectiveness of the corrective actions. The total number of F&MR's initiated has been increasing over the last few years. The licensee has attributed this increase to a heightened sensitivity of personnel to critical self-assessment and to the identification of potentially reportable or significant events to management. The total number of open F&MR's has significantly decreased over the last year.

The root cause analyses performed for the F&MR's reviewed were found to be of excellent quality. Each analysis included an event description, probable cause, actions completed, recommended actions, and safety significance. The Systems Engineering Group's impact on this important process has been positive.

The Team reviewed the latest F&MR Trend Analysis Report, which covered the period July through December 1987, and the applicable procedures. The Team noted that the station's Technical Sections did not specifically assign responsibility for the report's proposed recommendations. Further review found that this program deficiency had been previously identified by the licensee and the NRC and that the licensee had initiated corrective action. Specifically, a review of all previous trend report recommendations was performed by the licensee to determine their status.

The review was completed in July 1988, and 74% of the recommendations were corrected. The remaining items are currently being dispositioned by the licensee to ensure effective long-term corrective action. In addition, the licensee has revised the F&MR procedures to include use of the Management Corrective Action Report (MCAR) as a vehicle for the Technical Section to report and correct negative trends identified in the reports. The most recent trend report resulted in the issuance of two MCAR's, which the Team reviewed.

The Team also noted that the trend report focused its discussions primarily on individual problems rather than trend patterns and recurring failures. The Team observed that the Technical Section would be more effective if it thoroughly evaluated trends and patterns, since the individual F&MR itself is adequate to evaluate isolated problems. In addition, the report did not provide any detailed discussion of personnel errors or procedural failures, although there were a large number in the report.

3.10.5.2 Potential Conditions Adverse to Quality

As described by PNPS Nuclear Organization Procedure (NOP) 83A9, "Management Corrective Action Process," the potential conditions adverse to quality (PCAQ) report can be used by any licensee member to document and report any actual or suspected conditions adverse to quality not reported by other report forms such as NCRs, DRs, and F&MRs. In short, it is a process for anyone to elevate a concern to management to assure that the concern will be evaluated and resolved.

As implemented, PCAQs are written from one department to another or from one section to another within a department. For example, Operations (NOD) could send a PCAQ to Engineering (NED) asking for an evaluation of a specific plant condition. In each case, the originating department is responsible for tracking each item to resolution. According to NOP 83A9, a PCAQ is not formally closed until the originating department is satisfied with the proposed corrective action and the corrective action has been implemented.

The Team reviewed a listing of open and closed PCAQ's and also reviewed a sampling of individual PCAQ's to determine the completeness and effectiveness of corrective actions. As of August 19, 1988, there were about 250 PCAQs awaiting resolution. There is currently no central tracking system for all PCAQs, although licensee management has begun initiatives in that area. In June 1988, the licensee began an effort to reduce the number of open PCAQ's and to establish a central tracking system for PCAQ's with the QAD. As part of this effort, each department is reviewing unresolved PCAQ's to evaluate each one's significance and its potential impact on restart. Based on discussions with responsible managers, the Team learned that QAD has completed its review and concluded that none of the unresolved PCAQ's concern equipment operability issues or are of a significance level that requires action before restart. NOD has not completed its evaluation but expects to be finished within two weeks. NED has been implementing a routine review of each unresolved PCAQ and has been maintaining a list of PCAQ's needed to be resolved prior to restart. The review of outstanding PCAQ's is an item on the restart checklist maintained by the plant. Subsequent checklist review by ORC also provides a decision point in the process to assure that all necessary evaluations have been completed.

Based on the above, the Team has concluded that the licensee is assuring that each PCAQ is being evaluated for its nuclear safety and equipment operability impact relative to the planned restart of the plant and that all PCAQ's needed for resolution before restart will be identified. The ORC review of the PCAQ's on the restart checklist will provide another check to assure that resolution of PCAQ's needed for restart has occurred.

The Team selected several closed PCAQ's to determine whether the proposed corrective action had satisfied the originating department's concerns and whether the corrective action was completed as required by station procedures. In general, all identified corrective actions described on the PCAQ's were completed; however, the documentation of the completed activity was, in many cases, limited and specific references were not provided. The Team stated that additional guidance on the level of documentation to be provided on the closeout portion of the PCAQ form could enhance clarity and auditability of the closure process. The Team also noted that the PCAQ system can allow ambiguity of PCAQ status in cases where a proposed action has been rejected by the originating office. For example, NED rejected the response prepared by NOD to PCAQ NED-88-087. A review of the NOD log showed the issue resolved (July 22, 1988), but further investigation with persons affected indicated that the response was being rewritten and further corrective action was to be performed. The formal closeout process and status tracking for the PCAQ's needs improvement. This finding parallels a similar finding of the QA Department contained in QAD 88-609, dated May 23, 1988.

3.10.5.3 Management Corrective Action Request

The BEQAM and NOP 83A9, "Management Corrective Action Process," describe the purpose of the Management Corrective Action Request (MCAR). The MCAR is a two-part corrective action document used to: (1) perform a root cause analysis of significant conditions adverse to quality and develop preventive action plans; and (2) request management to implement selected action plans to prevent recurrence of a problem. In lieu of a Deficiency Report, an MCAR may be used to report and resolve deficiencies involving process or policy issues which affect more than one department and for which management attention and direction is required. An MCAR may also be used for tracking long-term corrective actions related to nonconformance reports (NCRs) and PCAQ's or for identification of adverse trends identified through trend analysis programs.

QAD is assigned administrative control for the MCAR process. QAD logs the status, distributes copies, reports on delinquent MCAR's, and performs the closeout. QAD also reviews each MCAR where the responsible department is different from the issuing department to verify that the assignment of the responsible department is appropriate.

The Team reviewed the current status of open MCAR's and the administrative controls in place to track and promptly resolve MCAR's. The latest monthly status report, issued to the SVP-N on August 1, 1988, from the QAD Manager listed 30 open MCAR's. This list included two 1985 MCAR's and eight 1986 MCAR's. Approximately 40% of the MCAR's initiated since 1984 remain open.

The licensee has previously observed that increased management attention is required to close out MCAR's in a timely manner. For example, the most recent QAD trend analysis report, issued on May 23, 1988, recommended that the SVP-N initiate action to closeout MCAR's QAD 85-2 and QAD 87-2, which address the large number of quality problem reports issued for "failure to follow procedures" and "inadequate procedures."

Team attendance at several QA Interface meetings also noted that there is clearly increased management attention being directed to closeout the longstanding MCAR's.

The Team reviewed two open MCAR's to evaluate the effectiveness of the process. MCAR 86-06, issued in November 1986, involved recurring failures of the salt service water (SSW) pumps. The MCAR was issued as a result of an F&MR trend report finding. The MCAR resulted in a detailed root cause analysis by a consultant and the development of a long-term corrective action plan, which is not yet complete. MCAR 88-02, issued in June 1988, concerned programmatic inefficiencies in the PCAQ process. The licensee is actively working on developing an integrated list of the approximately 250 open PCAQ's with a current status (see Section 3.10.4.2). This list is to be utilized to increase emphasis on closeouts. Review of these MCAR's did not identify any discrepancies in the process.

3.10.5.4 Clearinghouse Process

The current procedure describing the corrective action process is NOP 83A9, "Management Corrective Action Process." This procedure discusses the responsibilities of the station departments in resolving identified deficiencies and reporting the trends observed. The procedure also describes the various types of reports or documents available to station personnel and specifically defines their use.

As a result of the self-assessment evaluations and performance improvement plans, the licensee determined that the existing corrective action processes were very complicated and that a streamlined process was needed that would provide an easy means of raising any concerns to management for resolution. A need was also identified for a specific entity which could monitor the performance of the station organization in implementing self-improvement recommendations, as well as provide the focal point for identified issues to be placed into the appropriate plant corrective action process.

In June 1988, the "Clearinghouse" was established to serve a number of needs. It was developed to assure that the licensee's restart assessment team observations had been entered into the regular corrective action process and, when necessary, that all necessary paperwork was prepared for the resolution of any outstanding items. As of this inspection, 69 assessment items remain unresolved but have schedules identified for their completion. Responses for approximately 69 additional items have not been received from the station organization. The balance of the original 449 items have been listed as closed. The Team did not evaluate the closeout process for any completed or closed items.

A second responsibility of the Clearinghouse was to streamline the corrective action process. As of this inspection period, revisions to the station procedures for improvements in corrective action processes have not been made. The current estimate for completion of the necessary procedure revisions was the end of August.

While subject to revision during the required station procedure review process, the following is a discussion of the current licensee philosophy concerning potential modification of the corrective action processes. The Team did not evaluate the effectiveness of these proposed changes in the overall corrective action programs.

The Clearinghouse is currently revising three existing NOPs, creating a new NOP, and revising the BEQAM. The new NOP would define the role and responsibilities of the Clearinghouse, establish a new form for identifying real or potential plant problems, as well as for reporting employee-identified concerns or self-assessment recommendations for plant improvements. The new form would provide a simple method for raising issues, concerns, or recommendations to station management. Upon receipt of this form, the Clearinghouse would review the issue described and integrate the issue into the regular plant corrective action processes for resolution.

Another proposed change is a categorization of all the existing corrective action processes identified in NOP B3A9 into three groups. One group, identified as corrective action processes, would include deficiency reports (DR), non-conformance reports (NCR), management corrective action requests (MCAR), failure and malfunction reports (F&MR), radiological occurrence reports (ROR), security deficiency reports (SDR), and supplier finder reports (SFR). These processes are used to identify and document plant deficiencies and to provide a means of tracking the resolution of identified problems.

A second group of controls would be categorized as normal work control processes. This group would potentially include maintenance requests (MR), housekeeping services assistance (HSA), procedure change notices (PC), and engineering services requests (ESR).

The last group currently being proposed includes all recommendations or findings from the existing self-assessment programs. The information to be tracked in this group are recommendations for improving performance and would not be used to identify programmatic deficiencies. Any identification of deficiencies would be tracked using one of the processes described in the first group above. Examples of the types of recommendations to be tracked would be quality assurance audit findings and peer evaluator reports.

Changes would also be required for NOP 84E1, "Engineering Service Request (ESR) Process," and NOP 84A7, "Drawing Control," as well as the quality assurance manual, in order to fully implement the revised program.

The licensee anticipates that all necessary changes to station procedures would be completed by the end of August, with formal implementation of the program changes within an additional 30 days.

3.10.5.5 Management Oversight and Assessment Team (MO&AT)

In addition to the plant operations oversight provided by the ORC, the MO&AT also provides an oversight review of plant operations by the nature of its responsibilities for overview of restart activities. The MO&AT is composed of eight senior managers, which includes the Station Director, Director of Special Projects and Vice President Nuclear Engineering. The SVP-N acts as the Chairman of the team. Further, three MO&AT members had been licensee managers prior to the arrival of the SVP-N, while the remaining managers joined the licensee subsequent to February 1987.

The MO&AT maintains its oversight of restart-related activities and associated plant operations through several self-assessment programs. These programs include but are not limited to the peer evaluator and management monitoring programs. The team noted that these programs were effective in evaluating plant activities.

The Team determined that, in some ways, the responsibilities of the MO&AT parallels some of the responsibilities to review plant operations assigned to the ORC. In addition, the Team determined that the current role of the MO&AT is not credited by the ORC as a means of fulfilling its responsibilities to review plant operations, but it does provide a second, independent look at plant operations.

3.10.5.6 Engineering Service Requests (ESR's)

ESRs are tracking forms used by any licensee department to request engineering assistance from the Nuclear Engineering Department (NED). Standard practice within NED is to attach an ESR to all requests for assistance which may be already tracked under another corrective action tracking system, such as DR's, PCAQ's, etc. This is done to provide a means for the NED to track and monitor the progress of its work. When an ESR is opened or received, NED is to review the concern, determine a plan for resolution of the item, which would include an evaluation relative to plans for plant restart. Unless the issue can be resolved within 30 days, a response to the originating department is to be provided within 30 days which describes the above. In discussions with the Team, a management representative of NED indicated that this practice has not always worked as planned and that additional emphasis is being placed on assuring that the 30-day responses are being sent in a timely fashion.

NED tracks all existing ESR's, determines what actions are required prior to restart, and routinely evaluates the potential impacts of outstanding ESR's on the planned restart of the plant. In each case where NED determines that resolution of an ESR is not required to support restart, NED prepares documentation to support that position. This documentation undergoes several levels of review, including the Section Manager, Department Manager and the Vice President - Nuclear Engineering. Any open ESR associated with unresolved PCAQ's or MCAR's is also reviewed by the CRC as part of its assigned restart checklist review.

Based upon discussions with NED personnel, the Team concluded that ESR's are adequately tracked and that upper management is routinely informed of potential problems in a timely fashion.

3.10.5.7 Human Performance Evaluation System

The Team inquired as to the licensee's intentions in participating in the Institute for Nuclear Power Operations (INPO) Human Performance Evaluation System (HPES) program. The program is intended to assist licensees in the reduction of human error by encouraging personnel to report actual or potential situations which keep a person from outstanding performance. The licensee has designated an HPES coordinator, who is in the Training Department. The coordinator has been trained by INPO and is currently preparing to implement the program. The coordinator has already become involved in the Incident Investigation and Critique process, and has reviewed the recent findings from the licensee's ESF Actuation Task Force report. This program, once fully implemented, should provide additional valuable input into the corrective action process.

3.10.6 Conclusions

Overall, the Team determined the licensee's programs for safety assessment/quality verification to be adequate and improving. Based upon the areas inspected and examples raised, the Team concluded that:

1. The Nuclear Safety Review and Audit Committee is actively involved in the oversight of facility operations. The committee is composed of experienced managers with diverse experience and provides clear and valid input to the SVP-N on safety-related activities.

2. Plant problems and deficiencies are being identified and entered into the appropriate corrective action system.

3. There are effective, meaningful communications between the QA and plant operations departments, as well as good systems engineering involvement in evaluation and resolution of problems.

4. The weekly QA interface meeting has enhanced communications at the station and improved the process of resolving open issues.

5. The Operations Review Committee (ORC) has not been reviewing plant operations effectively so that meaningful input to licensee management is being consistently provided. Recently, heavy emphasis has been placed on administrative reviews of procedure changes and modifications, rather than reviewing plant operations. Also, ORC review of plant failure and malfunction reports has neither been timely nor included all appropriate reports.

6. Multiple corrective action processes and multiple tracking systems detract from efficient functioning of the system. This has been identified by the licensee and programs are being established to correct the known deficiencies.

7. The tracking and closeout of PCAQ's and MCAR's have not been effective in the past. Also, a relatively large number of open PCAQ's exists. The licensee is taking action to resolve these problem.

4.0 UNRESOLVED ITEMS

An unresolved item is an item for which additional information is required in order to determine whether the item is acceptable, a violation, or a deviation. An unresolved item is discussed in section 3.4.2.2 of this report.

5.0 MANAGEMENT MEETINGS

At periodic intervals during the inspection period, the Team Leader held meetings with senior facility management to discuss the inspection scope and preliminary findings. A final exit interview was conducted on August 24, 1988. Attendees are listed in Appendix B. At the exit meeting, the Team Leader described the preliminary inspection findings, including both the preliminary overall conclusions and the preliminary findings and observations in each functional area. The Team Leader also confirmed licensee commitments at the exit meeting. Then the Team Manager discussed how the Team findings will be used in NRC Restart Assessment Panel activities. Also, the Regional Administrator outlined the remaining step in the NRC staff process of evaluating Pilgrim restart readiness and developing staff recommendation.

APPENDIX A

Entrance Interview Attendees

August 8, 1988

Boston Edison Company

J. Alexander, Plant Operations Section Manager
R. Anderson, Plant Manager
H. Balfour, Training Section Manager
R. Bird, Senior Vice President - Nuclear
F. Famulari, Quality Assurance Department Manager
D. Gillispie, Nuclear Training Department Manager
R. Grazio, Regulatory Section Manager
F. Hamilton, Compliance Division Manager
K. Highfill, Station Director
J. Jens, Radiological Section Manager
E. Kraft, Plant Support Department Manager
R. Ledgett, Director Special Projects
D. Long, Security Section Manager
A. Morisi, Planning and Outage Department Manager
E. Robinson, Corporate Communication Information Division Head
L. Schmeling, Program Manager
J. Seery, Technical Section Manager
R. Sherry, Plant Maintenance Section Manager
R. Swanson, Nuclear Engineering Department Manager
E. Wagner, Assistant to Senior Vice President - Nuclear
F. Wozniak, Fire Protection Division Manager

United States Nuclear Regulatory Commission

F. Akstulewicz, Senior Technical Assistant, Policy Development and Technical Support Branch, Office of Nuclear Reactor Regulation (NRR)
R. Blough, Chief, Reactor Projects Section No. 3B, Division of Reactor Projects (DRP), Region I (RI)
S. Collins, Deputy Director, DRP, RI
L. Doerflein, Project Engineer, DRP, RI
T. Dragoun, Senior Radiation Specialist, Division of Radiation Safety and Safeguards (DRSS)
M. Evans, Operations Engineer, Division of Reactor Safety (DRS), RI
J. Lyash, Resident Inspector, Pilgrim Nuclear Power Station, DRP, RI
D. McDonald, Project Manager, Project Directorate I-3, NRR
L. Plisco, Senior Operations Engineer, Division of License Performance and Quality Evaluation, NRR
W. Raymond, Senior Resident Inspector, Millstone Point, DRP, RI
L. Rossbach, Senior Resident Inspector, Indian Point Unit 2, DRP, RI
G. Smith, Safeguards Specialist, DRSS, RI
C. Warren, Senior Resident Inspector, Pilgrim Nuclear Power Station, DRP, RI

Commonwealth of Massachusetts

P. Agnes, Assistant Secretary of Department of Public Safety
P. Chan, Observer
S. Sholly (MHB Technical Associates, Inc.), Observer

APPENDIX B

Exit Interview Attendees

August 24, 1988

Boston Edison Company

J. Alexander, Plant Operations Section Manager
R. Bird, Senior Vice President - Nuclear
F. Famulari, Quality Assurance Department Manager
D. Gillispie, Nuclear Training Department Manager
R. Grammont, Deputy Maintenance Section Manager
R. Grazio, Regulatory Section Manager
P. Hamilton, Compliance Division Manager
K. Highfill, Station Director
J. Jens, Radiological Section Manager
E. Kraft, Plant Support Department Manager
R. Ledgett, Director Special Projects
D. Long, Security Section Manager
E Robinson, Corporate Communication Information Division Head
L. Schmeling, Program Manager
J. Seery, Technical Section Manager
R. Sherry, Plant Maintenance Section Manager
R. Swanson, Nuclear Engineering Department Manager
S. Sweeney, Chief Executive Officer and Chairman of the Board
E. Wagner, Assistant to Senior Vice President - Nuclear
F. Wozniak, Fire Protection Division Manager

United States Nuclear Regulatory Commission

F. Akstulewicz, Senior Technical Assistant, Policy Development and Technical Support Branch, Office of Nuclear Reactor Regulation (NRR)
R. Blough, Chief, Reactor Projects Section No. 3B, Division of Reactor Projects (DRP), Region I (RI)
B. Boger, Assistant Director for Region I Reactors, NRR
S. Collins, Deputy Director, DRP, RI
L. Doerflein, Project Engineer, DRP RI
W. Little, Office of Special Projects, RII
J. Lyash, Resident Inspector, Pilgrim Nuclear Power Station, DRP, RI
D. McDonald, Project Manager, Project Directorate (PD) I-3, NRR
W. Raymond, Senior Resident Inspector, Millstone Point, DRP, RI
L. Rossbach, Senior Resident Inspector, Indian Point Unit 2, DRP, RI
W. Russell, Regional Administrator, RI
C. Warren, Senior Resident Inspector, Pilgrim Nuclear Power Station, DRP, RI
R. Wessman, Director, PD I-3, NRR

Commonwealth of Massachusetts

P. Agnes, Assistant Secretary of Department of Public Safety
P. Chan, Observer
G. Minor (MHB Technical Associates, Inc.), Observer

APPENDIX C

Persons Contacted

R. Anderson, Plant Manager
R. Bird, Senior Vice President - Nuclear
F. Famulari, Quality Assurance Department Manager
K. Highfill, Station Director
E. Ward, Vice President - Nuclear Engineering
E. Kraft, Plant Support Services Manager
A. Morisi, Planning and Outage Manager
R. Swanson, Nuclear Engineering Department Manager
S. Sweeney, Chairman of the Board and Chief Executive Officer

In addition, the Team interviewed a large number of managers (including virtually all section and division managers), engineers, supervisors, and craft personnel in each inspection area.

APPENDIX D

Documents Reviewed

- PNPS, Nuclear Training Manual, T-001, Parts 3, 4 and 5
- PNPS, Special Post-Startup Training Program, Approved August 9, 1988
- PNPS Technical Specifications
- Boston Edison Company Nuclear Mission, Organization and Policy Manual
- Nuclear Organization Procedures
- Material Condition Improvement Action Plan
- Boston Edison Quality Assurance Manual
- Audit Reports -- Sampling review including the following: 87-40, 88-02, 87-63, 88-10, 88-20, 87-37, 87-49, 88-04, and 88-17
- Potential Conditions Adverse to Quality (PCAQ) Reports -- Sampling review including NOD 87-88, NED 86-71, BED 87-255, SO 88-57, SO 88-58, SO 88-48, NOD 87-02, NOD 87-28, NED 88-087, SO 88-59, SO 88-12, NOD 88-120, NED 88-90, SO 88-55, and SO 88-22
- Management Corrective Action Requests (MCAR's) -- Sampling review including QAD 85-2, QAD 87-2, 86-06, and 88-02
- Licensee Event Reports (LER's) -- Sampling review including 87-21, 88-008 thru 88-014, 88-016, and 88-017
- Maintenance Requests (MR's) -- Sampling review including 88-11-6, 88-110, 88-10-179, 88-46-300, 88-14-16, 88-45-183, 88-45-181, 88-46-194, 88-10-26, 88-10-105, 88-10-69, 88-10-71, 88-10-80, 88-10-141, 87-10-282, and 87-10-283
- Maintenance Activities/Packages -- Sampling review including 88-3-26, 88-19-109, 88-46-213, 88-10-86, 87-46-173, 88-13-20, 88-46-438, 88-2-12, 86-20-47, 88-45-152, 88-45-176, 88-3-62, 88-63-276, 88-45-190, 88-1-31, 88-14-16, 88-46-194, and 88-10-114
- Meeting Minutes for ORC Meetings 88-40 through 88-63
- Failure and Malfunction Report 86-266
- NED Procedure 16.03, "Corrective Action Program"

- QAD Trend Analysis Report for the First Quarter of 1988 - QAD 88-609
- PNPS Work Instruction N8-3.2.12, F&MR Trend Analysis
- Memo from J. Seery to R. Grazio, Appointment of Compliance Division as ORC Subcommittee, June 23, 1988
- Memo from R. G. Bird to K. L. Highfill, NSRAC Concern from May 24, 1988 NSRAC Meeting - May 27, 1988
- Memo from K. L. Highfill to R. G. Bird, Response to NSRAC Action Item 88-04-01 - June 22, 1988
- Memo from J. A. Seery to R. Flannery, ORC Meeting Minutes Distribution List - dated May 6, 1988
- Procedure 1.2.1, Operation Review Committee
- Procedure 1.3.24, Failure and Malfunction Reports
- Procedure 1.3.2.6, Response to Deficiency Reports
- Procedure 1.3.4, Procedures
- Procedure 1.3.33, Operating Experience Review
- Procedure 1.3.37, Post Trip Reviews
- Procedure 1.3.38, Plant Performance Monitoring Program
- Procedure 1.3.63, Conduct of Critiques and Incident Investigations
- Procedure NOP 83A9, Management Corrective Action Process
- Procedure NOP 83A13, Deficiency Report Process
- Procedure NOP 83A14, Nonconformance Report Process
- Procedure NOP 84A1, Surveillance Monitoring Program
- Procedure NOP 84A11, Annual Independent Review of BECo's Quality Assurance Program
- Procedure NOP 85A1, Nuclear Organization Performance Monitoring and Management Information Program
- Procedure NOP 88A1, Performance Standards and Evaluation Guidelines for Pilgrim Station

- Procedure NOP 8305, The Failure and Malfunction Report Process
- Procedure NOP 8401, Operating Experience Review Program
- Procedure 1.4.5, PNPS Tagging
- Procedure 1.5.3, Maintenance Requests
- Procedure 1.5.3.1, Maintenance Work Plan
- Procedure 1.5.7, Emergency Maintenance
- Procedure 3.M.1-30, Post-Work Testing Guidance
- Procedure SI-MT.1000, Maintenance Section Manual
- Procedure SI-MT.0501, Post-Work Test Matrices and Guidelines
- Procedure 3.M.1-11.1, EQ Maintenance Process: Repair/Replacement
- Procedure 3.M.3-1, A5/A6 Buses 4KV Protective Relay Calibration/Functional Test and Annunciator Verification
- Procedure 3.M.3-8, Inspection/Troubleshooting Electrical Circuits
- Procedure TP 88-40, 480 VAC Contactor Testing
- Procedure TP 88-22, Pre-Operational Test of the New Degraded Voltage Relays and Modified Load Shedding Logic
- Procedure PW TMI-1, Post Work Test Matrix and Guidelines, Revision A
- Procedure 3.M.4-14, Rotating Equipment Inspection, Assembly and Disassembly, Revision 6, dated April 4, 1988
- Procedure 8.Q.3.4, 125/250V DC Motor Control Center Testing and Maintenance
- Procedure 2.2.85, Fuel Pool Cooling System
- Procedure 3.M.1-15, Vibration Monitoring for Preventive Maintenance and Balancing, Revision 5, dated June 12, 1988
- Procedure 2.2.8, Standby AC Power System (Diesel Generators), Revision 20, dated January 13, 1988
- Procedure ARP, Panel C39, Fuel Pool Cooling System, Revision 0, dated January 30, 1988
- Procedure 2.2.83, Reactor Cleanup System, Revision 22, dated June 20, 1988

- Fire Watch Computer Listing, dated August 4, 1988
- Fire Protection Maintenance Request Computer Listing, dated August 9, 1988
- Pilgrim Station Performance Indicators, dated August 10, 1988 and August 17, 1988
- Procedure 8.B.29, "Inspection of Fire Barriers," Revision 1
- Temporary Modification Log
- Temporary Modification Status Report to R. Anderson from P. Mastrangelo, dated August 4, 1988
- Procedure 1.5.9, "Temporary Modifications," Revision 12
- Procedure 1.5.9.1, "Lifted Leads and Jumpers," Revision 0
- Procedure 1.3.34, "Conduct of Operations"
- Procedure 2.1.16, "Nuclear Power Plant Operator Tour," Revision 54
- Overtime Book
- Procedure 1.3.67, "Use and Control of Overtime at PNPS"
- Advance Overtime Requests for Week Ending August 6, 1988
- PNPS 1-ERHS-VIII.B-4-0, Turbine Building Shield Wall Design
- Confidential Memo #13, to J. P. Jens from K. L. Highfill, dated July 19, 1988, "Training Program for Radiation Protection Manager"
- Procedure 6.1-209, "Radiological Occurrence Reports"
- Radiological Work Plan for A and B Recirculation Pump Seal Welds
- Procedure 6.1-012, "Access Control to High Radiation Areas"
- Selected RP Technician Training and Qualification Folders, Lesson Plan, Quizzes and Training Guides
- Selected Radiation Work Permits from March 1988 to August 1988
- Maintenance Request 87-20-84

- Procedure 8.M.2-1.5.3.4, "Primary Containment Isolation Logic Channel Test - Channel B2," Revision 8, dated September 24, 1987
- Procedure 8.M.2-1.5.7, "Group I Primary Containment Isolation Valve Testing," Revision 5, dated November 7, 1987
- Procedure 8.M.2-8.2, "Calibration of ATS Transmitters Rack C2206," Revision 2, dated June 30, 1988
- Procedure 8.M.1-32.4, "Analog Trip System - Trip Unit Calibration - Cabinet C2229-B2," Revision 5, dated April 4, 1988
- Procedure 8.M.2-2.10.8.5, "Diesel Generator 'A' Initiation By Loss of Off-Site Power Logic," Revision 8, dated November 6, 1987
- Procedure 8.M.2-2.10.8.3, "Diesel Generator 'A' Initiation By Core Spray Logic," Revision 12, dated April 9, 1988
- Procedure 3.M.3-1, "A5/A6 Buses 4KV Protective Relay Calibration/ Functional Test and Annunciator Verification," Revision 23, dated August 13, 1988
- Procedure 8.M.2-2.6.7, "RCIC Simulated Automatic Actuation," Revision 6, dated February 5, 1988
- Procedure 8.5.5.1, "RCIC Pump Operability and Flow Rate Test at 1000 psig," Revision 24, dated June 4, 1988
- Procedure 8.M.2-2.10.7, "RCIC Automatic Isolation System Logic," Revision 11, dated November 7, 1987
- Procedure 8.M.2-2.6.1, "RCIC Steam Line Hi Flow," Revision 13, dated June 9, 1988
- Procedure 8.M.2-2.6.3, "RCIC Steam Line Hi Temperature," Revision 12, dated July 17, 1987
- Procedure 8.M.2-2.64, "RCIC Steam Line Low Pressure," Revision 16, dated June 20, 1988
- Procedure 8.M.1-32.5, "Analog Trip System - Trip Unit Calibration Cabinet C2233A, Section A," Revision 2, dated December 7, 1987
- Procedure 8.E.11, "Standby Liquid Control System Instrument Calibration," Revision 9, dated September 2, 1987
- Procedure 8.E.13, "RCIC System Instrument Calibration," Revision 14, dated June 26, 1988

- Procedure 8.4.1, "Standby Liquid Control Pump Operability and Flow Rate Test," Revision 19, dated April 9, 1988
- Procedure 1.8, "Master Surveillance Tracking Program," Revision 9, dated August 15, 1988
- Procedure 1.3.36, "Measurement and Test Equipment," Revision 4, dated March 9, 1988
- Procedure 8.I.1, "Administration of Inservice Pump and Valve Testing," Revision 4, dated August 15, 1986
- Procedure 8.I.3, "Inservice Test Analysis and Documentation Methods," Revision 6, dated May 11, 1988

Drawings

- PNPS Elementary Diagram M1N 34-9 (Revision E1): Primary Containment Isolation System
- PNPS Elementary Diagram M1N 28-12 (Revision E14): Primary Containment Isolation System
- PNPS Elementary Diagram M1N 36-7 (Sh. 10, Revision E7): Primary Containment Isolation System
- PNPS Elementary Diagram M1N 36-7 (Sh. 11, Revision E5): Primary Containment Isolation System
- PNPS Elementary Diagram M1N 41-10 (Revision E2): Primary Containment Isolation System
- PNPS Elementary Diagram M1N 38-11 (Revision E2): Primary Containment Isolation System
- PNPS Elementary Diagram M1N 35-7 (Revision E4): Primary Containment Isolation System
- PNPS Elementary Diagram M1G 11-11 (Revision E11): RCIC System
- PNPS Elementary Diagram M1G 12-12 (Revision E5): RCIC System
- PNPS Elementary Diagram M1G 14-9 (Revision E5): RCIC System
- PNPS Elementary Diagram M1G 15-9 (Revision E8): RCIC System
- PNPS Elementary Diagram M1G 16-7 (Revision E5): RCIC System
- PNPS Elementary Diagram M1K 4-11 (Revision E10): Core Spray

- PNPS Schematic Diagram E-548 (Revision E0): Containment Atmosphere Isolation Control
- PNPS Schematic Diagram E-38 (Revision E6): 4160V System Breakers 152-504 and 152-604
- PNPS Schematic Diagram E-35 (Revision E3): 4160V Auxiliary Relays and Miscellaneous Schemes
- PNPS Schematic Diagram E-27 (Revision E7): Diesel Generator
- PNPS Schematic Diagram E-17 (Revision E7): Schematic Meter and Relay Diagram 4160 Volt System
- PNPS Schematic Diagram M6-22-14 (Sh. 1, Revision E11): Diesel Generator "A" X107A Engine Control
- PNPS Relay Setting Drawing E5-200 (Sh. 1, Revision E3): 4160 Volt Switchgear Relay Settings
- PNPS Relay Setting Drawing E5-200 (Sh. 3, Revision E2): 4160 Volt Switchgear Relay Settings
- PNPS P&ID M245 (Revision E13): RCIC System, Sh. 1
- PNPS P&ID M246 (Revision E10): RCIC System, Sh. 2
- PNPS P&ID M249 (Revision E12): Standby Liquid Control System

APPENDIX E

IATI Composition and Structure

Team Manager	Samuel J. Collins
Team Leader	A. Randy Blough
Technical Assistant	Clay C. Warren
Administrative Assistant	Mary Jo DiDonato
Operations	Lawrence W. Rossbach (Lead)
Shift Inspectors	Lawrence W. Rossbach William J. Raymond Loren R. Plisco Lawrence T. Doerflein Francis M. Akstulewicz
Radiological Controls	Thomas F. Dragoun
Maintenance	Jeffrey J. Lyash William J. Raymond
Surveillance	Lawrence T. Doerflein
Security	Gregory C. Smith
Fire Protection	Lawrence W. Rossbach
Assurance of Quality	Loren R. Plisco Francis M. Akstulewicz
Training and Management Effectiveness	Daniel G. McDonald Michele G. Evans
Report Coordinator	Tae K. Kim
Commonwealth of Massachusetts (Observers)	Steven C. Sholly Pamela M. Chan

APPENDIX F

NRC Integraced Assessment Team Inspection (IATI) Members Resumes

This appendix shows IATI summary resumes of the team members and Commonwealth of Massachusetts observers. The resumes outline the nuclear experience of team members.

NAME: FRANCIS M. AKSTULEWICZ

ORGANIZATION: United States Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Policy Development and Technical Support Branch

TITLE: Senior Technical Assistant

EDUCATION: B.S., Nuclear Engineering

EXPERIENCE: Fourteen Years of Nuclear Experience as Follows:

Two and One-Half Years - Shielding Engineer - Bechtel Power Corporation

One Year - Technical Analyst - Office of Material Safety and Safeguards (NRC)

Eight Years - Nuclear Engineer - Office of Nuclear Reactor Regulation (NRC)

Two Years - Project Manager - Haddam Neck Plant, Office of Nuclear Reactor Regulation (NRC)

One-Half Year - Present Position

SPECIAL QUALIFICATIONS: Completion of NRC Fundamental and Advanced BWR Systems Training Course and BWR Simulator Course

SPECIAL ASSIGNMENTS: Member of Fire Protection, Health Physics and Diagnostic Team Inspection at Haddam Neck

NAME: A. RANDOLPH BLOUGH

ORGANIZATION: United States Nuclear Regulatory Commission, Region I Division of Reactor Projects

TITLE: Chief, Reactor Projects Section No. 3B

EDUCATION: B.S., U.S. Naval Academy, 1973 (Graduated with Honors)
Navy Nuclear Engineer Officer Course, 1977
NRC Inspector Technical Training Program, 1980
Various technical and management courses in USN and USNRC, such as QA, Reactor Engineering, Reactor Safety, Supervising Human Resources, EEO, Management Workshops

EXPERIENCE: Fifteen Years Nuclear Experience as Follows:

1985-Present United States Nuclear Regulatory Commission (USNRC) -- Reactor Projects Section Chief. Manage safety inspection programs for three commercial reactor facilities. Supervise nine nuclear engineers. Provide formal assessments of utility management effectiveness and safety performance.

1982-1985 USNRC -- Senior Resident Inspector at operations phase and preoperational phase nuclear power plants. Planned, supervised, and performed inspections of management controls and activities important to nuclear safety. Coordinated specialist inspector efforts. Formally reported findings and recommended appropriate enforcement.

1972-1982 USNRC -- Resident Inspector. Planned, performed, and documented inspections of all functional areas at a dual-unit operating reactor site.

1973-1979 U. S. Navy Nuclear Power Program. Duties included supervisory positions in nuclear plant operations, maintenance and training. Performed audits and coordinated plant self-assessment. Was responsible for a complex, in-plant nuclear training program for up to 300 students. Shipboard duties included Main Propulsion Assistant: responsible for all reactor and main propulsion systems, all radiological controls and plant chemistry. Collateral duties included QA Officer, and Nuclear Weapons Safety/Security Officer.

SPECIAL QUALIFICATIONS: Qualified BWR Inspector, NRC Region I, 1980
Qualified Nuclear Engineer Officer, Naval Reactors, 1977

SPECIAL ASSIGNMENTS: Team Leader, NRC Integrated Performance Assessnment Team Inspection, Oyster Creek, 1987
Team Leader, NRC Team Inspection of Oyster Creek Containment Vacuum Breakers Event, 1987
Participated in various other plant readiness inspections, 1984-1985

NAME:	PAMELA M. CHAN
ORGANIZATION:	Massachusetts Energy Facilities Siting Council (Since 12/87)
TITLE:	Engineer/Utility Analyst
EDUCATION:	B.S. M.E. Pennsylvania State University
EXPERIENCE:	Five Years Nuclear Experience as Follows:
1987	United States Nuclear Regulatory Commission, Region III, Reactor Inspector
1985-1987	Nuclear Power Services - Construction
1984-1985	Combustion Engineering - Nuclear Systems Services; Field Service Engineer
1982-1984	Stone & Webster Engineering Corporation - Power Division System Engineer - Turbine Plant Systems
SPECIAL QUALIFICATIONS:	Background in Maintenance and Quality Assurance
SPECIAL ASSIGNMENTS:	Participated in several team inspections while at NRC Region III

NAME: SAMUEL J. COLLINS

ORGANIZATION: United States Nuclear Regulatory Commission, Region I
Division of Reactor Projects

TITLE: Deputy Director

EDUCATION: Bachelor of Science, Maine Maritime Academy
Business Program, Southern Vermont College

EXPERIENCE: Seventeen Years Nuclear Experience in Design, Construction, Operations, Inspection and Management as Follows:

1987 - Present Deputy Director: Division of Reactor Projects, USNRC, Region I

1986 - 1987 Deputy Director (Detail): Division of Reactor Projects, USNRC, Region I

As a member of the Senior Executive Service, responsible for division management; the conduct of inspections and evaluations of assigned NRC programs for all power and non-power reactors within Region I.

1985 - 1986 Branch Chief: Reactor Projects Branch No. 2, USNRC, Region I

Responsible for project management, staffing and budget considerations, including inspections, implementation of SALP, resident inspection and enforcement for eleven assigned power reactor sites in operation and under construction.

1984 - 1985 Section Chief: Reactor Projects Section No. 2C, USNRC, Region I

Responsible for implementation of the routine and reactive inspection program at six assigned power reactors during new construction, testing and operation.

1983 - 1984 Senior Resident Inspector: Operations, Yankee Nuclear Power Station, DRP, USNRC, Region I

Supervised; inspection and event response program at operating Westinghouse PWR power reactor facility.

1980 -1983 Resident Reactor Inspector: Operations, Vermont Yankee Nuclear Power Station, DRP, USNRC, Region I. Field inspector at operating General Electric BWR power reactor facility.

Private Industry:

1971 - 1980 Tenneco Corporation, Newport News Shipbuilding. Various positions as contractor to U.S. Navy Nuclear Program including:

Project Manager - S5W Steam Generator Chemical Cleaning Project

Chief Test Engineer - Chairman and NNS representative to Joint Test Group for S5W overhaul and construction

Shift Test Engineer - Shift supervisor for reactor overhaul and refueling

Shift Test Engineer - Shift supervisor for reactor new construction

Mechanical Test Engineer - Shift mechanical test for reactor new construction

Reactor Design Engineer - Design support for reactor new construction

SPECIAL QUALIFICATIONS:

Senior Executive Service Candidate Development Program, USNRC, 1986 - 1987

Qualified BWR Resident Inspector

Qualified PWR Resident Inspector

Qualified S5W Shift Test Engineer

Third Engineer License, USCG

SPECIAL ASSIGNMENTS:

1988 - Team Manager, Pilgrim Integrated Assessment Restart Team Inspection

1987 - 1988 - Chairman, Pilgrim Restart Assessment Panel

1987 - 1988 - Region I Representative, NRC Training Advisory Group

1987 - Chairman, Differing Professional Opinion Peer Review Group

1987 - Chairman, Comanche Peak Task Force Review Group

1986 - Team Leader, Nine Mile Point 1 and 2 Diagnostic Team Inspection

1985 - Team Leader, Peach Bottom 2 and 3 Diagnostic Team Inspection

NAME:	LAWRENCE T. DOERFLEIN
ORGANIZATION:	United States Nuclear Regulatory Commission, Region I Division of Reactor Projects
TITLE:	Project Engineer
EDUCATION:	BS Electrical Engineering US Naval Academy, 1973
EXPERIENCE:	Fifteen Years Nuclear Experience as Follows:
Aug. 1985-Present	Project Engineer
Oct. 1983-July 1985	Senior Resident Inspector, FitzPatrick Nuclear Power Plant
Nov. 1980-Oct. 1980	Resident Inspector, FitzPatrick Nuclear Power Plant
June 1973-Oct. 1980	US Navy
SPECIAL QUALIFICATIONS:	Certified NRC BWR Inspector
	Qualified Chief Naval Nuclear Engineer
SPECIAL ASSIGNMENTS:	Limerick Readiness Assessment Team
	Pilgrim Augmented Inspection Team

NAME:	THOMAS F. DRAGOUN
ORGANIZATION:	United States Nuclear Regulatory Commission, Region I Division of Radiation Safety and Safeguards
TITLE:	Senior Radiation Specialist
EDUCATION:	Rensselaer Polytechnic Institute, and Union College DOD Staff College, Battle Creek, Michigan
EXPERIENCE:	Twenty-Three Years of Nuclear Experience as Follows:
1983-Present	NRC - Senior Radiation Specialist
1983-1969	General Electric Company, which included the following: - Qualified as Operations Engineer and EOOW at Navy Prototype (3 Years) - Senior Engineer on Trident Prototype Construction Project (5 Years) - Health Physicist responsible for service work, both domestic and foreign by Large Steam Turbine Division (6 Years)
1965-1969	Cornell University - Taught Radiation Protection Subjects

NAME:	MICHELE G. EVANS
ORGANIZATION:	United States Nuclear Regulatory Commission, Region I Division of Reactor Safety
TITLE:	Operations Engineer
EDUCATION:	B.S., Chemical Engineering, University of Pennsylvania
EXPERIENCE:	Four Years of Nuclear Experience as Follows:
Aug 1987-Present	Operations Engineer, Boiling Water Reactor Section - Conduct review and inspection of Power Ascension Programs at Pilgrim and Nine Mile Point 2. Currently in training to qualify as BWR Operator Licensing Examiner
July 1984-Aug 1987	Reactor Engineer, Test Programs Section - Conducted review and inspection of preoperational test programs at Hope Creek and Nine Mile Point 2, and Startup Testing Programs at Limerick 1, Shoreham, Hope Creek and Nine Mile Point 2.
SPECIAL QUALIFICATIONS:	USNRC Certified BWR Inspector Engineer in Training (State of Pennsylvania)
SPECIAL ASSIGNMENTS:	Currently participating in the Women's Executive Leadership Program for Management Development

NAME:	JEFFREY J. LYASH
ORGANIZATION:	United States Nuclear Regulatory Commission, Region I Division of Reactor Projects
TITLE:	Resident Inspector - Pilgrim Nuclear Power Station
EDUCATION:	B.S., Mechanical Engineering, Drexel University
EXPERIENCE:	Six Years Nuclear Experience as Follows:
	Two and One-Half Years - NRC Resident Inspector - Pilgrim Nuclear Power Station
	One Year - NRC Resident Inspector - Hope Creek Generating Station
	One Year - NRC Reactor Engineer - Region I
	One and One-Half Years - Pennsylvania Power and Light Company - Test Engineer - Susquehanna Steam Electric Station
SPECIAL QUALIFICATIONS:	Meritorious Service Award as NRC Resident Inspector of the Year 1987-1988

NAME: DANIEL G. MCDONALD, JR.

ORGANIZATION: United States Nuclear Regulatory Commission (USNRC)
Office of Nuclear Reactor Regulation

TITLE: Senior Project Manager

EDUCATION: B.S., Management, Shenandoah College
A.A., Engineering, Solano College

EXPERIENCE: Thirty-One Years Nuclear Experience as Follows:

1982-Present	Senior Project Manager - Manage and coordinate all NRC licensing functions on assigned operating reactor facilities which have difficulties or complexities with management and operation. (NRC)
1982 (3 Months)	Reactor Engineer (Instrumentation) - Technical evaluations of instrumentation and control systems or licensee applications and operating reactor modifications. Assist in developing regulatory requirements and establishing staff policy. (NRC)
1980-1982	Staff Member - Conduct, direct and coordinate assessments of critical technologies in the context of national security. Provide technical support to the Nuclear Regulatory Commission. (Los Alamos National Laboratory)
1979-1980	Reactor Inspector (Electrical) - Inspects reactors under construction and in operation. (NRC)
1978-1979	Senior Electrical Engineer - Technical evaluations of electrical, instrumentation and control systems. Assist in developing staff policy. (NRC)
1973-1978	Reactor Engineer (Instrumentation) - Technical evaluation for license applications and operating reactors. (NRC)
1966-1973	Senior Technical Associate - Field engineer in nuclear weapons test programs. (Lawrence Livermore Laboratory (LLL))
1964-1966	Senior Electronic Engineering Coordinator - Design of control, interlock and instrumentation systems for critical assembly machines, test reactors and containment vaults. (LLL)
1960-1964	Electronics Designer - Design of communication, personnel warning, closed circuit TV and radiation monitoring systems. (LLL)

1957-1960	Senior Electronic Technician - Fabricated and assisted in the design and development of prototype electrical and electronics equipment. (LLL)
1953-1957	Electrical Specialist - Four year apprenticeship with Department of Navy. (Mare Island Shipyard)

NAME:	LOREN R. PLISCO
ORGANIZATION:	United States Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Division of Licensee Performance and Quality Evaluation
TITLE:	Senior Operations Engineer
EDUCATION:	B.S., Systems Engineering, U.S. Naval Academy
EXPERIENCE:	Eleven Years Nuclear Experience as Follows:
1987-1988	Senior Operations Engineer, NRC:NRR
1986-1987	Senior Resident Inspector - Susquehanna Steam Electric Station
1983-1986	Resident Inspector - Susquehanna Steam Electric Station
1982-1983	Reactor Engineer, Region I
1977-1982	US Navy Nuclear Power Program
SPECIAL QUALIFICATIONS:	Certified NRC BWR Inspector
	Qualified Naval Nuclear Engineer Officer
SPECIAL ASSIGNMENTS:	Susquehanna 2 - Operational Readiness Assessment Team Inspection
	Limerick 1 - Operational Readiness Asssessment Team Inspection
	Hope Creek - Operational Readiness Assessment Team Inspection
	Salem - ATWS Inspection
	TMI-1 - Management Integrity Inspection

NAME: WILLIAM J. RAYMOND

ORGANIZATION: United States Nuclear Regulatory Commission, Region I
Division of Reactor Projects

TITLE: Senior Resident Inspector - Millstone Nuclear Power Station

EDUCATION: B.S. Physics
M.S. Nuclear Science and Engineering

EXPERIENCE: Eighteen Years Nuclear Experience as Follows:

1975-1988 NRC Reactor Operations Inspector

- SU&T, Core Physics, Refueling, Pre & SU&T for BV, CC1, IP3, MP2
- Project Inspector - Beaver Valley, Ginna and Susquehanna
- TMI Recovery Team - Accident Response and Containment Entry
- Senior Resident Inspector - Vermont Yankee and Millstone

1972-1975 Startup Engineer, Babcock & Wilcox, Oconee 1 and 2 and Three Mile Island, Unit 1

1970-1972 Reactor Operator, VPI Research Reactor

SPECIAL QUALIFICATIONS: VPI Reactor Operator License

Certified NRC Licensed Operator Examiner - 1986

SPECIAL ASSIGNMENTS: IAEA Assist Visit to Brazil CNEN - 1981

Team Leader Salem ATWS Event - NRC Fact Finding - 1983

Salem ATWS Generic Issue Review Team - 1983

NRC Response to Crystal River Event - 1981

Assist Visit to Region V - WNP2 Startup Readiness - 1982

Team Inspections - Shoreham 1982 and Pilgrim 1986

Operator Briefings of TMI Event - 1979

NAME: LAWRENCE ROSSBACH

ORGANIZATION: United States Nuclear Regulatory Commission, Region I
Division of Reactor Projects

TITLE: Senior Resident Inspector - Indian Point Unit 2

EDUCATION: B.S., Nuclear Engineering

EXPERIENCE: Sixteen Years of Nuclear Experience as Follows:

Six Years, NRC Resident Inspector and Senior Resident Inspector

Two and One-Half Years, Program Manager for NRC's preparation to review a high level waste repository license application

Two and One-Half Years, NRC Project Manager and Reviewer for Uranium Mills

Five Years, Systems Design Engineer at Architectural Engineering (AE) Company

NAME: STEVEN C. SHOLLY

ORGANIZATION: MHB Technical Associates (Observer for the Commonwealth of Massachusetts

TITLE: Associate Consultant

EDUCATION: B.S. in Education (1975); Graduate Course Work in Geo-environmental Studies (1976-1977)

EXPERIENCE: Seven and One-Half Years Nuclear Experience as Follows:

1985-Present MHB Technical Associates, San Jose, CA - Work in Risk Assessment, Quality Assurance, Operating Events Analysis, and Design and Construction Assessment

1981-1985 Union of Concerned Scientists, Washington, D.C. - Work in generic safety issues, risk assessment and emergency planning

SPECIAL ASSIGNMENTS:

- Member of NRC Peer Review Group, NUREG-1050 (1984)
- Participated in NRC Containment Performance Design Objective Workshop (1986)
- Participated in NRC/LLNL Workshop on Safety Goals Implementation, Presentation on Seismic Risk Assessment (1987)

NAME: GREGORY C. SMITH

ORGANIZATION: United States Nuclear Regulatory Commission, Region I
Division of Radiation Safety and Safeguards

TITLE: Safeguards Specialist

EDUCATION: B.S. Education, California State College

- Various additional courses including: Technical Writing, Quality Assurance Auditing, Statistics, Reactor Design and Layout, Radiological Accident Assessment, Radiological Emergency Response, BWR Technology, Transportation of Radioactive Materials, Advanced Neutron Nuclear Materials Assay, Safeguards Chemical Analysis of Nuclear Materials, Nondestructive Assay of Nuclear Materials, Nondestructive Assay of Fissionable Material, Accident/Incident Investigation and Intrusion Detection Systems

EXPERIENCE: Twenty-Two Years Nuclear Industry Experience as Follows:

1977-Present Safeguards Specialist, Physical Protection Inspector and Safeguards Auditor (USNRC)

1966-1977 Westinghouse Electric Corporation, Bettis Atomic Power Laboratory - Production Engineer, Nuclear Materials Auditor, Nuclear Materials Analyst, Reactor Development Technician

NAME:	CLAY C. WARREN
ORGANIZATION:	United States Nuclear Regulatory Commission, Region I Division of Reactor Projects
TITLE:	Senior Resident Inspector - Pilgrim Nuclear Power Station
EDUCATION:	B.S., Natural Sciences, Louisianna State University
Industrial:	1986 - USNRC Inspector Qualification Program
	1985 - Training Program on the General Electric BWR-6 product line and received NRC Senior Reactor Operator License
	1982 - GE Boiling Water Reactor (BWR) Senior Reactor Operator Certification training at the General Electric BWR Training Center
	1980 - Shift Test Engineer training program at General Dynamics Corporation, Electric Boat Division. Successfully completed the Naval Engineering Officer exam administered by Naval Reactors.
Military:	Navy Nuclear Prototype Training Navy Nuclear Power School Electronics Technicians School
EXPERIENCE:	Fifteen Years Nuclear Experience as Follows:
Jan 1987-Present	United States Nuclear Regulatory Commission, Senior Resident Inspector
Jan 1986-Jan 1987	Resident Inspector
June 1984-Jan 1986	Shift Supervisor, Gulf States Utilities Company, River Bend Nuclear Station
Jan 1981-June 1984	Control Operating Foreman, Gulf States Utilities Company, River Bend Nuclear Station
June 1979-Dec 1980	Shift Test Engineer, General Dynamics Corporation, Electric Boat Division
Jan 1971-June 1979	Electronics Technician - Reactor Operator, United States Navy
SPECIAL QUALIFICATIONS:	USNRC Senior Reactor Operators License

SPECIAL ASSIGNMENTS:

Nine Mile Point 2 Operational Readiness Assessment Team Inspection

Peach Bottom - Special Team Inspection March 1986

APPENDIX G

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

01 SEF 1988

The Commonwealth of Massachusetts
Executive Office of Public Safety
ATTN: Mr. Charles V. Barry
One Ashburton Place
Boston, Massachusetts 02108

Dear Mr. Barry:

This refers to our letter of July 13, 1988, regarding the Commonwealth of Massachusetts' participation in the Integrated Assessment Team Inspection (IATI) conducted at the Pilgrim Nuclear Power Station.

As the NRC Senior Manager responsible for the inspection, I would like to acknowledge the conduct of the designated state representatives Ms. Pamela J. Chen and Mr. Steven C. Sholly as being professional and contributing to the performance of the inspection.

The established protocol (enclosed) provided to you on June 1, 1988, clarified by our letter of July 13, 1988, and discussed directly by myself with Mr. Peter Agnes of your staff on August 9, 1988, provides for collection and coordination of the concerns from the various interests within the Commonwealth. As stated in our July 13, 1988 letter, the NRC placed the burden on the Commonwealth's representative to present the many views, be they from the local governments or from the State's Attorney General's office, to the NRC for consideration during development of tne inspection scope. In this regard, we understand that Mr. Agnes conducted a public meeting on August 4, 19[illegible], with a designated state representative to the IATI present.

On August 9, 1988, having received no issues from the Commonwealth as an additional input to the existing inspection plan, I contacted the Assistant Secretary of Public Safety directly and was assured that: no formal input to the IATI inspection plan would be submitted by the Commonwealth, the Commonwealth would work through the designated representatives for any issues and that issues brought to the Commonwealth's attention were no different than those previously noted. Also, the team leader has notified me that at no time during the inspection did he receive immediate notification of any different state observation or conclusion as would be called for under Protocol Guideline 3 if any such differences were identified during the inspection.

Since the IATI exit meeting conducted on August 24, 1988 which was attended by Mr. Agnes and Ms. Chen, the Commonwealth has expressed on several occasions both to the media and at public meetings that technical issues and management concerns continue to exist. These statements appear inconsistent with the Commonwealth's response to repeated NRC requests for IATI inspection scope input and moreover inconsistent with the Commonwealth views expressed at the IATI exit meeting.

In order to better understand and address the areas of concern, the NRC requests that in accordance with the protocol agreement accepted by the Commonwealth, as provided for by Guideline 3, that the Commonwealth make available in writing those conclusions or observations that are substantially different from those of the NRC inspectors in order that the NRC can take the necessary actions to meet its regulatory responsibilities.

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It is necessary that the Commonwealth's response be provided to the NRC Region I by September 6, 1988, to be considered in conjunction with the documentation of the results of the recently completed IATI. This request was discussed with Mr. P. Agnes of your staff on August 26 and August 31, 1988.

If you have any questions regarding the above matters, please contact me at (215) 337-5126 or the State Liaison Officer for Region I, Ms. Marie Miller at (215) 337-5246.

Sincerely,

Samuel J. Collins, Deputy Director
Division of Reactor Projects

Enclosure: As Stated

cc w/encl:
R. Bird, Senior Vice President - Nuclear
K. Highfill, Station Director
R. Anderson, Plant Manager
J. Keyes, Licensing Division Manager
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
B. McIntyre, Chairman, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Plymouth Civil Defense Director
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
S. Pollard, Massachusetts Secretary of Energy Resources
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

bcc w/encl:
Region I Docket Room (with concurrences)
S. Collins, DRP
J. Wiggins, DRP
R. Blough, DRP
L. Doerflein, DRP
R. Bores, DRSS
D. McDonald, PM, NRR

ENCLOSURE

Guidelines for Accompaniment on the Integrated Assessment Team Inspection

The following are guidelines for accompaniment during NRC's Pilgrim Integrated Assessment Team Inspection.

1. The observer is to make arrangements with the licensee for site access training and badging.

2. The observer shall be available throughout the inspection and will accompany NRC inspectors. Communication with the licensee will be through the appropriate NRC team member, preferably the team leader.

3. When the conclusions or observations made by the Commonwealth of Massachusetts observer are substantially different from those of the NRC inspectors, Commonwealth of Massachusetts will make its observations immediately known to the inspection team leader and available in writing to the NRC and the licensee, in order that NRC can take the necessary actions to meet its regulatory responsibilities. These communications will be publicly available, similar to NRC inspection reports.

4. NRC inspectors are authorized to refuse to permit continued accompaniment by the Commonwealth of Massachusetts observer if his conduct interferes with a fair and orderly inspection.

5. The Commonwealth of Massachusetts observer in accompanying NRC inspectors will not normally be provided access to proprietary information. No license material may be removed from the site or licensee possession without NRC approval.

6. The Commonwealth of Massachusetts observer in accompanying the NRC inspectors pursuant to these guidelines does so at his own risk. The NRC will accept no responsibility for injuries and exposures to harmful substances which may occur to the accompanying individual during the inspection and will assume no liability for any incidents associated with the accompaniment.