ACKNOWLEDGMENT

The Enercon Services, Inc. Independent Management Appraisal Team wishes to express its appreciation to Florida Power and Light Company personnel for their cooperation during this appraisal. The candor of the people we interviewed and the assistance they provided is greatly appreciated. We are especially grateful to those people on whom we imposed a continuous burden of arranging meetings, providing documents and who generally supported our efforts.

TABLE OF CONTENTS

LIST OF ACRONYMS

CEO	Chief Executive Officer
CPM	Critical Path Methodology
CRT	Change Review Team
CTRAC	Commitment Tracking System
EM	Engineering Manager
FPL	Florida Power & Light
I&C	Instrumentation and Control
I&E	NRC Office of Inspection and Enforcement
IMA	Independent Management Appraisal
INPO	Institute of Nuclear Power Operations
IS	Integrated Schedule
JPE	Juno Beach Power Plant Engineering
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LO	Licensed Operator
MOS	Management on Shift
Mwe	Megawatt-electrical

LIST OF ANCRONYMS (cont.)

NED	Nuclear Energy Department
NIMS	Nuclear Information Management System
NLO	Non-licensed Operator
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
PC/M	Plant Change/Modification
PEP	Performance Enhancement Program
PERT	Program Evaluation and Review Technique
PNSC	Plant Nuclear Safety Committee
PPE	Power Plant Engineering
PRB	Project Review Board
PRM	Process Radiation Monitoring System
PSN	Plant Supervisor, Nuclear
PUP	Procedure Upgrade Program
PWO	Plant Work Order
QA	Quality Assurance
QC	Quality Control
QI	Quality Improvement
QIDW	Quality in Daily Work
QIP	Quality Improvement Program

LIST OF ACRONYMS (cont.)

REA	Request for Engineering Assistance
RTA	Request for Technical Assistance
SALP	Systematic Assessment of Licensee Performance
SET	Senior Evaluation Team
SLRB	Senior Level Review Board (FPL)
TMI	Three Mile Island
TSG	Technical Support Group

EXECUTIVE SUMMARY

The purpose of this Independent Management Appraisal (IMA) is to assist Florida Power and Light Company (FPL) in its efforts to improve the performance of the Turkey Point Nuclear Power Plant (Turkey Point). In an October 7, 1987, letter to the Nuclear Regulatory Commission (NRC), FPL committed to an independent appraisal to augment a number of initiatives for plant improvement. On October 19, 1987, the NRC confirmed FPL's commitment by NRC Order EA-87-85. On November 10, 1987, FPL contracted with Enercon Services, Inc. to perform this appraisal. On December 2, 1987, the NRC approved, with comment, the plan for the appraisal.

Audits and inspections by the NRC, Institute for Nuclear Power Operation (INPO), and FPL have extensively documented the operational difficulties which FPL has experienced over the years at Turkey Point. This report focuses primarily on the root causes of these documented problems, on recent corrective actions which FPL has initiated, and on additional corrective actions which the IMA Team believes would be constructive.

Turkey Point and St. Lucie Performance Records

FPL owns and operates two nuclear power stations, St. Lucie and Turkey Point. St. Lucie has achieved considerable success as an operating plant. This success is illustrated by a recent ranking of the performance of world nuclear power plants which showed St. Lucie Unit 1 as the highest ranked U.S. plant. In addition, St. Lucie has been consistently awarded high rankings in the NRC's Systematic Assessment of Licensee Performance (SALP) program. INPO has also commended St. Lucie in past plant evaluations. Turkey Point, however, has not achieved the standard of excellence desired by FPL and required in today's nuclear industry environment. Turkey

Point has experienced a series of events which indicate that the plant has not met FPL's goals and which have resulted in NRC enforcement actions. The purpose of the IMA was to review Turkey Point's performance to determine the root causes of deficiencies and to recommend appropriate corrective actions.

IMA Organization

The IMA project organization included a Project Team (IMA Team) and a Senior Evaluation Team (SET). The IMA Team was responsible for conduct of the appraisal in accordance with the program plan approved by the NRC. The SET was responsible for providing executive level overview of the project methods and results and for periodically reporting project status to FPL's Senior Level Review Board (SLRB). The SLRB consisted of the FPL Chairman and Chief Executive Officer (CEO), President, Executive Vice President and Senior Vice President, Nuclear.

IMA Overall Findings

Between December 14, 1987, and March 30, 1988, the IMA Team conducted numerous interviews, document reviews, surveys and direct observations at Turkey Point, the FPL corporate organizations, and St. Lucie. This extensive data gathering effort and the subsequent evaluation, analysis and verification efforts determined that a number of Turkey Point performance deficiencies exist. A major reason for performance differences between Turkey Point and St. Lucie is traceable to Turkey Point's closer historical association with managers trained in the fossil power industry. St. Lucie went into operation more recently than Turkey Point, with personnel more experienced in the nuclear industry. In addition, St. Lucie has operated with site management in direct control of the plant. FPL corporate management, however, has exercised a greater degree of control at Turkey Point throughout the plant's life.

Turkey Point has had a history of hardware performance problems. These have been exacerbated by management's emphasis on short-term availability. Too many permanent equipment upgrades have been delayed at Turkey Point. This has put unnecessary pressure on the operations staff. Major reasons for operational difficulties are support deficiencies outside the control room and inadequately maintained equipment.

As a result of these factors, the Turkey Point site organization did not develop the initiative, responsibility, and commitment to excellence that has been developed and successfully nurtured at St. Lucie. Persistent governmental and industry criticisms and programmatic recommendations have placed additional burdens on the Turkey Point organization.

Root Causes

Turkey Point's performance deficiencies are attributable to five root causes. The first of these root causes is related to leadership deficiencies. Inadequate leadership is reflected in the failure to establish and communicate effective goals for plant improvement. There is also an absence of firm policies, established and enforced by management, in such critical areas as the control of commitments and plant changes and the establishment of an effective interface with the NRC.

A second root cause is insufficient management attention and follow-up. An inadequate sense of personal accountability persists within the Turkey Point work force. Further, management is not adequately using information provided by the Quality Assurance and Quality Control organizations. Also, persistent problems in the security program have not always received the level of attention required.

Third, the IMA Team identified a lack of sufficient technical support as a root cause of several performance deficiencies at Turkey Point. The various engineering organizations, both onsite and offsite, are not properly structured to support the plant. The onsite Technical Support Group does not have the proper skills or training. These technical support deficiencies have led to inadequate root cause analysis by the Turkey Point technical support organizations, which has in turn allowed the observed level of repetitive problems and violations to persist.

The IMA Team identified inadequacies in several key support systems at Turkey Point as a fourth root cause of performance problems. Examples include inadequate plant information systems, an inefficient system for producing and controlling Plant Work Orders, and inadequate Instrumentation and Control support for plant operations. An excessive use of overtime is a further indication of inadequate support systems.

The fifth root cause of performance deficiencies at Turkey Point is the lack of a strong sense of plant ownership and leadership in the Operations Department. The Operations Department has a tradition of accepting and overcoming plant equipment and support deficiencies, rather than demanding excellence from the supporting departments such as maintenance, technical support and training. Operation's position is further weakened by problems with the plant Technical Specifications.

<u>Corrective Actions Underway</u>

The IMA Team observed that FPL Corporate and Turkey Point management have a strong commitment to upgrade the plant's performance. This commitment is reflected in an aggressive series of corrective actions and programs initiated by FPL prior to or concurrent with the IMA. These corrective actions

were initiated when FPL management recognized performance deficiencies at Turkey Point and they demonstrate FPL's commitment to achieving excellence in the operation of Turkey Point. The IMA Team examined these corrective actions and found them to be, in most cases, responsive to the problems.

Recommendations

The IMA team recommends a number of corrective actions in addition to those already initiated by FPL. The recommendations have been grouped into four categories (in order of importance): critical, strategic, essential and important. The critical recommendations relate to assuring that key positions at Turkey Point are staffed with personnel who have demonstrated successful performance in the nuclear industry. Two recommendations are included in this first category:

1. Define job requirements and match them with skilled people who have proven track records.
2. Suspend the management development program rotations for at least two years.

Second, there are five strategic recommendations which address plant goals and policy issues:

1. Establish more meaningful site goals.
2. Effectively communicate goals to plant personnel.
3. Match workload to resources.
4. Reduce external demands on Turkey Point.
5. Establish performance measures and provide feedback.

The third set of recommendations are categorized as essential. These deal primarily with modifying the plant management style, correcting deficiencies in plant support systems and organizations and improving the NRC interface. These recommendations are:

1. Conduct management "walk-throughs".
2. Upgrade the physical conditions of the plant.
3. Accept reduced short term plant availability goals.
4. Accept personal responsibility for problem solution.
5. Improve System Engineering effectiveness.
6. Control overtime.
7. Improve maintenance performance.
8. Achieve a better relationship with the NRC.
9. Nuclear Energy Department staff accept more responsibility for knowledge transfer within FPL.

Finally, the report includes recommendations which are categorized as important. These deal primarily with actions which are important to assuring permanent improvement in plant performance. These recommendations include:

1. Expedite approval of the new technical specifications.
2. Emphasize quality.
3. Improve engineering support.
4. Streamline the technical support paperwork process.
5. Improve plant information systems.
6. Improve reliability engineering and root cause analysis.

The IMA recommendations can be implemented within the framework of the current programs and through line management responsibilities. FPL management, the NRC and INPO should allow a reasonable time for the impact of the recent FPL initiatives and the IMA recommendations to show significant improvement. The effective implementation of some of these recommendations will produce results in six months while others may take up to two years for the results to be visible.

The corrective actions currently underway coupled with an effective implementation of the recommendations developed by the IMA will lead to improved Turkey Point performance and the achievement of FPL's goal of excellence in Turkey Point operations.

1.0 INTRODUCTION

The purpose of this Independent Management Appraisal (IMA) is to assist Florida Power and Light Company (FPL) in its efforts to improve the performance of the Turkey Point Nuclear Power Plant (Turkey Point). In an October 7, 1987, letter to the Nuclear Regulatory Commission (NRC), FPL committed to an independent management appraisal to augment a number of other initiatives for plant improvement which had already been undertaken. On October 19, 1987, the NRC confirmed FPL's commitment by NRC Order EA-87-85. On November 10, 1987, FPL contracted with Enercon Services, Inc. to perform the appraisal. The program plan for conduct of the IMA was submitted to the NRC on November 18, 1987. On December 2, 1987, the plan was approved, with comment, by the NRC. Revision 1 of the plan included responses to the NRC comments and was submitted on December 30, 1987. Appendix A contains a matrix cross referencing the requirements of the NRC order to the sections of this report which discusses each requirement.

The appraisal followed the process described in Revision 1 of the program plan. This report focuses on the issues which were found by the IMA to contribute most directly to the performance problems at Turkey Point.

The IMA found that the FPL organization, including the corporate office and the work force, has a strong commitment to achieve high quality operation at Turkey Point and throughout the company. Accordingly, FPL has initiated several programs to improve the performance at Turkey Point. Some of these programs were initiated prior to the IMA, while others were initiated during the IMA (but independent of the IMA). This continuing effort of FPL corporate management and Turkey Point management to improve Turkey Point performance

has resulted in the appraisal team assessing a dynamic situation. Therefore, the IMA necessarily includes an evaluation of the effectiveness of FPL's improvement efforts to date (i.e. the end of March 1988).

The study evaluated how FPL's corporate nuclear goals and measures of achievement are established and communicated to employees, and the degree of success achieved in realizing those goals. With the assistance of behavior consultants, the IMA Team assessed employee attitudes and dedication to accomplishing the goals. The IMA Team also reviewed the extent to which a sense of personal and organizational accountability exists for achieving the corporate nuclear goals. The IMA Team considered qualities such as teamwork, leadership and professionalism and the methods used by management to develop these qualities.

Section 2.0 of the report briefly reviews background information which is important to understanding the current culture and attitude at Turkey Point. Section 3.0 describes the appraisal organization and methods. Turkey Point's performance deficiencies and their root causes are discussed in Section 4.0. Also contained in Section 4.0 is an evaluation of FPL's actions to improve Turkey Point's performance. Section 5.0 contains the recommendations made by the IMA Team to assist FPL achieve its desired standard of excellence at Turkey Point.

2.0 BACKGROUND AND DISCUSSION

FPL owns and operates two nuclear power stations, St. Lucie and Turkey Point. The Turkey Point station, located south of Miami, Florida has two nuclear units, with each unit rated at 666 Mwe. The Turkey Point nuclear units (Turkey Point 3 & 4) share a site and some systems with two fossil units (Turkey Point 1 & 2). The Turkey Point nuclear steam supply systems (NSSS) were furnished by Westinghouse. Bechtel Power Corporation was the engineer and constructor of the plants. Turkey Point 3 & 4 were declared commercial in 1972 and 1973, respectively. The St. Lucie station is located north of Miami on Hutchinson Island. St. Lucie is a two unit station, with each unit rated at 839 Mwe. The NSSSs were supplied by Combustion Engineering. The plant engineer and constructor was Ebasco. The St. Lucie 1 and 2 units were declared commercial in 1976 and 1983, respectively.

Turkey Point is a pre-TMI vintage station. The Turkey Point site management and staff have not successfully completed the transition to the environment of increased managerial and regulatory demands which characterize the post-TMI commercial nuclear industry. This transition has been complicated by the Turkey Point design which, like that of many plants of its vintage, reflects considerations of construction economy at least as strongly as considerations of ease of maintenance and operation. Although these design considerations appear to impose some additional constraints on the operation of the Turkey Point plant, they do not preclude operational excellence. They simply demand greater management attention to achieve that excellence.

Both the St. Lucie and Turkey Point plants rely on the FPL corporate Power Plant Engineering (PPE) organization,

supplemented by the architect-engineer, for design of major plant modifications and for resolution of problems requiring significant engineering design or analysis.

PPE is a matrixed organization supporting both nuclear and fossil generation. In the matrix organization there are engineering groups of specific disciplines, with personnel from each discipline assigned to various projects. PPE and the Nuclear Energy Department (NED) are located at Juno Beach, approximately 50 miles from St. Lucie and 125 miles from Turkey Point. The FPL Corporate General Offices are located in Miami about 25 miles from Turkey Point and 150 miles from St. Lucie.

FPL has historically been a well managed utility. An example of FPL's progressive attitude is their company-wide commitment to the Quality Improvement Program (QIP). Additional details regarding QIP are contained in Appendix C. QIP is a management process which emphasizes product quality through employee teamwork and involvement. QIP has achieved international acclaim and has been adopted by some of the more successful corporations worldwide. The IMA Team found that, consistent with its progressive approach, FPL is committed to achieving excellence in the operation of both their nuclear power plants. In the case of St. Lucie, this commitment has achieved considerable success as illustrated by a 1987 Atomic Industrial Forum ranking of the performance of world nuclear power plants. The ranking showed St. Lucie Unit 1 as the highest ranked U.S. plant in capacity factor from 1982 through 1986. In addition, St. Lucie is consistently awarded high rankings in the NRC's Systematic Assessment of Licensee Performance (SALP) program. The Institute for Nuclear Power Operations (INPO) has also commended St. Lucie in past plant evaluations.

Turkey Point, however, has not achieved the standard of excellence desired by FPL and required in the post-TMI commercial nuclear industry. Turkey Point has experienced a series of events which indicate that the plant has not met FPL's goal of excellence and which have resulted in NRC enforcement actions. In response to these problems, FPL has undertaken a number of initiatives to improve operations at Turkey Point. These initiatives include personnel changes, improvements in procedures and a program to develop a sense of teamwork and accountability in all Turkey Point personnel. However, FPL management and the NRC have continued to identify breakdowns in performance and failures to comply fully with procedures and regulatory requirements.

In October 1987, FPL committed to initiate a comprehensive independent management appraisal to identify the causes for the performance deficiencies of Turkey Point. The NRC confirmed FPL's commitment by NRC Order EA-87-85. As indicated in Appendix A, this appraisal is consistent with the requirements of that order. The appraisal reviews corporate and plant management, as well as specific technical areas. The appraisal followed the process described in Revision 1 of the IMA Program Plan. The effort was concentrated on those issues which, based on initial investigations, were the most pertinent to the performance issues at Turkey Point. The appraisal considered the differences and similarities between Turkey Point and St. Lucie performance, in order to better understand the underlying reasons for the performance issues at Turkey Point. The evaluation focused on identifying Turkey Point problems, establishing root causes for the problems, including attitudinal and cultural factors, evaluating the effectiveness of FPL corrective actions, and developing recommendations which will help to improve Turkey Point operations.

3.0 APPRAISAL ORGANIZATION AND METHODOLOGY

3.1 ORGANIZATION

The IMA project organization included a Project Team (IMA Team) and a Senior Evaluation Team (SET). The IMA Team was responsible for conduct of the project in accordance with the NRC approved program plan. The SET was responsible for providing executive level overview of the project methods and results. The SET periodically reported project status to FPL's Senior Level Review Board (SLRB). The SLRB consisted of the FPL Chairman and CEO, President, Executive Vice President and Senior Vice President, Nuclear. Consistent with the guidelines established for this IMA, the NRC also attended these meetings.

3.1.1 Project Team Organization

The IMA Team used extensive data gathering, validation, interpretation and analysis to identify Turkey Point performance deficiencies and their root causes and to develop recommendations for corrective action. The IMA Team organization consisted of four discipline teams. The IMA Team developed procedures to assure a thorough, orderly and uniform examination of relevant data in each discipline. These teams were:

Management and Organization
Engineering and Regulatory Compliance
Operations, Maintenance and Training
Security, QA/QC and Health Physics/Chemistry

Each discipline team included a Team Leader, reporting to the Project Manager, and professional personnel with operating nuclear power plant experience in their respective specialties. Key project personnel are listed in Appendix B along with summaries of their qualifications.

Organizational performance deficiencies are often rooted in human behavior considerations. For this reason, a team of behavior experts from the firm of Behavior Consulting Services, Inc. participated on the IMA Team to assure that these aspects were appropriately considered and analyzed. They contributed to all phases of the project, and were of particular benefit in the design of the interview process, the selection and interpretation of the surveys, the analysis of the collected data to detect behavior trends, and in assuring that the recommendations properly considered relevant principles of human behavior. The Management and Organization team was assisted by Tim Martin & Associates, a firm specializing in analyses of utility organizational structure and staffing.

3.1.2 Senior Evaluation Team

The purpose of the SET was to provide a senior executive overview of the appraisal. The SET consisted of five senior executives. SET members were not directly involved in the data gathering and initial data evaluation activities of the project and, with exception of the SET Chairman, are from organizations other than Enercon. A list of the SET members, along with summaries of their qualifications, is included in Appendix B.

The SET assured that the appraisal was conducted and presented in a manner consistent with the perspective of senior level utility and regulatory management. The SET reviewed the methods used in the appraisal and the recommendations provided by the project team. The SET overview provided reasonable assurance that the methods could be expected to produce a full spectrum of relevant facts, that problem areas requiring corrective action were properly identified, that root causes were properly defined, that the IMA recommendations were

appropriate and that compliance with the recommendations could be achieved with practical, measurable actions. The SET also presented the appraisal methods and findings, both preliminary and final, to the FPL SLRB.

3.2 APPRAISAL METHODOLOGY

The IMA relied on interviews, surveys, document reviews and direct observations to gather data for this appraisal.

Documents from 1985 through March of 1988 were examined during the IMA. Other than to provide an overview, documents generated prior to 1985 were assumed to be of minimal relevance to the current situation at Turkey Point.

The IMA Team generally classified the data as either "hard" or "soft". Hard data included data derived from direct observations and data extracted from the various documents. Soft data included information obtained from the interviews and the surveys. Soft data was used as a basis to identify areas requiring further investigation. Unless the IMA Team corroborated the soft data they did not consider it to be an adequate basis for conclusions.

The data was collected in two phases. The first phase involved a broad collection of data from throughout the Turkey Point organization and, as appropriate, from St. Lucie and related corporate organizations. This data was analyzed to identify potential problem areas requiring further investigation. A more focused and detailed data gathering effort was then initiated for each of the potential problem areas identified. The IMA Team examined each of the identified areas in order to determine the validity, extent and relevance of the potential problem, and to identify root causes.

The data gathering methods are described in the following paragraphs.

3.2.1 Interviews

Interviews were conducted throughout the Turkey Point organization, at St. Lucie and with the corporate organizations. The interviews were conducted at multiple levels within the organization, from the executive level to the workforce level. The IMA Team members conducting interviews were trained in interview techniques.

The team members conducted detailed interviews. The duration of the interviews typically ranged from two to four hours. Two interviewers were present at most interviews in order to assure adequate notes were taken and to allow an immediate post-interview cross check of the data provided. Following the initial formal interviews, additional informal interviews were held which focused on specific issues. Interviews were considered to provide soft data. They were used to identify areas requiring further investigation. Conclusions were not drawn based on interview data unless corroborated.

The approximate number of interviews conducted in each of the relevant FPL organizations is indicated in Table 3-1.

TABLE 3-1

FORMAL INTERVIEWS

	Turkey Point	St. Lucie	Corporate Support
Approximate Number of Interviews	90	50	30

3.2.2 Questionnaires

The Clark Wilson Survey of Management Practices was given to 521 FPL employees in the Turkey Point, St. Lucie and corporate organizations. The purpose of the survey was to identify the dominant characteristics of management style within these organizations and to identify potential problem areas requiring further investigation. The behavioral specialists selected this particular survey because of its widespread acceptance and usage in industry. The survey has been administered to over two hundred thousand individuals in the last ten years. The response norms have been stable throughout this period.

The individuals surveyed were selected in order to assure representation from every organization of interest at Turkey Point, St. Lucie and the Juno Beach offices and to assure representation from all levels of management.

The surveys were distributed, monitored and collected by an IMA Team representative in order to assure confidentiality. The number of employees surveyed in each of the FPL organizations is shown in Table 3-2 below:

TABLE 3-2
QUESTIONNAIRES

	Turkey Point	St. Lucie	Corporate Support
Number of Personnel Surveyed	179	229	113

3.2.3 Document Review

An extensive review of documentation was performed in order to identify and document those conditions or items which have had an impact on Turkey Point operations. For comparison purposes, selected documents from St. Lucie were also

reviewed. Documents from January 1985 through March 1988 were reviewed. Documents prior to 1985 were judged to have little relevance to the current conditions at Turkey Point.

A more complete documentation review was performed for the more recent time periods. This allowed the Project Team to focus more resources on the more current documents.

Specifically, the documents reviewed for each time period are described below:

a) Documents generated in 1985 - Major documents such as: SALP Reports; NRC Notices of Violation, including FPL responses; INPO Evaluations; Licensee Event Reports (LERs); FPL documents which summarize plant performance (problems and good practices); and other such documents identified during the document review and management appraisal process.

b) Documents generated in 1986 - In addition to the documents listed in paragraph a), the following documents were reviewed: Internal Audit Reports for areas of concern; Surveillance Reports; Corrective Action Reports; NRC Office of Inspection and Enforcement (I&E) Reports; FPL responses to SALP and INPO reports; and other documents identified during the document review and management appraisal process.

c) Documents generated in 1987 and 1988 - In addition to the documents listed in paragraph a) and b), the following documents were reviewed: Samples of Quality Control (QC) Inspection Reports; Samples of log books; Selected safety related maintenance work requests; Selected Quality Improvement Program records; Management On Shift reports;

Comments from the Senn-Delaney Program; INPO Operational Assistance Visit Reports; and other documents identified during the document review and management appraisal process.

This initial review included approximately 1,700 documents. During the appraisal process many additional documents were examined including correspondence, drawings, reports, organization charts, safety evaluations, plant change/modification packages, work orders, and other work products. Document Review results were considered to be hard data.

3.2.4 <u>Observations</u>

Observations consisted of one or more team members observing activities in progress. Typical activities that were observed included:

a) Various meetings such as Plan-of-the-Day meetings, nuclear safety committee meetings, etc.

b) Field observations of work in progress.

c) Shift turnovers.

d) Sampling of in-progress work efforts, activities and products. Examples include the plant work order process, plant change/modification process, etc.

The IMA Team selected activities to be observed based primarily on interviews or document reviews. The hard data gained from observations was a key element in the validation of potential problem areas identified through the interviews, surveys, and document reviews.

3.2.5 Data Evaluation Process

An analysis was performed following the first phase of data collection. The analysis involved correlating the data to identify repetitive errors or failures, organizational units with higher than average incidents of deficient performance, and/or functional groups not performing satisfactorily. Also, the data was analyzed to provide a characterization of the deficiencies as, for example, training, planning, staffing, design, etc. This preliminary analyses produced a list of performance issues. The performance issues were then reviewed by the project team and the SET and were used to identify areas requiring further investigation.

The second phase of data gathering was an in-depth examination of the performance issues which required further investigation. Team members conducted interviews, observations, document reviews and specific case history studies. Each performance issue was either further validated or was invalidated when it was more accurately characterized. The validated performance issues were then analyzed to identify common elements or interrelationships which were indicative of the root causes. The goal of the root cause analysis was to identify root causes which would lead to recommendations on which FPL could take action. The identified root causes, the associated performance issues and the validation data for each issue were then reviewed with the SET. Following the SET review, a final series of data was collected to confirm, verify, and characterize the root causes and to provide further guidance in the development of recommendations.

During the conduct of the project, the IMA Team reported to a designated individual at FPL any findings which represented a potential for regulatory noncompliance by FPL. This allowed

FPL to investigate the potential noncompliance immediately and to take the appropriate corrective action.

. The verified root causes, associated performance issues supporting data, and recommendations were reviewed by the IMA Team and by the SET before development of this final project report.

4.0 ROOT CAUSES OF TURKEY POINT PERFORMANCE DEFICIENCIES

This section of the report discusses the root causes and the underlying performance deficiencies associated with each root cause. Also discussed are corrective actions initiated independently of this IMA by FPL Management. Finally, an evaluation of the effectiveness of these corrective actions is presented. As used herein, root cause is defined as the most basic reason for a problem which, if corrected, will prevent recurrence of that problem and similar problems. The IMA Team pursued the evaluation to the extent required to produce root causes for which practical corrective action could be identified. The IMA Team determined that the five root causes of the Turkey Point deficiencies were inadeqaucies related to leadership, management attention and follow-up, technical support, work performance and support, and operations and maintenance.

To understand the root causes of the performance problems experienced at Turkey Point it is helpful to review historical events which have had a significant impact on the culture of the workforce. Turkey Point, FPL's first nuclear power plant, was built on a site with two fossil plants. The nuclear units were initially staffed with mostly fossil plant employees who had inadequate nuclear training or experience. These employees did not fully understand the impact of the stringent regulations of the nuclear industry. They often viewed the NRC as an adversary and they were not always sensitive to the NRC's role to help assure the safety of the nuclear industry.

After the incident at Three Mile Island, the regulatory climate changed greatly, and the public awareness of nuclear plant operations increased significantly. As a result, the nuclear industry implemented many hardware, software, organizational and procedure changes over a period of years in

the early 1980's. The Turkey Point plant culture and the burden of these changes led to performance problems and to an ineffective NRC interface. This placed Turkey Point site management under a great deal of pressure to implement changes and improve performance. Consequently, a culture developed at the plant of committing to many improvement programs without examining the impact on the plant personnel's ability to manage or execute the full spectrum of programs.

Other elements affecting the culture of the work force were the proximity of the FPL General Office in Miami to Turkey Point and the fact that Turkey Point was the company's first nuclear power plant. This resulted in direct, substantial corporate involvement in construction and operation of the plant. While this close working relationship has had many positive aspects, there were two negative impacts. First, corporate management, in many cases, believed that they best understood the plant's needs and as a result they were not always responsive to the views of the plant staff. Second, the plant grew accustomed to corporate management making the decisions and, to a large extent, ceased making those decisions which should have been made at the plant site. This lack of assertiveness by plant management appears to have had an effect on the attitude of the entire plant staff.

In addition, until the mid-1980's corporate management, and therefore the plant staff, emphasized short term plant availability as a goal, rather than reliability. This emphasis too often resulted in a reliance on short term fixes rather than permanent repairs and improvements.

Finally, until April 1986, the plant support organizations were located in various buildings around the site. This dispersal was not conducive to an attitude of teamwork in the support organizations.

Many of the current FPL improvement initiatives are aimed at changing the culture which has developed and persisted over the past 15 years. Many of the performance issues discussed in the following sections can be traced to that same culture.

4.1 Leadership

The less than adequate performance of several management leadership functions has been found to be a root cause of Turkey Point's performance. The essence of this root cause focuses on the workforce receiving, understanding, and acting upon the goals and direction provided by site management. The IMA team found several performance issues which substantiate this root cause. These include shortcomings in the following areas: (1) management goals, (2) communication of goals, (3) management resource diversion, (4) the NRC interface and (5) control of commitments and changes. These performance issues are discussed below.

4.1.1 Management Goals

4.1.1.1 Discussion

To assist with the implementation of the QIP at Turkey Point, the Site Vice President appointed a Site Lead Team of key plant managers. Additional details of QIP and the Site Lead Team are given in Appendix C. The Site Lead Team established eight indicators to be used as measures of plant performance. These indicators are Mean-Time-Between-Failure, Licensee Event Reports, Hours in Limiting Condition of Operations, Radiation Exposure, Contaminated Floor Space, Security Event Reports, Outage Extension, and Reactor Trips. These indicators are sufficient to measure certain aspects of plant performance and achieving a positive trend in the indicators would represent a significant improvement in performance at Turkey Point. However, they are not a complete statement of plant goals. For example, mean-time-between-failure and reactor trips are indicative of achieving a goal of high plant reliability. In other words they are, as the name states, indicators but not goals.

Targets have been established to improve each of these indicators. These targets are derived from the corporate policy deployment short term plans, but they are not easily communicated as goals to which the plant staff can relate. In addition, elements which have not been adequately addressed include control of changes and improvement in the physical condition of the plant. Further, during the process of establishing the indicators the Site Lead Team recognized many of the problems which this report addresses. However, the plant indicators do not necessarily focus on those problems.

4.1.1.2. <u>Corrective Action Currently Underway</u>

Recently FPL corporate management has provided direction to establish goals which more directly support the policy deployment short term plans. The Site Lead Team has reexamined the indicators and recently added outage extension and reactor trips. They are currently considering additional indicators. The IMA Team concurs that the indicators should be re-examined and should be stated as goals to which the staff can relate.

4.1.2 <u>Communication Of Goals</u>

4.1.2.1 <u>Discussion</u>

The indicators which have been generated by site management in the last six months have not yet been effectively communicated to the work force. This has resulted in a lack of unified organizational effort and has produced departmental priorities that are sometimes uncoordinated and inconsistent with the priorities of plant management.

Employee interviews and observations of various meetings failed to produce evidence that, at the working level, the plant goals were known or were considered in the decision

making process. The goals are not being devolved by each organization into elements that relate to the group's work responsibilities or performance.

Examples of goals and management expectations which have not been effectively communicated are the new emphasis on reliability rather than short-term availability, the expectation of superior quality in all phases of work and the interest in improving plant equipment conditions. In addition, the managers and supervisors are not getting out in the plant often enough to communicate the goals directly to the work force.

4.1.2.2 Corrective Actions Underway

The Site Lead Team has realized that the site indicators need to be effectively communicated throughout the organization and is currently developing an action plan to accomplish such communication through line management. This realization and development of an action plan is a positive step. However, the action plan is still in the preliminary stages after several weeks of preparation. Site management should expedite effective communication of its goals.

"Quality Days" meetings were recently held where the Lead Team indicators were explained to the plant staff. This communication overemphasized the technical aspects of the quality improvement efforts rather than discussing the employees' roles in achieving the indicator targets, soliciting employee support, or describing the process of how the goals of each plant organization were going to be developed to support these indicators. Thus, an opportunity for effective communication was only partially successful. In addition, for two of the four sessions the two senior managers on site were unable to attend. The reason for their absence

was unexplained and the unexplained absences made the meetings seem less important.

In late 1987, the Site Vice President began a series of meetings which will eventually include the entire work force. In these meetings, he communicates his expectations to the work force. To date he has held meetings with operations and security. Meetings for the other plant organizations will be scheduled during 1988. In addition, the Site Vice President is working with his line managers to communicate the goals throughout the organization. These efforts to communicate the indicators and expectations are positive but have not yet been effective in reaching the work force.

4.1.3 <u>Management Resources Diversion</u>

4.1.3.1 <u>Discussion</u>

As previously discussed, lack of visible leadership has been one root cause of Turkey Point's performance deficiencies. Strong leadership in line management functions is particularly important. At Turkey Point, however, the line management function has, in many cases, been eroded because focus and time has been diverted from regular responsibilities to the various improvement programs and large number of meetings. One effect of this diversion is that management and supervisors do not have sufficient time to be in the plant to directly observe and supervise the efforts of the work force.

Numerous improvement programs at Turkey Point have been initiated in response to NRC and corporate management concerns as well as those self-initiated by the plant. Each of these programs is positive and each was imposed with the intention of improving Turkey Point performance. Considered in the aggregate, however, they have diverted attention and resources from the correction of known problems. In retrospect, line

and senior management should have focused more on line management responsibilities and should have been more sensitive to resource limitations. This might have avoided the imposition of excessive parallel improvement programs.

Nonetheless, many of these programs have had or will have a positive impact. For example, the Site Lead Team may eventually correct the lack of management goal communication discussed earlier. The Management on Shift Program has helped to improve licensed operator performance. Turkey Point line management appears to believe that focusing on these improvement programs will restore Turkey Point to the standards of excellence desired. However, a critical element required for Turkey Point recovery is a renewed dedication to the planning, supervisory, leadership, counselling, and aggressive problem solving responsibilities of line management. Only then can the improvement programs be effectively integrated into the recovery process.

4.1.3.2 Corrective Actions Underway

There is no specific corrective action apparent which indicates that the time required of management to be involved in programs and meetings is being reduced to allow more attention to line management responsibilities.

4.1.4 NRC Interface

4.1.4.1 Discussion

The lack of clear and aggressive management direction regarding the NRC interface is a leadership performance issue. Turkey Point has had a history of interface difficulties with the NRC. A part of this is due to Turkey Point's plant performance and the inability to establish effective corrective action as indicated by the number of repeat LERs and violations. However, a portion of it can be attributed to

the way Turkey Point has interacted with the NRC. This has led to additional scrutiny by the NRC. The significance of this is not just that additional scrutiny typically results in additional findings of noncompliance, but that performance must show significant visible improvement to an exemplary level to be convincing to the regulator. Moreover, it is not enough to just improve performance. The relationship with the NRC must be based on mutual respect and confidence so that the NRC staff will recognize plant performance improvements and allow FPL management to manage plant operations.

Past plant management practices were contributors to the ineffective NRC interface. The practices and policies in dealing with the NRC have been, to a large degree, learned from on the job experience. Corporate management has not yet adequately promulgated a formal policy and approach for achieving an effective regulatory interface.

In addition to the lack of a clear policy regarding the NRC interface, the responsibilities of various organizations have not been clearly defined. There are at least six organizations with some duties and responsibilities related to licensing activities and the NRC interface. These include the Regulatory and Compliance Group in the Technical Support Group, a licensing group in PPE on site and one in PPE at Juno Beach, Juno Beach Nuclear Licensing Group, the Turkey Point Quality Control Group and the Quality Assurance Group. The duties and responsibilities of each group are generally understood but have developed more by custom than through management direction or policy. Such a diverse organization can be effective depending on the people involved. However, with Turkey Point's history of NRC interface difficulties it is important that responsibility for licensing and the NRC interface be focused and directed by strong, unified leadership.

4.1.4.2 Corrective Action Currently Underway

Corporate and Turkey Point management have taken some positive actions to improve the management of the NRC interface. Most significant are recent management changes at Turkey Point which have directly contributed to improving the relationship with the NRC resident inspectors.

In 1986, corporate management issued a policy statement on communications with the NRC. However, many people involved with the NRC are not aware of this policy. The policy statement is a good starting point for communicating the manner in which an effective NRC interface should be achieved. However, the policy statement currently provides more information and background on the NRC, than ways to achieve an effective NRC interface.

As a result of a problem concerning closure of commitments made to the NRC, Turkey Point established a centralized commitment tracking system (CTRAC). As discussed in a later section, there are some problems with the current use of CTRAC, however, CTRAC has resulted in better tracking of NRC commitments.

The Quality Assurance (QA) organization has recognized the need for and established a program to improve the NRC interface. The program consists of a series of planned meetings with the NRC, frequent contacts with resident inspectors, and monthly plans to improve communications. The objectives of the plan are to establish open communication, keep the NRC aware of improvement initiatives within QA, discuss achievements, and develop good working relationships between the NRC and QA. Such a program is a good step in achieving effective NRC interface and has shown good results.

One additional positive action currently planned is Turkey Point management's decision to increase the size of the Regulatory and Compliance Group staff, with particular emphasis on improving the root cause analysis of LERs and violations, and on assuring that corrective actions are appropriate to preclude recurrence.

These actions are having or will have a positive impact on improving the relationship with the NRC, however, additional actions are recommended as discussed in Section 5.

4.1.5 Control of Commitments and Changes

4.1.5.1 Discussion

There has been a tendency for external organizations (e.g. corporate management, NRC, INPO) to suggest or impose multiple improvement programs on Turkey Point. One of the ramifications of this tendency is that line management is required to focus on implementing programs, rather than on their day-to-day management responsibilities. In addition, if plant physical condition, design, or configuration is perceived to be a part of the performance issues, there is a tendency to initiate numerous plant and procedural modifications. The result has been a level of commitment and a state of change which overwhelms available resources and creates such a state of flux that the corrective actions are difficult to implement. The point is that such commitments and changes should be carefully evaluated relative to other needs. If such programs are truly necessary, then they must be planned and prioritized so that management attention is not diverted from the primary line management functions of assuring safe and reliable plant operation.

Other indications of the increasing number of commitments and changes are the backlog of engineering action items from PPE

in Juno Beach (JPE), the high number of Requests for Technical Assistance (RTAs) and Requests for Engineering Assistance (REAs) and the increasing number of Plant Change/Modifications (PC/Ms). A large fraction of these are the result of internally generated changes and were not regulatory driven.

One undesirable by-product of an excessive level of change at Turkey Point is the impact on the Plant Nuclear Safety Committee (PNSC). This committee is composed of the key managers such as the Operations Superintendent, Maintenance Superintendent, etc. Technical Specifications and the PNSC Charter require these managers to review and approve procedures, changes to procedures, design changes, safety evaluations, temporary system alterations, violations, LER's, etc. In 1987, there were approximately 350 PNSC meetings during which the PNSC reviewed and approved over 4,000 procedures, procedure changes and other items. The key managers on the PNSC spend a disproportionate amount of their time on PNSC activities. This further detracts from the management of their respective departments.

The Integrated Schedule (IS) has recently been established at Turkey Point and was made an amendment to the operating license in November 1987. The objective of the IS is to allow effective control and management of resources by prioritizing tasks and scheduling the work within manageable resource limits. The IS is a new system at Turkey Point and some implementation problems are still in the process of being corrected. However, there are two important points relative to Turkey Point's utilization of the IS process. First, there is a significant fraction of work at Turkey Point which is not incorporated in the IS and is therefore not considered when developing priorities of schedules for additional work items. There is no centralized scheduling and prioritization or

work. Second, there is currently a significant amount of work scheduled in excess of specified resource limits. Some of this is due to management overrides which allow work to be scheduled by management even though it may conflict with the priorities and resource limitations defined by the IS. These two points limit the effectiveness of the IS as a tool to assure effective control and prioritization of commitments and illustrate the overcommitment of resources.

There is a need for improvement of commitment control at Turkey Point. There is no clear definition of what constitutes a commitment, although a very broad interpretation has evolved. Commitments can be made in a number of ways and the degree of management review depends on the type and the relative significance of the commitment. All commitments are entered and tracked on CTRAC. CTRAC not only includes regulatory commitments but also includes a high number of internal FPL actions which are not directly related to an NRC commitment. Responsibilities for commitment management are not centralized. Commitments and responsibilities for commitment closure can be entered into CTRAC from a number of organizations. Another problem has been the closure of items based upon initiation of paperwork defining corrective actions, rather than closure after the corrective actions have been implemented.

As a result of the lack of commitment definition and control and the large amount of paperwork required for commitment tracking and closure, there has been a significant increase in the resources devoted to closing commitments. In addition, the commitment closure efforts are not prioritized and integrated with other work so that resources devoted to near term commitment closure may be diverted from solving important plant performance problems.

In summary, Turkey Point management has not established a clear goal and policy for control of commitments and the reduction of changes. There are a number of indications of a large workload required to resolve open commitments and effect changes. This work has not, in all cases, been prioritized and coordinated with other work. As a result, management attention has been directed away from important, high priority issues directly related to overall performance problems at Turkey Point.

4.1.5.2 Corrective Actions Underway

Turkey Point has taken some positive actions for improving the control of commitments. There is currently a policy in draft form for commitment control. The establishment of CTRAC provides for a centralized tracking of commitments which precludes the need for different groups to track their own individual commitments.

Turkey Point has taken some actions to improve the screening of requested design changes (RTAs and REAs) and of PC/Ms to determine if the change is warranted. This screening process has included reviews by the Change Review Team (CRT) and the Project Review Board (PRB) prior to review by the PNSC. However, in the past the members of the CRT which performed the reviews have been lower level personnel. Recent actions to require department heads to review changes at the CRT should improve the screening process and help to control changes.

An important recent action was a freeze on plant changes initiated by the Site Vice President. The objective of the freeze was to review all plant changes, particularly those internally initiated, and to re-evaluate their need. Such an effort was certainly necessary. However, there is still a significant amount of current and planned work which warrants examination to assure that the changes are essential.

4.2 Management Attention and Follow-Up

The IMA Team has identified insufficient management attention and follow-up as a second root cause which has contributed to the performance issues at Turkey Point. This root cause is reflected in following performance issues: (1) lack of accountability, (2) ineffective use of the quality organizations and (3) the lack of sufficient emphasis on the security program requirements.

4.2.1 Accountability

4.2.1.1 Discussion

Management attention has not been sufficient to develop accountability in the Turkey Point organization. Accountability, as used herein, is the sense of personal ownership that an individual must feel toward his/her responsibilities in order to assure that a related problem is corrected or an issue resolved.

Coaching and follow-up are critical to develop accountability. The IMA Team observed that most Turkey Point managers do not make enough time available to observe work in progress and do not provide specific on-the-job coaching and feedback. Frequent tours of the plant would allow the managers to directly observe and communicate with employees, determine the employees' concerns, and relate worker activities to the group and plant management expectations.

The management development rotations at Turkey Point have had a negative impact on teamwork and accountability. The high managerial turnover created by this program creates an emphasis on short term results and competition, rather than long term improvements and teamwork. It also disrupts personal manager-subordinate relationships and impairs the communication and involvement that foster accountability.

Turkey Point practices relating to delegation and written requests for assistance also have a negative impact on accountability. Personal involvement and commitment are key components of accountability and are too often missing at Turkey Point. Goals, responsibilities, action plans and job assignments must be mutually defined and agreed upon to establish a sense of ownership. In general, Turkey Point tends to rely on written communication rather than verbal communication which, if necessary, can be later summarized in writing. At Turkey Point, problems are too often shuffled among various organizations instead of being solved. The paperwork systems appear to be used to avoid ownership, particularly where the task is difficult and can easily be handed to another group in the organization.

A basic cause of poor accountability is the lack of meaningful performance indicators which are consistent with the management goals and relate directly to the work activity. For example, many of the performance indicators relate to the amount of paperwork processed instead of the performance of plant systems. Turkey Point managers lack feedback on direct measures of performance concerning safety, quality, schedule, and budget. They also lack information regarding indirect measures of performance such as overtime and turnover. Such feedback is crucial in developing personal and organizational accountability. When performance measures do not clearly relate to targets and goals (as discussed in Section 4.1.1), mid-level managers are more likely to lose sight of what their people should be doing. This leads to a drifting of responsibilities from the appropriate issues and a tendency to manage crises and short-term problems. Managers and supervisors do not have the performance information they need to effectively manage their areas.

A clear sense of purpose and clear measures of the group's performance are important elements of an effective team process. Data on a group's performance is the foundation for establishing a common purpose. Without this information, managers and supervisors cannot provide regular, objective feedback on performance to their work groups or hold their personnel accountable. Nor can the work groups be easily involved in setting targets and developing action plans for achieving their targets. Creating effective teams begins with the basics of establishing clear goals and measuring the group's performance, then grows through involvement of the entire group and success.

4.2.1.2 <u>Corrective Actions Underway</u>

FPL has taken several actions to enhance accountability, particularly within the QIP. Several organizations have posted graphs in the hallways to provide feedback on progress in achieving goals. The Site Lead Team identified accountability of supervisors as one of the five major plant problems. This recognition is essential to the solution of the problem. In addition, workshops on team building and accountability are being held. The IMA Team understands that all Turkey Point personnel will attend the workshop sessions and follow-up meetings and that everyone at Turkey Point will participate in their first session before June 1988.

Plan-of-the-Day meetings were initiated in September 1987. These meetings help identify which group is responsible for solving specific problems. Improvements in the meeting are being planned at the present time.

The Operations Superintendent, who was appointed in 1987, has developed Standards of Professionalism for the plant operators and is working with them to create a sense of accountability within Operations. The shift turnover process has been

improved so that operators and maintenance supervisors assume responsibility for problems, not just tasks. The actions taken by the new Operations Superintendent have been successful because he is holding operations personnel accountable for their work. This type of managerial insistance on accountability must be adopted by all Turkey Point managers in order for the corrective actions described in the paragraphs above to be fully effective.

4.2.2 Use of Quality Organizations

4.2.2.1 Discussion

Management has at its disposal an excellent tool for ensuring high quality performance. The QA group can perform in-depth audits to identify performance problems and trends which indicate future performance deficiencies. The Quality Control (QC) group can get out into the plant to help prevent recurrence of problems. Currently, the QA and QC activities are being conducted effectively within the guidelines established by management. However, the capabilities of these groups and the data from their reports have not been fully utilized by plant management to improve plant performance and reduce problems. This under-utilization is indicated by:

1. A high incidence of repeat violations and events.

2. Failure of plant management to use QC to monitor activities in areas that are particularly visible or have a history of problems.

3. Failure to use QA information to develop the necessary trends that would allow management to identify and anticipate problems and prevent violations.

NRC inspection reports and INPO evaluation reports demonstrate recurrence of some events. In addition, QA audit reports indicate that QA identified many of these items prior to the outside inspections. Management, however, was either not sufficiently aware of the items or did not pursue these problems with sufficient vigor to correct them.

In reviewing QC documents, it appears that the QC function is being performed in a reasonable manner. However, the number of QC activities related to operations and maintenance has been inadequate to reduce recurring problems. For example, there have been several instances of incorrect valving operations on the same system. One way to remedy this problem is to provide QC oversight each time a troublesome evolution is executed until the root cause of the problem is found.

4.2.2.2 Corrective Actions Underway

QC has requested additional resources. However, justification for these personnel continues to focus on the currently defined activities. It does not appear that sufficient emphasis has been placed on using the QC function to reduce the number of recurring problems.

QA has created a performance monitoring organization with the responsibility for identifying potential problem areas. Reports from this organization provide management with an indication of areas where increased QA and QC activities may be initiated to prevent recurring problems.

There is evidence that root cause analysis is occurring more frequently at Turkey Point. The IMA Team observed more frequent use of performance monitoring reports and analysis of quality-related findings.

The above actions are positive. Additional efforts are needed to more effectively use the information from the QA and QC organizations.

4.2.3 Security Program Requirements

4.2.3.1 Discussion

Excessive security violations indicate that until recently there has been insufficient management attention on security. There apparently has been inadequate effort to make all personnel aware of the importance and sensitivity of security. Lost security badges and access control problems illustrate this lack of effort.

There is a lack of emphasis on security information in General Employee Training which may suggest to incoming plant personnel that security is not one of the high priorities at Turkey Point. The incoming personnel remain uninformed of their personal role in plant security. Until recently, training for the security guards was also insufficient and the guards had a high rate of failure in training examinations.

The IMA Team found no evidence of written goals by either Corporate Security or the Plant Security Supervisor to establish direction and identify the steps necessary to attain success. There is less chance for misunderstanding of written goals than when goals are orally transmitted. FPL security employees at Turkey Point have thought of accountability in general terms rather than having personal ownership of security problems. This lack of accountability has been compounded by the fact that there is an insufficient number of FPL security personnel at Turkey Point who have nuclear site security experience. In addition, Turkey Point Security did not seek help from Corporate Security.

Communication between plant security staff and construction management needs to be more effective. Currently, work requirements are informally discussed with security and, in some cases, not even reviewed as to their impact on security. This is not an acceptable approach. There have been instances where construction has unwittingly caused violations of the security plan. There have been numerous occasions in which better planning by construction would have resulted in more effective and more economical use of compensatory posts. Currently, security's overtime costs are significant and could be related to scheduling problems caused by this informal communication system.

In addition to the personnel issues discussed above, the site security equipment and security plan are out-of-date. While these items do not necessarily reduce security they place an additional workload on the security force and increase the opportunity for violations to occur.

4.2.3.2 <u>Corrective Actions Underway</u>

Security equipment has been recognized by FPL management as a significant deficiency and is the subject of a twenty-four (24) month upgrade which has been included in the Integrated Schedule. This upgrade program should be examined with the objective of accelerating any improvements which are not dependent on new security electronics.

An additional security manager with nuclear site experience has been temporarily added to the site security organization as the senior security manager on site. Two additional FPL corporate security personnel have been temporarily assigned to Turkey Point. Turkey Point was just authorized to hire five additional site security personnel. The intent is to have an FPL security person on each shift to handle any problems that might arise.

A new video emphasizing security has been developed to supplement GET. This video will be shown to all Turkey Point personnel to help each of them understand that security is the responsibility of everyone, not just the security personnel.

FPL has contracted with an outside company to rewrite the Turkey Point Security Plan and Procedures. The rewrite of the Security Plan has begun. In addition, FPL has had the security contractor upgrade its training lesson plans and training aids and develop a Quality Improvement Program to improve the performance of the security guards and supervisors. A significant part of this program should be the contractor's acknowledgment of their accountability in ensuring that their personnel, especially supervisors, implement good security practices. These actions are required because, until recently, corrective actions were directed to only the involved individuals and not the contractor organization.

These corrective actions should be sufficient to improve the performance of the security force and to define the accountability of the security contractor with regard to their responsibility for civil penalties resulting from NRC violations. However, Turkey Point management must closely monitor security to assure that improvement is being achieved. In Section 5, several recommendations are made to increase the security knowledge and accountability of non-security plant personnel, FPL employees and contractors.

4.3 Technical Support

The Turkey Point plant requires effective technical support. In addition to having a number of shared systems the original design did not include many of the lessons learned and design features that evolved over the years to improve overall plant performance. These features (or the lack thereof) combined with the current Technical Specifications have led to significant operability issues, and a high number of hours in LCOs. Other issues which have contributed to the problems experienced at Turkey Point and also emphasize the need for effective technical support include: many original components are no longer commercially available and require engineering and safety evaluation upon replacement; inadequate maintenance of the design basis documentation; and substantial design changes to improve plant performance or meet current regulatory requirements.

Turkey Point has had a history of persistent equipment and design problems. These problems include a high repetitive equipment failure rate, a high percentage of operating hours in Limiting Condition for Operation (LCO) and a high number of unplanned days off-line due to design related issues. In the recent SALP report, the NRC identified a growing concern related to adequacy of engineering and technical support provided to plant operations and maintenance. The IMA Team has found several performance issues indicating that one of the root causes leading to performance deficiencies at Turkey Point is ineffective technical support (technical support as used in this report includes engineering support in addition to site technical support). This root cause is indicated by the following performance issues: (1) the organizational structure, (2) skills and training and (3) root cause analysis, trending and reliability engineering.

These issues make the management of Turkey Point more difficult and they demand that a high level of effective technical support be provided to the plant.

4.3.1 <u>Organizational Structure</u>

4.3.1.1. <u>Discussion</u>

One of the primary contributors to ineffective technical support is the organizational structure. Turkey Point has technical support requirements that are, in many respects, different from those at St. Lucie and significantly different from those at FPL's fossil power plants. However, the engineering and technical support organizations have not been aligned to meet those needs.

There are two primary organizations providing technical support for Turkey Point; Power Plant Engineering (PPE), which is headquartered at the Juno Beach offices and also maintains a staff at the Turkey Point site, and the Technical Support Group (TSG) which is part of the Turkey Point plant staff. PPE provides design engineering support and retains responsibility for design changes and design control activities (including component replacement) at Turkey Point. Most of the engineering is performed offsite at Juno Beach. The TSG provides engineering and technical support to the plant organization. TSG support is primarily in the form of system engineering, Shift Technical Advisors, in-service inspection and testing, and regulatory compliance and licensing support. Selected engineering and technical support is provided by three other organizations. Specifically, there are maintenance engineers providing support for maintenance, reactor engineering support is provided from the Operations Group, and field engineering and post modification testing support is provided by the site Project Management Organization.

PPE is a large organization, with ties to the Nuclear Energy Department (NED) only at a very high level in the FPL organization. PPE is organized with discipline engineers assigned to projects as needed. PPE provides engineering support to both fossil and nuclear power plants even though there is a different culture between nuclear and fossil plant engineering. Coupled with the geographical separation from Turkey Point, these factors contribute to PPE goals and capabilities which do not align effectively with Turkey Point needs. Problems have included missed schedules, budget overruns, little proactive support and less than satisfactory work quality, teamwork and communications. The resulting lack of understanding of plant needs has often led to quick fixes or to temporary design changes instead of effective long range solutions.

The Turkey Point system engineering concept was initiated in the TSG and formalized in early 1987. System engineering is an excellent approach to providing technical support at the plant by solving problems when they arise and by preventing future problems. Other than the fact that there were too many systems assigned to each system engineer, initial efforts by FPL to implement the concept appear to be appropriate. The duties, responsibilities and accountabilities were established; a system engineering procedure and handbook were written; and the positions were staffed with FPL engineers and contractors. However, there has been little management follow-up to reinforce the concept and assure system engineer utilization. Implementation has never been fully achieved, and the system engineering function has not produced the desired results.

The lack of clear definition and recognition of system engineer responsibilities by those outside the TSG results in

the system engineers lacking the authority to obtain the support needed to resolve problems. Also within the TSG, the system engineers have not been used to carry out their defined responsibilities. Design change related Requests for Technical Assistance (RTAs) are routinely sent to the Change Review Team (CRT) without prior system engineer review. Design change RTAs are routed to the system engineer from the CRT when an REA is required to be prepared.

Paperwork, e.g. RTAs and the Juno Beach Power Plant Engineering (JPE) Action Item List, is a major contributor to system engineer ineffectiveness. The system engineers spend the largest percentage of their time processing paperwork instead of solving plant problems. The number of RTAs processed by the system engineers is high (almost 900 per year for the last three years). Any request or problem construed to be "technical" is transmitted as an RTA. Each RTA must be processed even if it is misdirected or unnecessary. In many cases, an RTA requests information which could be obtained verbally. In addition, there is a high number of JPE action items, many of which are unimportant, that must be processed by the system engineer.

The System Engineers primarily react to problems. They do not have sufficient time, nor are they directed to prevent future problems. There is little trending of system performance data. System reliability engineering aimed at identifying potential system problems before they occur is not performed.

4.3.1.2 <u>Corrective Actions Underway</u>

In early 1987 a Quality Improvement Team (QI Team) recommended changes to improve the engineering support to Turkey Point. The QI Team evaluation did not include PPE positions located in Juno Beach other than those directly supporting Turkey Point. As a result of the QI Team's recommendation, a

Turkey Point Engineering Manager (EM) position was created, and the onsite PPE engineering staff and responsibilities were expanded. Day-to-day work direction is provided to the EM by the Turkey Point Site Vice President while technical direction is provided by the PPE Assistant Chief Engineer, Projects. The EM provides day-to-day work direction to the onsite PPE engineering group and to the Juno Beach Turkey Point project engineering group while staffing and technical direction are provided by the appropriate PPE discipline managers and the Assistant Chief Engineer, Technical. The EM position has provided a useful focal point for coordination of Turkey Point PPE engineering support, both at the site and in Juno Beach. The expansion of the onsite PPE engineering group has improved the timeliness of support and the communications between engineering and the plant organizations.

These changes are somewhat limited in what they can accomplish. They have little effect on the PPE organization in Juno Beach, from which a large portion of the engineering support is provided. PPE is organizationally separate from the Nuclear Energy Department and provides both fossil and nuclear plant support. In addition, the changes have no effect on deficiencies in the TSG system engineering function and to a degree have made the technical support organizations more complex.

4.3.2 Skills and Training

4.3.2.1 Discussion

To be effective, the engineers assigned to the TSG System Engineering function must be proficient in all aspects of their assigned systems. The basic characteristics of systems, including the design basis, performance characteristics, operational idiosyncrasies and control logic require a great deal of time to master. An effective system engineering group requires skilled, well trained engineers, as well as stability in the group.

At Turkey Point this group has been staffed primarily with contractor personnel who have not provided the needed group stability. High contractor personnel turnover has resulted in a loss of specific system and plant experience. Presently there are seventeen system engineer positions, only six of which are staffed by permanent FPL personnel. In the eight month period ending in May 1988, seven of the eleven contracted personnel assigned to system engineer positions have been or are being replaced. In addition, the approximate two weeks currently allowed for system responsibility turnover to a new individual is inadequate to provide the necessary continuity.

The nuclear experience level of the composite group of Turkey Point system engineers (both FPL and contractors) appears to be adequate. However, the level of system engineering experience of FPL engineers and Turkey Point specific experience of contractors is relatively low. The average nuclear experience for the system engineers is approximately seven years. The average system engineering experience of FPL system engineers is just over three years, however, over 70% of the total years of system engineering experience was gained at Turkey Point where the system engineering concept has not been effective. Four of the six FPL system engineers gained substantially all their system engineer experience at Turkey Point. The average contractor experience at Turkey Point is slightly over one year and soon will be less with several contractors scheduled to leave the site in the near future.

There is no formal training program for system engineers to provide the proper level of technical skills. Training is necessary to ensure that new system engineers understand their function, objectives, job requirements and plant systems.

In addition to inadequate training for the Turkey Point System Engineers, there is little, if any, system training for engineers in PPE. This contributes to inadequate understanding of the plant and systems interactions.

A recent NRC SALP report identified several deficiencies within the engineering groups at Turkey Point, including deficiencies in the area of preparation of safety evaluations. The IMA Team reviewed a number of safety evaluations generated by both PPE and the TSG and has found that some improvements in this area are still required. Inadequate training in the conduct of safety evaluations for the system engineers and inadequate system training for PPE engineers contribute to the observed deficiencies.

Managerial and supervisory skills in the TSG need improvement. This is characterized by ineffective goal setting and prioritization of work, the inability to establish the proper performance measures and the lack of management direction and follow-up. Many of the performance indicators in the TSG inappropriately measure the paper processed (such as RTAs, JPE action items, etc.) rather than focusing on system reliability or the number of real system problems corrected. Work priorities are generally set by the system engineer, with no effective guidance by management, and those priorities are typically ranked by the severity of the crisis involved. Management has not placed the proper emphasis on those tasks that are really important and has not assured consistent guidelines for all engineers. In addition, after work responsibilities are assigned to engineers, there is often inadequate follow-up by supervisors and managers.

4.3.2.2 Corrective Actions Underway

Recently, a System Engineers Handbook was prepared along with a procedure which described the role of the system engineer. However, these have been implemented on a read-only-training basis which is not effective for subjects of this nature. FPL is in the process of filling the present eleven contractor system engineer positions with permanent employees and has authorized an additional six FPL system engineer positions. If the personnel with the proper experience level and skills are obtained, this will help to resolve some of the problems discussed above. PPE has recently taken action to improve the procedures and training for conducting safety evaluations. This should improve the safety evaluation process for design changes issued by PPE.

4.3.3 Root Cause Analysis, Trending, and Reliability Engineering

4.3.3.1 Discussion

Historically, Turkey Point has had a high rate of repetitive equipment failures. The recurrence of the same types of failures, or significant numbers of varying failures on a particular system or component, indicate insufficient root cause determination. Trending of system performance and root cause analysis are part of the process of reliability analysis, which should be emphasized at Turkey Point.

Turkey Point has given much scrutiny to several systems over the past several years, without complete success in resolving certain chronic problems encountered. Examples include the Intake Cooling Water System, the Chemical and Volume Control System, the Containment Isolation System, and the Process Radiation Monitoring System. One repetitive problem caused a number of load swings, requiring operator action to stabilize the turbine hydraulic control system. This has been the cause

of at least six plant trips. Management did not take decisive action to analyze these challenges to the safety systems until late 1987. In any case, attention to the problems associated with these systems for the most part has been reactive rather than proactive.

PPE and TSG involvement in root cause analysis has generally been limited to major issues having an immediate and obvious impact on plant availability. This appears to be due to the management philosophy that engineering provides support when called upon. Responsibility for root cause analysis for those problems having less immediate and obvious impact on the plant has not been clearly defined. In the past, little emphasis has been placed upon proactive reliability engineering to improve system performance. In many cases, compensatory measures were required of the operators rather than correcting the problem with a permanent solution. Available reliability data is not being effectively utilized by system engineers to determine and prevent problems. For instance, there is minimal use of the Nuclear Plant Reliability Data System.

The NRC and INPO have noted numerous instances where FPL has failed to adequately determine root causes of events and trends or take effective corrective action through equipment upgrading and corrective or preventive maintenance. Turkey Point has had a high number of repeat LERs, and inspector follow-up items which were converted into violations due to inadequate corrective actions.

4.3.3.2 Corrective Actions Underway

A number of QI Teams were formed to deal with some of the recurring problems, such as the turbine control system and the high number of hours in LCOs and LERs. The QI Team approach provides a formalized process for root cause analysis. It is

particularly effective where application of statistical analysis is appropriate. As a result, solutions to selected recurring problems have been identified and actions have been taken or planned. However, the time consuming QI Team approach has often delayed action on problems which require direct engineering input and decisive management action. Root cause analysis has not been used consistently by engineers in their daily work to solve problems.

Training in root cause analysis has recently been provided to maintenance personnel and a position has been established for a reliability engineer in Maintenance. It is too early to evaluate the effects of the training and the reliability engineer position has not yet been filled.

4.4 Work Performance and Support

The IMA Team has found several systems and mechanisms necessary to support the efficient execution of quality work at Turkey Point to be deficient. This root cause is demonstrated by performance issues in the following areas: (1) overtime, (2) I&C support, (3) the Plant Work Order process and (4) information support for the plant. Deficiencies in these areas impede the ability of the Turkey Point work force to operate and maintain the plant in a quality manner.

4.4.1 Overtime

4.4.1.1 Discussion

The IMA Team's review of plant records indicated an overtime level for 1987 for the average plant worker of almost 25%, with many workers considerably in excess of this level. This level of overtime may be the result of inadequate planning, low efficiency in work performance, or a cultural value placed on time spent rather than on results obtained. The problem of excessive overtime is further aggravated by the previously discussed level of over-commitment, the ineffective prioritization of work and the failure to limit work commitments to available resources.

Except for licensed operators, overtime guidelines or limitations are not clearly specified and there is not an effective management mechanism for limiting overtime. Consequently, it appears that an excessive level of overtime has become the norm at Turkey Point. The adverse potential effects of excessive overtime include a higher risk of human error, a lower level of productivity, and poor employee morale. Also, the high level of continued overtime often establishes an economic pattern of overtime dependence in the work force which serves to complicate the solution of the overtime problem and which further degrades work force productivity.

4.4.1.2 Corrective Actions Underway

Turkey Point is planning to increase the staff in a number of organizations, e.g. Health Physics and Chemistry. Also, an additional eight Senior Reactor Operators have qualified at Turkey Point. These staff additions should reduce the level of overtime in the specific organizations. However, they do not address the site-wide problem of chronic and excessive overtime.

4.4.2 Instrumentation & Control (I&C) Support

4.4.2.1 Discussion

The Management on Shift (MOS) Observer reports contain many references to inadequate I&C support and its impact on operations - either by delaying the return of equipment to service, or contributing to equipment out-of-service.

Examples of the problem are: half of the Area Radiation Monitoring System channels repaired after a recent outage failed acceptance testing upon startup; control room isolation caused by I&C technicians working in the process radiation monitoring system racks (i.e., actuation of an Engineering Safeguards Feature); and control room deficiency tags not corrected over a long period of time.

The skill level of the I&C technicians is a contributing factor to these deficiencies. Because Turkey Point I&C Maintenance positions are often used as a stepping stone to the licensed operator training program, I&C technicians "bid-out" so frequently that the I&C group Turkey Point specific experience level is approximately one year.

4.4.2.2 Corrective Actions Underway

Turkey Point management has realized the significance of the problem, is aware of the I&C personnel retention problem and has recently taken steps to correct the situation. First,

potential exits of personnel from the department to join an operator training class are now anticipated. Additional technicians are hired in advance of the operator classes to allow sufficient time for "break-in" and turnover. Presently, ten additional technicians are on the staff.

Second, selection of personnel to fill open positions has significantly improved. Until recently the selection process was very brief and the pool of candidates was too small. Now, a larger pool of personnel with nuclear plant instrumentation experience exists. The I&C Supervisor now requires that persons selected have a two year degree (or equivalent) and four to five years experience.

Third, the I&C personnel are receiving additional training. A ten week course has recently been implemented for the technicians.

Finally, the lack of in-plant experience is being compensated for by the use of increased instruction and supervision and by allowing an increase in the allotted time for task completion. Work supervisors are spending more time instructing the technicians before they go into the plant to perform a job, to be certain they understand the task and to answer any questions.

The IMA Team believes that these actions should be sufficient to resolve the current lack of experience. However, this situation must be monitored by plant management to ensure that improvement actually occurs.

4.4.3 Plant Work Order (PWO) Process

4.4.3.1 Discussion

NRC I&E Inspection Report 87-19 notes the contribution of repetitive maintenance deficiencies to ten critical reactor trips and to one subcritical reactor trip. The MOS Program reports discuss numerous instances where maintenance activities could not be performed or were delayed because of deficient PWO packages. The Turkey Point Unit 3 Refueling Cycle XI Outage Report also notes significant problems with PWO scheduling performance and coordination. The IMA Team studied a sample of "ready-to-work" PWO packages to assess their level of technical adequacy. It was concluded that the PWO packages are too often deficient in root cause determinations, utilization of equipment histories, the availability of design bases information, current working level procedures and as-built drawings. A number of instances were cited where adequate post-maintenance testing was not specified. Instances of inadequate estimates of resources, e.g., manpower requirements and spare parts, were also noted. Complete PWO rework statistics were not available but it has been estimated by the Maintenance Superintendent to be about 30 percent.

The IMA Team believes that the causes of the deficient PWOs are primarily the lack of training, inadequate technical depth and failure to maintain rigorous compliance to current PWO package preparation requirements. Also the current organization structure with planners in each discipline makes it difficult for planners and schedulers to coordinate their activities. The PWO processing procedure was revised and significantly upgraded in late 1987. The new procedure prescribes the PWO preparation step-by-step and details technical requirements. However, the personnel preparing PWO packages do not have adequate training in the new PWO process. Nor do they have sufficient technical knowledge of plant

systems and components to effectively utilize the equipment data bases available. In addition, the data bases themselves do not appear to be complete and adequate, in that they lack sufficient machinery history data or spare parts data for proper preparation of the work packages.

4.4.3.2 Corrective Actions Underway

In Turkey Point's response to INPO findings from the Fall 1987 Maintenance Assistance and Review Team visit, Turkey Point has committed to develop and implement a root cause determination program and to a PWO package upgrade program at the planning level. These programs, if developed and implemented properly, should mitigate the PWO package deficiencies. To successfully complete the corrective action for the upgrading of the PWO process, it will be necessary to insure strict adherence to the requirements of the new procedure by providing additional training and supervisory oversight.

4.4.4 Information For Plant Support

4.4.4.1 Discussion

The Turkey Point work force does not have available complete and easily retrievable data needed to efficiently operate the plant. NRC inspections have documented a lack of adequately maintained design basis information. Examples of other required data are equipment histories, spare parts lists, and various equipment and material lists. A recent study performed by the Nuclear Energy Department of FPL confirms the existence of significant shortcomings in the information and information systems available to the Turkey Point work force.

In addition, the design documentation (drawings) at Turkey Point have not been properly updated to reflect all of the many changes made to the plant from the original design configuration. Without proper documentation, the ability to

perform effective, timely, resolution of day-to-day problems by operations or their support groups, maintenance and engineering, is significantly reduced. A recent QI Team studying the problem of drawing update identified many of the shortcomings of the update process.

The lack of complete and easily retrievable data and adequate design drawings do not in and of themselves preclude operating the plant in compliance with all applicable regulations. However, this lack is a significant barrier to the efficient, coordinated, and well-informed environment necessary to achieve operating excellence.

4.4.4.2 Corrective Actions Underway

FPL is currently conducting a Nuclear Information Management Systems (NIMS) study, the purpose of which is to develop the information "architecture" required to support their nuclear operations. FPL currently has a major drawing update program underway which includes separation of the Piping and Instrumentation Drawings and the Elementary Wiring Diagrams into drawings for each unit and includes other improvements. In addition, FPL is involved in a design basis reconstitution program, the purpose of which is to document, update, and make readily available the design basis information for selected systems at Turkey Point. FPL has also recently developed an equipment data base system and a new job planning system. These actions in addition to the recommendations made in Section 5.4.5, should be sufficient to provide the information necessary to achieve operating excellence.

4.5 Operations and Maintenance

It is important to emphasize that the IMA Team observed that the operations staff at Turkey Point Nuclear Power Plant operates the plant in a conservative, competent and safe manner. Team members were in the control room during several significant plant evolutions and were able to observe the manner in which unexpected and complex control manipulations were performed. One evolution required the removal of a 4-kv bus from service. Another required the removal from service of a feedwater loop resulting in a fifty percent power reduction. During a rampdown in power, a turbine stop valve suddenly closed. The transient was diagnosed promptly and appropriate action was taken to prevent a reactor trip during a 400 Mwe load swing. These incidents demonstrate the communications, skills, teamwork, and leadership abilities of the Plant Supervisor, Nuclear (PSN), Assistant Plant Supervisor, Nuclear and Reactor Control Operator in the control room environment. The Team has, however, observed that the root cause of a number of the Turkey Point Plant operating problems emanate from the inability of operations management and supervision to cope with factors outside the control room environment and outside their immediate control - problems related to maintenance, engineering, training, and licensing.

Until recently operations emphasis was on high plant availability rather than on plant reliability. This resulted in operators using compensatory measures and backup methods to operate the plant safely when equipment was not operating properly or was out-of-calibration. These practices resulted in operators who did not insist on proper maintenance support and who did not take a leadership role in the operations and maintenance of the plant. This inclination still exists in

the plant culture, and continues to have an adverse effect on plant operations. However, the new Operation Superintendent is changing this pattern of behavior. This root cause is indicated by the following performance issues: (1) operations "ownership" and leadership (2) training and (3) plant Technical Specifications.

4.5.1 Operating "Ownership" and Leadership

4.5.1.1 Discussion

The regulatory history contains accounts of persistent problems occurring in safety-related systems such as the auxiliary feedwater, component cooling water and intake cooling water systems. Other persistent equipment problems documented in internal plant reports include the emergency diesel generator, radiation monitors, and the main turbine control oil system. A recent PWO summary report notes a total of 160 control room deficiency tags with an average age of 30 days. Considering the above, the IMA Team concluded that operations management and supervision have not yet been fully effective in insisting that inadequately performing equipment be redesigned, upgraded or adequately maintained. Programs to upgrade equipment and maintenance practices have been implemented. However, until recently this corrective action was more regulatory-driven than operations-driven.

There are too many examples of equipment out-of-service in the secondary plant, which require the operator to engage in compensatory actions to avoid Limiting Conditions for Operations (LCOs) equipment damage, plant trips or load reductions which could challenge safety systems. These compensatory measures have also occassionally been required due to out-of-service primary system equipment. For example, operator compensatory measures were required when instrumentation utilized in diagnostic steps in emergency

operating procedures was temporarily out-of-service. In these cases, the workload on the licensed and non-licensed operators is increased. The additional workload can lead to distractions during operations and can contribute to errors and plant trips.

4.5.1.2 Corrective Actions Underway

To improve the effectiveness of operations, management has instituted a number of decisive corrective actions. The first step was to appoint a new Operations Superintendent. He has supported the NRC emphasis on "verbatim compliance" to procedures as a cornerstone in the operations upgrade. The importance of verbatim compliance has been emphasized in the implementation of the Procedure Upgrade Program (PUP). From the operators viewpoint, PUP has led to three important improvements: in procedure content; strengthening of the process by which procedures are maintained and controlled; and management emphasis on the importance of procedure compliance. The impact of verbatim compliance has been positive as evidenced by the conservative, although sometimes tedious, operations activities observed by the IMA Team. However, as one may expect, the procedures produced as a result of PUP contain some deficiencies which are being systematically modified "on-the-spot" as the procedures are used.

The IMA Team considers that verbatim compliance, PUP and on-the-spot changes are effective corrective actions that have brought about a positive change in operator behavior. In early 1988, the Operations Superintendent developed a Turkey Point Standards of Professionalism Document for the operators. This code of conduct sets out in clear terms new stringent standards of conduct and performance against which the operators will be evaluated. The Operations

Superintendent has stated that he will supplement these written standards with appropriate direction, coaching and examples to raise the level of leadership performance among the operators and their direct supervision. The Operations Superintendent has clearly communicated the necessity of a step-change in operating leadership practices. The supervisors realize that they must change and appear to be responding in a positive manner. Some, however, are finding the transition difficult and will need additional coaching and support.

To assist the Plant Supervisor, Nuclear (PSN) in the discharge of his duties as the visible manager of the power block, the Operations Superintendent will soon initiate a "Manager on Shift" procedure. This procedure emulates the current "Management on Shift" program and is intended to replace it. The "Manager on Shift" system will use a report that is completed and updated by each on-shift PSN. The report identifies questionable work practices, actions taken, recommendations, areas for improvement, good practices and professionalism observed. The form will be processed by a coordinator and when appropriate, will be brought to management's attention. Feedback is given directly to the PSNs and an item will not be closed until the PSN is satisfied. If successfully implemented this new procedure should contribute considerably to establishing the PSNs as the visible manager of the power block. The IMA Team believes that the implementation of this procedure will allow the current MOS program to be terminated.

The Operations Superintendent has also taken an aggressive approach to improving the physical condition of the plant. He and the Maintenance Superintendent have taken the initiative to schedule a 105 day maintenance and refueling outage for

Unit 4 in the fall of 1988. This outage is to include work on a number of systems which have had persistent or recurrent problems. In addition, an attempt will be made to partially work off the maintenance PWO backlog. Operations and Maintenance supervision have also initiated a "System of the Week" initiatives which has as its objective the reduction of the PWO backlog. These recent management initiatives indicate an attempt to change the culture which was too tolerant of equipment which required the operator to take compensatory actions. They are new initiatives, however, and cannot be fully evaluated at this time but, if effectively executed, will continue the current trend of significant improvements in the Operations Department performance.

4.5.2 Training

4.5.2.1 Discussion

There are numerous indications that Turkey Point training has been inadequate. There is no evidence that the Corporate Training Group has had a positive influence on the training results, or is there evidence that Turkey Point training management sought assistance from the St. Lucie staff.

The NRC license examination pass rate for reactor operators over the past two years has been 95 percent at the St. Lucie Plant and about 60 percent at Turkey Point. Although both plant training staffs have been provided similar training materials and environment, the results have been divergent.

A number of factors have been identified as being contributors to the difference between examination pass rates at the two plants. Both training groups received basically the same training materials and found these to be inadequate. St. Lucie upgraded the material immediately while Turkey Point is still in the process of upgrading the material. Another difference relates to the qualification and experience of the

instructors. St. Lucie instructors have licenses and experience on St. Lucie; most Turkey Point instructors have neither licenses nor experience on Turkey Point. It appears that deficient training material and marginally qualified instructors have been contributors to poor performance of Turkey Point operator candidates on the NRC license examinations.

Other practices have contributed to the training problem at Turkey Point. At St. Lucie, the Training Department is responsible for operator certifications, but operators are qualified by the operations department. At Turkey Point, the Training Department is responsible for both operator certification and qualification.

Another comparison between Turkey Point and St. Lucie relates to a different perception of the readiness of the new plant simulators. St. Lucie considers the current hardware and software problems of its simulator to be severe enough to prevent validation and verification and use in operator evaluations in 1988. However, until late February 1988, Turkey Point believed that their simulator could be validated by March 1988. Turkey Point training and operations staff are anticipating operator evaluation on their own simulator, even if it has limitations and deficiencies which they are working hard to correct. They believe that it will be far superior to the simulators they have been training on in the past which were of generic design and not specific to Turkey Point. However, this example is symptomatic of the culture to overcommit and apparently not recognize the resulting problem.

Another contributing factor to the Turkey Point training problems is that the the non-licensed operator (NLO) program does not provide adequate numbers of qualified candidates to

operate the plant and to support the hot license operator (LO) program candidate requirements. The NLO program is a logical and desirable source for LOs because the candidates already have gained considerable plant systems operation experience and have a history of readily passing the NRC exams.

4.5.2.2 <u>Corrective Actions Underway</u>

Several corrective actions have been implemented to address factors contributing to the inadequate training performance. The most important of these is the selection of a new Training Superintendent. The training materials are in the process of being upgraded. Self-taught training modules are being phased out and replaced with an instructor lesson plan format. Qualifications of instructors are being upgraded. An additional instructor licensed on Turkey Point has recently been added to the training staff. Operator candidate screening and testing has been enhanced. The process for identifying training needs has been improved by the development of a closer working relationship between operations management and training management. The QA Department has conducted a training program assessment which has resulted in additional corrective actions to improve the management and administrative control for training and examinations. A long-range plan for recruiting, training and qualifying adequate numbers of operators and training personnel to support future plant operations appears to be in place. The Site Vice President has begun to emphasize to the Operations and Maintenance Superintendents their direct responsibility for the training of their personnel. The IMA team believes that the combination of these actions and the recommendations in Section 5 will result in improved performance of the Turkey Point Training Department.

4.5.3 Plant Technical Specifications

4.5.3.1 Discussion

The operations staff continues to use a combination of original and interim Technical Specifications and licensing commitment documents to determine if they are in compliance with the Technical Specification LCO. Since mid-1986, as a result of discussions with the NRC concerning the requirements for equipment operability, operations has been under an internal operating order (Turkey Point-OPS-86-210). The order requires operators to notify the Operations Superintendent, the Operations Supervisor and the Licensing Department of any equipment problem which may cause operation less conservative than that specified in a LCO. The determinations are usually made jointly. The process is arduous, time consuming and significantly dilutes the leadership of the operators, and hence, their effectiveness. In addition, the current and interim technical specifications lack sufficient clarity and technical bases to assist the operators in their determinations of equipment operability. In the past, this lack of clarity has contributed directly to a number of license infractions.

4.5.3.2 Corrective Actions Underway

The plant licensing staff is currently working with the NRC to develop a new version of the Plant Technical Specifications. The current target data for the acceptance of the new technical specifications is fourth-quarter 1988. The new Technical Specifications will correct the problems caused by the simultaneous use of both the original and interim Technical Specifications.

5.0 RECOMMENDATIONS

This section discusses the recommendations which will help Turkey Point management achieve their goal for improved performance. Table 5-1, page 63, relates the recommendations to the root causes. The IMA Team classified recommendations into four priority groupings: critical, strategic, essential, and important. The order of recommendations within the groupings does not indicate any priority relative to timing or importance of implementation. The critical recommendations are the most important and, if implemented, will make the implementation of the remaining recommendations more effective. The recommendations classified as strategic are those which are associated with formulating and communicating appropriate goals, reducing changes, establishing performance measures and providing feedback on performance. The essential recommendations deal primarily with modification of plant management style, with correcting deficiencies in plant support systems and organizations and with improving the relationship with the NRC. The important recommendations deal primarily with actions which are necessary to assure a permanent improvement in plant performance. While most of the recommendations are offered for plant management, several of the recommendations are directed toward non-plant organizations such as FPL Corporate and Nuclear Energy Department Management, the Nuclear Regulatory Commission and the Institute for Nuclear Power Operations.

When acting on these recommendations, Turkey Point management should understand that the IMA Team is not suggesting major new programs. As discussed in Section 4.1.3, the excessive emphasis on programs has, on balance, detracted from direct action on known problems, and has diverted line management from its responsibilities of managing the workforce and carrying out day-to-day responsiblities. The IMA

recommendations can be implemented within the framework of the current management programs and the line managers' responsibilities.

In addition, FPL management, the NRC and INPO should allow a reasonable time for the IMA recommendations and the recent FPL initiatives to show significant improvement. The effective implementation of some of these recommendations will produce results in six months while others may take up to two years for the results to be visible. Near term evaluations and special inspections would be counter productive. This appraisal, along with Turkey Point's self evaluations, INPO evaluations, and NRC inspections have identified the problems. Additional special inspections, however well intended, would divert resources from the improvement process.

TABLE 5-1
RELATIONSHIP OF RECOMMENDATIONS TO ROOT CAUSES

RECOMMENDATIONS / ROOT CAUSES	4.1 LEADERSHIP	4.2 MANAGEMENT ATTENTION AND FOLLOW-UP	4.3 TECHNICAL SUPPORT	4.4 WORK PERFORMANCE AND SUPPORT	4.5 OPERATIONS AND MAINTENANCE
5.1.1 DEFINE JOB REQUIREMENTS	■	■	■		■
5.1.2 SUSPEND ROTATIONS	■	■	■		
5.2.1 ESTABLISH SITE GOALS	■				
5.2.2 COMMUNICATE GOALS	■				
5.2.3 MATCH WORKLOAD/RESOURCES	■	■	■	■	
5.2.4 REDUCE EXTERNAL DEMANDS	■				
5.2.5 PERFORMANCE MEASURES		■		■	
5.3.1 MANAGEMENT WALK-THROUGHS		■			■
5.3.2 UPGRADE PHYSICAL CONDITION					■
5.3.3 SHORT-TERM AVAILABILITY					■
5.3.4 PERSONAL RESPONSIBILITY		■	■		■
5.3.5 SYSTEM ENGINEERING			■		
5.3.6 CONTROL OVERTIME				■	
5.3.7 MAINTENANCE PERFORMANCE				■	■
5.3.8 RELATIONSHIP WITH NRC	■				
5.3.9 KNOWLEDGE TRANSFER	■		■		■
5.4.1 TECHNICAL SPECIFICATIONS					■
5.4.2 EMPHASIZE QUALITY		■		■	
5.4.3 ENGINEERING SUPPORT			■		
5.4.4 PAPERWORK PROCESS			■	■	
5.4.5 INFORMATION SYSTEMS			■	■	
5.4.6 PELIABILITY/ROOT CAUSE			■		■

5.1 Critical Recommendations

This section discusses the key recommendations. The existence of a highly experienced, qualified and stable management team is critical to establishing the foundations for improved performance at Turkey Point.

5.1.1 Define Job Requirements and Match Them With Skilled People Who Have Proven Track Records

FPL Corporate and Plant Management have demonstrated a strong desire to improve plant performance. To achieve this performance improvement, the management team must consist of personnel with demonstrated successful line management experience in their respective positions. Such direct and successful experience will assure that the management team has a basis for comparing Turkey Point practices with previously encountered successful practice and to recognize the need for any necessary corrective action. In addition, personnel added for specific positions must be sufficiently experienced to make an immediate contribution.

Plant management must define the experience and skill requirements for each position and must fill the positions with experienced people who match the required skills. There are specific examples of key positions which need personnel with proven track records.

Plant Manager

The current Plant Manager is being moved to another position in the FPL organization. His replacement must have a strong and successful operations background in order to understand the role of the plant operations and contribute immediately to improving the performance of Turkey Point. It is also necessary that the new Plant Manager have several years of successful line management experience in the commercial nuclear industry.

Security Personnel

Five new FPL security positions have been approved to provide an FPL security person on each shift. The new personnel must have the knowledge and experience necessary to handle problems that may arise. Selection of these people is critical and FPL must take the time necessary to hire qualified people.

System Engineer

In the process of replacing contracted personnel who are system engineers with FPL employees every effort should be made to select experienced system engineers. Since there are not a large number of skilled system engineers available, it may be necessary to select engineers with excellent track records and train them as system engineers. In either case, selection of people willing to accept the responsibility of this key position is essential. System engineering supervision should also have demonstrated success in providing plant technical support and directly related system engineering experience.

Training Staff

The recently appointed Training Superintendent has excellent operations experience. This experience is valuable to help training personnel understand the needs of one of their primary customers, Operations. However, the Training Superintendent lacks training management experience. The credentials of his staff should be carefully evaluated to assure that sufficient, successful training experience exists to provide the required expertise. If not, a person (s) with the necessary experience should be assigned to the Training Department to provide the Superintendent with the required training experience and expertise.

Technical Support Management

The onsite PPE Engineering Manager at Turkey Point is scheduled for a management development rotation. The replacement for this position should have a background of successful plant engineering. Similarly, any management positions which become open in the TSG must be filled with candidates who have successful experience in providing onsite technical support for a nuclear power plant.

When persons with the required nuclear industry and managerial experience are not available within FPL, the needed experience should be brought in from the outside.

5.1.2 Suspend the Management Development Program Rotations For At Least Two Years

Once the Turkey Point Management Team is in place, it is necessary to maintain a stable organization to develop teamwork and accountability and to ensure that the managers take a long term view of the performance of their organization. A major step in achieving a stable management team is the suspension for at least two years of the corporate management development rotation program at Turkey Point.

5.2 Strategic Recommendations

The IMA Team considers the recommendations discussed below to be strategic because of the importance the IMA Team places on their achievement. The term "strategic" does not indicate that the action to implement them should take a long period of time to execute. In fact, recommendations 5.2.1 (establish more meaningful site goals), 5.2.3 (match workload to resources) and 5.2.4 (reduction of external demands on Turkey Point), need to be acted on immediately. The implementation schedule for recommendations 5.2.2 (effectively communicate goals) and 5.2.5 (establish performance measures) are dependent upon the completion of other recommendations in this section.

5.2.1 Establish More Meaningful Site Goals

The IMA Team recommends that Turkey Point management evaluate the current site goals to assure that the proper messages are conveyed to the Turkey Point work force. It is recommended that the Site Lead Team indicators which have been selected be reexamined to assure that they are necessary and sufficient to achieve the needed focus at Turkey Point.

The IMA Team believes that there are areas of special emphasis and more meaningful, broader goals which management should consider in its review of Turkey Point goals. Some of the currently defined plant indicators are, in fact, measures of these goals. The following items are offered as examples of these higher level goals:

1. Continuing safe operation.

2. Achieving quality work performance.

3. Achieving high plant reliability.

4. Reducing the number of plant changes.

5. Improving the plant/NRC relationship.

6. Improving the physical condition of the plant.

7. Achieving effective outage management.

8. Increased plant-wide emphasis on security.

5.2.2 <u>Effectively Communicate Goals to Plant Personnel</u>

The IMA Team recommends that Turkey Point Management effectively communicate the plant goals to the entire organization. Such communication is the first step required to allow organizations and personnel to define their performance indicators (goals) to support the plant goals. This communication can be accomplished by a combination of processes.

The meetings of the site vice president with the plant staff should be used to emphatically articulate the specific goals of the plant, indicate that each group and person has an important role in achieving those goals and set forth a near-term schedule, e.g. two months, for each organization to develop its supporting goals.

The line management and supervision are key to the goal setting and communication process and must be involved very early. Line management must understand and agree to the goals. The plant goals must be devolved into goals for each organization which are meaningful to the personnel within the specific organization.

An effective means of communicating the goals is for management to conduct plant walk-throughs and meet face-to-face with the work force. Such meetings can demonstrate management's strong support of the goals and give the workers an opportunity for discussion of the goals. Management walk-throughs are discussed in Section 5.3.1.

5.2.3 Match Workload to Resources

The IMA Team Recommends that Turkey Point Site Management re-evaluate all improvement programs and plant changes. These should be carefully examined to select only those that are essential to the achievement of the site goals. The essential improvements must then be prioritized and scheduled such that they can be accomplished using the current plant resources. Because of the impact of changes on many aspects of the plant, there is a limit to the number of changes which can be managed effectively.

5.2.3.1 Improve the Use of CTRAC and the Integrated Schedule

The Integrated Schedule and CTRAC are tools which can aid in prioritizing and managing plant changes. The work associated with commitments identified in CTRAC should be prioritized consistent with other work activity rather than by due date. A clear commitment definition should be established and a method should be selected to screen the commitments entered into CTRAC and thus eliminate minor items which detract from the important issues. The method should include factors such as the level of effort required to close the commitment and whether the commitment is internal or external.

The Integrated Schedule (IS) is used to schedule plant changes which meet certain requirements. The current IS process does not consider the large fraction of available plant resources that are required for normal plant operations, special

programs, or that are committed to tasks which do not meet the criteria for inclusion into the IS. These resource commitments must be included in the IS or considered in the development of resource constraints for the IS. Stringent criteria should be developed to preclude management overrides in the IS except in clearly urgent situations. The number of management overrides demonstrate that the IS prioritizing system should be reevaluated. In addition, consideration should be given to centralizing the responsibility for scheduling work and setting priorities.

5.2.3.2 Improvement Programs and Plant Changes Proposed By External Organizations

The negative impact of the resource mismatch presently affecting Turkey Point would be reduced by a more effective screening process prior to Turkey Point committing to the action. The IMA Team believes that Turkey Point has too often committed to programs which overtax or distract the management team from their line responsibilities.

Successful definition and communication of plant goals combined with a more complete quantification of available resources will give management a better basis on which to demonstrate those instances in which a schedule or program proposed by corporate management, the NRC, INPO, etc. is unnecessary or excessive. The objective is to assure that line management resources are allowed to focus on line responsibilities.

5.2.3.3 Individual Sponsorship of Plant Changes

The IMA Team recommends that Turkey Point management enforce the practice that all proposed changes and modifications are sponsored by an individual along with the head of the department initiating the change. This recommendation is

designed to assure that the sponsor of a change is accountable for the change, justification for the need for change, and the validity of the specifics. The sponsoring department should also be accountable to budget for the change.

If the proposed change is accepted the "change sponsor" should be responsible to assure that the change is implemented in a quality manner, on schedule and within budget.

5.2.4 Reduce External Demands on Turkey Point

Turkey Point has been responding to numerous demands on its resources from external organizations, such as corporate and Nuclear Energy Department management, the NRC and INPO. These organizations have not always been sensitive to the potential adverse impact that incremental programs, plant changes or schedule accelerations can have on the entire plant, its management and its support systems. Each change taken individually may be desirable, but often the aggregate of many programs can be counterproductive or detrimental to plant improvement and performance.

With the completion of this appraisal and recent NRC and INPO inspections, the IMA team believes that the significant issues at Turkey Point have been identified. Consistent with this, the IMA team recommends that organizations outside the plant recognize the need for Turkey Point to focus resources on solving the identified problems. Preparing for and responding to additional special inspections and evaluations would absorb critical resources which could be better utilized to correct known problems.

5.2.5 Establish Performance Measures and Provide Feedback

Develop effective, written performance measures for each manager and work group, starting with the maintenance and

operations groups. These measures must support the goals of the plant and those of the specific organization. These measures should include direct measures of performance, such as plant safety, quality of work, schedules and budget as well as indirect measures, such as overtime and turnover. The measures must relate to the accomplishment of real work rather than just activity such as the processing of paperwork. Involving the employees in developing the performance measures and the action plans for achieving them can enhance teamwork.

Managers can enhance teamwork in natural work groups by reviewing performance reports and graphs during regular staff meetings and involving their employees in setting goals and developing action plans for achieving those goals. This process should be built into existing weekly meetings and should be kept to thirty minutes or less per week.

In light of the recent security performance at Turkey Point, the performance measures for each manager, superintendent, supervisor and foreman must acknowledge that security is an important part of their personal and organizational responsibility. To support this, key plant managers should review the Security Plan to become more sensitive to the overall security program.

5.3 Essential Recommendations

The following recommendations are considered to be essential to the improved performance of Turkey Point.

5.3.1 Management Walk-Throughs

Managers and supervisors must be in a position to ensure that work force activities relate to plant goals and priorities. Walk-throughs afford the opportunity to provide immediate and specific on-the-job coaching, to correct deficient performance, and to praise excellent performance. The walk throughs can also provide management with direct input on the physical condition of the plant and the efforts to eliminate compensatory measures required of operators.

5.3.2 Upgrade the Physical Condition of the Plant

The IMA Team recommends that management continue to emphasize actions to upgrade the physical condition of the plant, especially in those areas where deficient equipment requires that the operators take compensatory measures. The NLO's and LO's should identify those items which require compensatory measures, e.g. manual operation of functions designed to be automatic, and instrumentation out of service or calibration. Because Turkey Point operators have become accustomed to "working around" deficient equipment, support from MOS personnel or operators from St. Lucie may be very helpful in this identification. Once the needs are identified, operations management must prioritize those needs. Maintenance, PPE, TSG and other plant organizations should then be fully supportive of the priorities set by operations. The management walk-throughs, including those by the Site Vice President and plant managers, should focus on the progress made in repairing the equipment.

5.3.3 Corporate Management Acceptance of Lower Short-Term Availability

During the next two to three years, while the upgrade of the equipment is being accomplished, FPL Corporate Management must accept lower, realistic availability goals. The temporarily reduced availability goals will allow for longer or more frequent outages. Once the equipment is upgraded, the plant should be able to achieve the higher goals for long term availability which are normally appropriate for FPL plants.

5.3.4 Accept Personal Responsibility For Problem Solution

As part of the effort to increase the sense of ownership by the Turkey Point personnel, the Project Team recommends that each identified equipment problem at Turkey Point be assigned to one person. This person would be lowest level individual who could reasonably be expected to achieve resolution. He or she would be responsible to assure that the problem is resolved in a timely manner. This person would define the proper priority of the problem with line management, would involve only those parties who are required for the resolution and would escalate to management any conflicts in schedules or resources which the worker is unable to resolve. This recommendation is intended to help produce a change of attitude at Turkey Point, i.e., increased accountability. It is not intended to create new positions, procedures or additional paperwork.

5.3.5 Improve System Engineering Effectiveness

The IMA Team recommends that Turkey Point management improve the system engineer effectiveness by the following actions:

1. Provide support and direction to system engineers and recognize that the system engineer's role is vital to improved plant performance. Management must hold the

system engineer accountable for system performance. The system engineer must have approval authority for any changes proposed on his or her systems.

2. Complete the staffing plans to replace the contractor personnel and to fill the new positions with FPL employees.

3. Define the skills and experience required in the system engineering group and hire or transfer personnel that have the needed skills and experience.

4. Develop and implement a system engineer training program.

5. Revise program procedures as necessary to require the system engineer's active involvement in activities affecting their systems, such as PC/Ms, procedure changes, PWOs, etc.

5.3.6 <u>Control Overtime</u>

The IMA Team recommends that site management immediately initiate an action to control overtime. Such action should require supervisory approval of overtime in advance and should also require management justification of overtime beyond minimal levels. The policy should require management to budget overtime and to be held accountable for adherence to that budget. The IMA team believes that additional staff may be a solution in a very few specific cases, e.g. operations and health physics. However, the most appropriate solution is better management, improved prioritization of work and better utilization of the current work force.

In order to avoid severe employee morale problems, due to the fact that high overtime pay appears to have become the norm, it may be necessary to implement overtime reduction measures in a phased manner.

5.3.7 <u>Improve Maintenance Performance</u>

Improvement of the performance of the maintenance organization is esstential to Turkey Point. In addition to being responsive to the needs of operations, this improvement should include improving the PWO process and continuing the actions underway to increase the experience level of I&C support.

The IMA Team recommends that, where appropriate, more technical resources be applied to the planning phase of the PWO package development. Also, organizational changes should be made to improve the scheduling, planning and coordination between maintenance and operations. We recommend that qualified personnel be assigned to the planning phase of the PWO preparation, to assist in the execution of the technical requirements and to approve the final PWO package. They should also be assigned responsibility to analyze tasks to the specific activity level so that the tasks can be coordinated with other maintenance disciplines supporting or working (on other PWOs) on the same system or component. We further recommend that consideration be given to requiring the use of modern job planning techniques (i.e., PERT, CPM or other network analysis and resource scheduling tools). During PWO package preparation, the planners should be required to assess the impact of the work on security and to coordinate with Security when appropriate.

The IMA Team recommends that the Plant Manager closely monitor the effectiveness of the efforts underway to improve the experience level of the I&C maintenance group.

5.3.8 Achieve A Better Relationship With The NRC

The IMA Team recommends that Turkey Point emphasize actions to achieve a better relationship with the NRC. These actions include:

1. A corporate policy on achieving an excellent relationship with the NRC should be promulgated. At a minimum, the policy should:

   - clearly establish FPL's desire to develop a better relationship with the NRC which assures that potential problems are discussed before they become significant issues.

   - describe the proper protocol all FPL personnel should use when interacting with the NRC.

   - identify to the NRC and to FPL employees who in the FPL organization is to be notified when the NRC requests information or expresses a concern.

   - describe to FPL employees how the NRC questions or concerns will be handled and prioritized.

   - provide guidance on planned, periodic meetings with the NRC.

2. Establish a better working relationship with the NRC Resident Inspector at the Plant Manager level. This should include regular and routine interaction at an informal level between senior plant management and the NRC Resident Inspector.

3. Improve the effectiveness of the licensing and regulatory compliance support for Turkey Point by:

   - improving the definition of the required support and clearly defining the responsibilities of the two groups with the goal to unify the NRC interface responsibilities.

   - removing line responsibilities such as CTRAC from the QC organization and centralizing the CTRAC responsibilities in the Regulation and Compliance Group.

   - providing training and improving the skills of personnel who have the primary responsibility for communicating with the NRC.

4. The Regulation and Compliance Group and Licensing must work closely with other NED organizations, especially Security, to be proactive with the NRC Inspectors.

5.3.9 <u>Nuclear Energy Department (NED) Staff Must Accept Responsibility For Knowledge Transfer Within FPL</u>

The IMA Team recommends that the NED Staff at Juno Beach play a more effective role in assuring that successful practices, lessons learned and knowledge at one FPL nuclear site are transferred to the other.

The mechanics of this transfer should vary depending on the specific discipline. Each party must have definite responsibilities if the transfer of knowledge is to be successful. The NED staff must be the catalyst and facilitator while each of the plants must be eager to learn from and to help the other. All of NED (Juno Beach, St. Lucie and Turkey Point) needs to develop a team spirit conducive to

the successful exchange of knowledge and lessons learned. In those disciplines where the corporate staff does not have sufficient in-plant experience, the personnel must learn the plant's needs and understand them. This will require time at the plant sites. Understanding the plant needs is key to being able to assist the plants.

NED Management should assure that this transfer of knowledge between St. Lucie and Turkey Point actually takes place. Where the transfer does not occur, NED management should take the necessary action to change personnel or responsibilities.

This transfer of knowledge can be accomplished entirely within the current organization and programs. The IMA Team is not recommending a new program, new organization or the additional transfer of personnel. Rather, the recommendation is that the NED staff organizations which already have the visibility and organizational position become accountable to accomplish this essential goal.

5.4 Important Recommendations

The following recommendations are considered to be important to the improved performance of Turkey Point.

5.4.1 Expedite Approval of the New Technical Specifications

First, the IMA Team recommends that both FPL and NRC management review the current schedule for completion of the development and negotiation of the new Plant Technical Specifications, and make every effort to accelerate completion.

5.4.2 Emphasize Quality

Plant management should indicate the importance of quality by: (1) setting plant and organizational goals to improve quality, (2) by emphasizing quality during management walk throughs and meetings, (3) by providing more visible support to QA/QC and (4) making better use of data supplied by them. They should also use the QA/QC organizations to assist in performance monitoring, especially in surveillance of operations and maintenance activities. In addition Turkey Point management can make more effective use of the results of QA audits and trending to minimize recurring problems.

5.4.3 Improve Engineering Support

Organizational changes should be made to improve the engineering support. Nuclear plant engineering should be organized within NED. The organization should be streamlined to provide effective functional, administrative and technical control in the line organization. An additional organizational recommendation is to consolidate the root cause analysis and system reliability engineering into the Technical Support Group (TSG).

In addition to the training for TSG system engineers discussed in section 5.3.6, Power Plant Engineering should also provide

additional training for its engineers. This training should include items such as system engineering, root cause analysis and the conduct of safety evaluations.

5.4.4 Streamline The Technical Support Paperwork Process

The paperwork burden must be reduced to allow the engineers time to do actual system engineering. Personnel throughout the organization should be urged to interact through more personal contact rather than through writing letters or memoranda. JPE Action Items should be restricted to important issues.

The RTA process should be eliminated. The important aspects of the RTA process relating to design changes should be combined with the REA process such that anyone can initiate an REA. The system engineer should be the first level of review. Other procedures should be revised, as necessary, to redefine the process flow of issues previously dealt with by an RTA. The system engineer must review and approve changes to their systems prior to implementation.

5.4.5 Improve Plant Information Systems

The IMA Team recommends that NED consider increasing the emphasis on and accelerating the implementation of the current NIMS project. NIMS will provide additional definition of the information systems needs of the NED.

The IMA Team also recommends that the current "Design Basis Reconstitution" project be completed for the initial group of systems selected, including the validation phase in which the updated design basis is verified against the as-built configuration of the selected systems. This validation phase will verify that the systems can perform their functions as required by the reconstituted design basis. In addition, the

IMA Team recommends that Turkey Point consider extending the design basis reconstitution effort to include the balance of the nuclear safety related systems and other systems important to safety. In order to ensure maintenance of, and compliance with, the updated design basis the PC/M procedures should be revised to require that the specific portions of the design basis affected by a change be itemized in the PC/M package and discussed in the attendant safety evaluation.

The IMA Team recommends that the Piping and Instrumentation Drawings and the Elementary Wiring Diagrams update and utilization programs currently underway continue to receive sufficient manpower and budgetary support so that they may be completed. Once updated/redrawn, the new drawings (P&ID and EWD) should be added to the Plant Operating Drawing list so that they are kept current by the existing PC/M drawing update process. Specific action plans must be identified and implemented to deal with the current large backlog (approximately 4,000 drawings) of discrepant drawings. Prioritization of the process to ensure critical drawings are updated first is necessary. Additionally, procedures need to be reviewed/revised to ensure that potential drawing changes or document revisions created by any means are properly processed and incorporated.

5.4.6 Improve Reliability Engineering and Root Cause Analysis

A concerted and definitive approach to reliability engineering and root cause analysis should be developed and integrated into the organizational structure and programs at Turkey Point. Particular emphasis should be given to preventing and analyzing critical component failures and failures resulting in LCOs, shutdowns, or affecting plant availability. The results of root cause analysis should be incorporated into the

PWO process. Also, root cause analysis should be part of the normal problem solving process.

The reliability of a particular system must be the responsibility of a specific individual who can devote the time necessary and, using the information sources available, prescribe the appropriate preventive measures (operational, maintenance, or design) to maximize system reliability and prevent operator errors. Personnel responsible for system reliability must be cognizant of all the information sources available and must use that information to improve system performance. The IMA Team recommends that the reliability engineering and root cause analysis be centralized in the TSG. Training in reliability engineering and root cause analysis techniques should be provided as part of the system engineer training program.

Performance trending, failure trending and critical component failure analysis should all incorporate measures for triggering the performance of reliability reviews and root cause analysis. Event Response Teams have recently been used, with some success, to perform such evaluations for failures which have significant plant impact.

The Analytically Based Preventative Maintenance program has recently been initiated (approximately 1 1/2 years ago) and places emphasis on increasing component reliability through predictive maintenance and preventive maintenance. This group should coordinate with the TSG to provide adequate system (and component) reliability engineering efforts.

6.0 CONCLUSIONS

The IMA Team has analyzed the performance deficiencies which have occurred at Turkey Point and has discussed in this report their principal root causes. We have analyzed FPL's corrective actions which are in progress and have recommended additional corrections which we believe are required. The IMA Team believes that Turkey Point's problems are correctable and that FPL management is committed to take the required steps to achieve their goal for excellence in the operation of Turkey Point.

APPENDIX A
NRC ORDER REQUIREMENTS
CROSS REFERENCE TO IMA REPORT

NRC ORDER (EA 87-85) REQUIRED APPRAISAL PLAN ELEMENTS	FINAL REPORT SECTIONS: APPRAISAL	FINAL REPORT SECTIONS: RECOMMENDATIONS
1) Identified organizational and operational aspects (includes appropriate Turkey Point/St. Lucie comparison)		
(a) current organizational responsibilities	4.1.2 (Para.1-3); 4.1.2.2 (Para.1-3); 4.1.4.1 (Para.1-3); 4.1.4.2 (Para.1); 4.1.5.1 (Para.1); 4.2.1.1 (Para.1,2); 4.3.1.1 (Para.1-3); 4.3.3.1 (Para.3)	5.3.7 (Para.1,3); 5.3.8; 5.3.9 (Para.1-4); 5.4.3 (Para. 1); 5.4.4 (Para.1,2); 5.4.6 (Para.1,4)
(b) management controls	4.1.1.1; 4.1.1.2; 4.1.2.1 (Para.1-3); 4.1.2.2 (Para.1-3); 4.1.3.1 (Para.1-3); 4.1.4.1 (Para.1-3); 4.1.4.2 (Para.1); 4.1.5.1 (Para.1,2,7); 4.1.5.2 (Para.3); 4.2.1.1 (Para.1-3); 4.2.2.1 (Para.1-3); 4.2.3.1 (Para.1-5); 4.3.1.1 (Para.4-7); 4.3.2.1 (Para.6); 4.3.3.1 (Para.1-3); 4.4.1.1 (Para.1,2); 4.4.3.1 (Para.1); 4.4.4.1 (Para.1); 4.5.1.1 (Para.1); 4.5.2.1 (Para.1); 4.5.3.1	5.2.2 (Para.3); 5.2.3.2 (Para.1,2); 5.2.3.3 (Para.1,2); 5.2.5 (Para.1,2); 5.3.1; 5.3.2; 5.3.3; 5.3.5; 5.3.6 (Para.1); 5.3.7 (Para.3); 5.3.9 (Para.1,2,3,4); 5.4.2
(c) improvement and upgrade programs	4.1.1.1; 4.1.1.2; 4.1.3.1 (Para.1-3); 4.1.4.1 (Para.1); 4.1.4.2 (Para.1-5); 4.1.5.1 (Para.1,4); 4.1.5.2 (Para.1-3); 4.2.1.2 (Para.1-3); 4.2.2.2 (Para.1-3); 4.2.3.2 (Para.1-5); 4.3.1.2 (Para.1); 4.3.2.2; 4.3.3.2 (Para.1,2); 4.4.2.2 (Para.1-4); 4.4.3.2; 4.4.4.2; 4.5.1.2 (Para.1-4); 4.5.2.2; 4.5.3.2, Appendix C	5.2.3; 5.2.3.1 (Para.1-3); 5.2.4 (Para.1,2); 5.4.1; 5.4.5 (Para.1,2)

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NRC ORDER REQUIREMENTS
CROSS REFERENCE TO IMA REPORT

NRC ORDER (EA 87-85) REQUIRED APPRAISAL PLAN ELEMENTS		FINAL REPORT SECTIONS: APPRAISAL	FINAL REPORT SECTIONS: RECOMMENDATIONS
(d)	staffing levels and competence	4.1.4.2 (Para.5); 4.1.5.1 (Para.1,3,4,6); 4.2.3.1; 4.3.2.1 (Para.1-6); 4.3.3.2 (Para.2); 4.4.1.1 (Para.1,2); 4.4.1.2; 4.4.2.1 (Para.1-3); 4.4.3.1 (Para.1-3); 4.5 (Para.1); 4.5.2.1 (Para.2,3,5); 4.5.2.2	5.1.1 (Para.1-8); 5.1.2; 5.2.3; 5.2.3.1 (Para.2,3); 5.2.3.2 (Para.1,2); 5.2.3.3 (Para.1,2); 5.2.5 (Para.1); 5.3.5; 5.3.6 (Para.1); 5.3.7 (Para.1-4); 5.4.3 (Para. 1,2); 5.4.6 (Para.1)
(e)	communications	4.1.1.2; 4.1.2.1 (Para.1-3); 4.1.2.2 (Para.1-3); 4.1.4.1 (Para.1-3); 4.1.4.2 (Para.2,4); 4.1.5.1 (Para.5); 4.2.1.1 (Para.1-3,5); 4.4.4.1 (Para.1)	5.2.1 (Para.1,2); 5.2.2 (Para.1,2,4); 5.3.1; 5.3.8
(f)	safety review process	4.1.4.1 (Para.1); 4.1.5.1 (Para.1,2); 4.5.3.1	not addressed
(g)	operating practices	4.1.2.1 (Para.3); 4.1.4.1 (Para.1,2); 4.2.1.1 (Para.4,5); 4.4.1.1 (Para.2); 4.5 (Para.1,2); 4.5.1.1 (Para.1,2); 4.5.1.2 (Para.1-4); 4.5.2.1 (Para.3)	5.1.1 (Para.3); 5.1.2; 5.2.5 (Para.1); 5.3.1; 5.3.2
h)	personnel motivation programs	4.2.1.1 (Para.6,7); 4.4.1.1 (Para.2); 4.5.1.2 (Para.1,2)	5.3.4, 5.3.67 (Para.1,2)
2)	Review of site and corporate management, supervisory and site working personnel in terms of regulatory and administrative requirement understanding with respect to implementation and compliance, and commitment of personnel to goals.	4.1.1.1; 4.1.1.2; 4.1.2.1 (Para.1-3); 4.1.2.2 (Para.1-3); 4.1.4.1 (Para.1-3); 4.1.4.2 (Para.1-5); 4.1.5.1 (Para.5,7); 4.2.1.1 (Para.1-5,7); 4.2.2.1 (Para.3); 4.2.3.1 (Para.1-5); 4.3.1.1 (Para.2,3); 4.5 (Para.2); 4.5.1.1 (Para.1); 4.5.3.1	5.1.2, 5.2.1 (Para.1,2); 5.2.2 (Para.1-4); 5.2.5 (Para.2); 5.3.1; 5.3.3; 5.3.4; 5.3.8; 5.4.1; 5.4.2

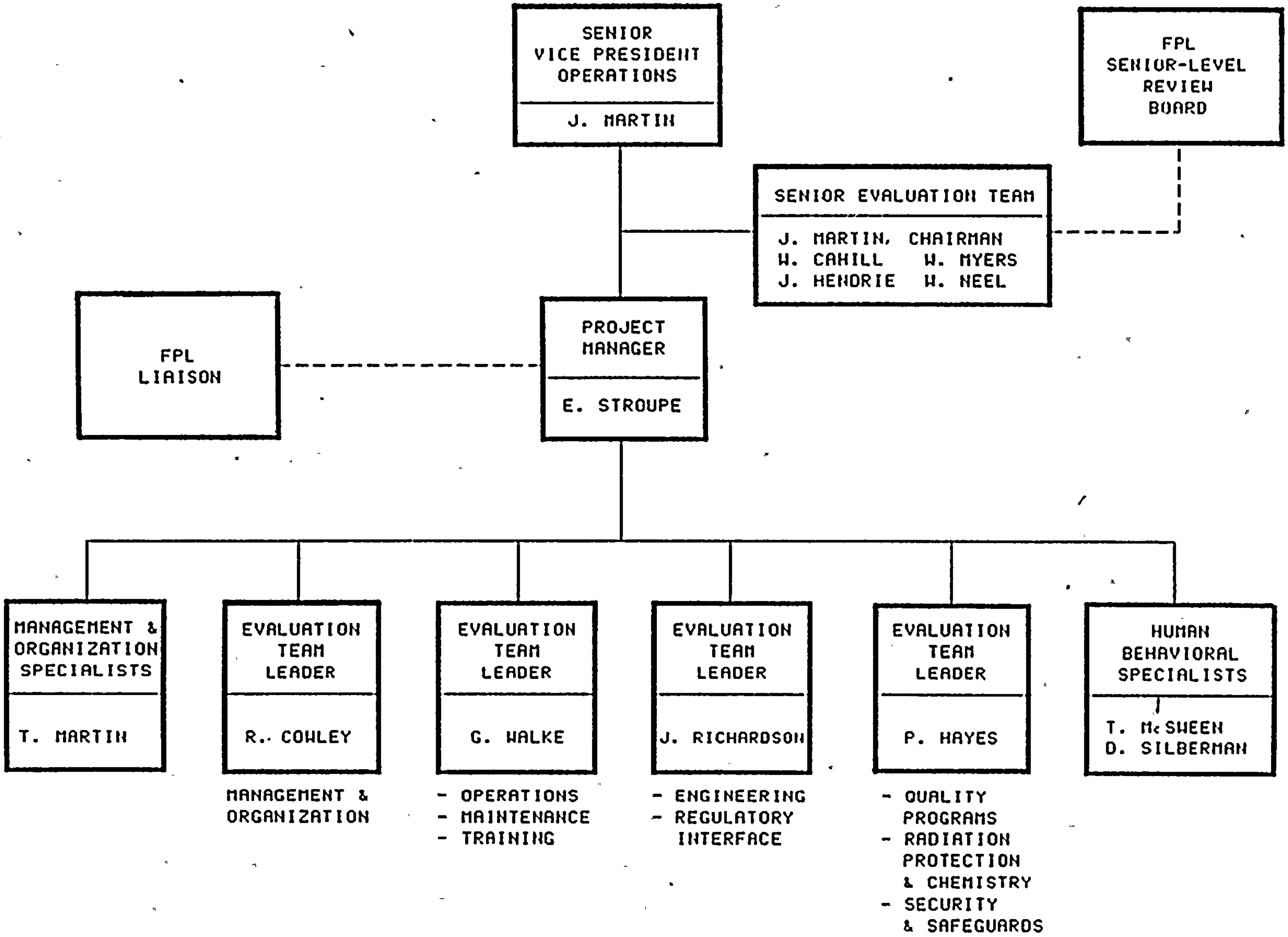
APPENDIX A
NRC ORDER REQUIREMENTS
CROSS REFERENCE TO IMA REPORT

NRC ORDER (EA 87-85) REQUIRED APPRAISAL PLAN ELEMENTS	FINAL REPORT SECTIONS APPRAISAL	FINAL REPORT SECTIONS RECOMMENDATIONS
3) Evaluation of causes behind past failures to meet requirements, adequacy of improvement and upgrade programs, and management changes.	2.0 (all); 4.0 (Para.1-6); 4.1.1.1; 4.1.1.2; 4.1.2.1 (Para.1-3); 4.1.2.2 (Para.1-3); 4.1.3.1 (Para.1-3); 4.1.3.2; 4.1.4.1 (Para.1-3); 4.1.4.2 (Para.1-6); 4.1.5.1 (Para.1-7); 4.1.5.2 (Para.1-3); 4.2.1.1 (Para.1-7); 4.2.1.2 (Para.1,5); 4.2.2.1 (Para.1-3); 4.2.2.2 (Para.1,3,4); 4.2.3.1 (Para.1-5); 4.2.3.2 (Para.6); 4.3 (Para.1-3); 4.3.1.1 (Para.1,3-7); 4.3.1.2 (Para.1,2); 4.3.2.1 (Para.2-6); 4.3.2.2; 4.3.3.1 (Para.1-4); 4.3.3.2 (Para.1,2); 4.4; 4.4.1.1 (Para.1,2); 4.4.1.2; 4.4.2.1 (Para.1,3); 4.4.2.2 (Para.5); 4.4.3.1 (Para.2); 4.4.3.2; 4.4.4.1 (Para.2); 4.4.4.2; 4.5 (Para.1,2); 4.5.1.1 (Para.1,2); 4.5.1.2 (Para.2,3,4); 4.5.2.1 (Para.1-5); 4.5.2.2; 4.5.3.1	5.1.1 (Para.3,6,7); 5.1.2; 5.2.3; 5.2.3.1 (Para.1-3); 5.2.3.2 (Para.1,2); 5.2.4 (Para.1,2); 5.4.1; 5.4.5 (Para.1,2); 5.4.6 (Para.1-4)

APPENDIX A
NRC ORDER REQUIREMENTS
CROSS REFERENCE TO IMA REPORT

NRC ORDER (EA 87-85) REQUIRED APPRAISAL PLAN ELEMENTS	FINAL REPORT SECTIONS: APPRAISAL	FINAL REPORT SECTIONS: RECOMMENDATIONS
4) Appraisal program description, including appraisal team qualification; appraisal documentation; and schedule and milestones.	1.0 (all); 3.0 (all); Appendix A1; Appendix B	
5) FPL/appraisal program organization interface and meetings (includes alerting of FPL to any matters requiring immediate attention).	3.1.2	

APPRAISAL TEAM ORGANIZATION



KEY PROJECT PERSONNEL

Jerry K. Martin - SET Chairman

- 20 years of diverse Technical and Management Commercial Nuclear experience
- Nuclear Utility, Vendor, Architect-Engineer, and Consulting experience
- Extensive Corporate Management Experience
- Extensive Project Management experience including several large multi-utility project
- B.S. Physics, M.S. Mechanical Engineering, Registered Professional Engineer

KEY PROJECT PERSONNEL

William J. Cahill, Jr. - SET Member

- o 38 years power plant design, construction and operations experience
- o 33 years commercial nuclear power experience
- o PWR and BWR Nuclear Utility Executive Experience (Consolidated Edison Co. and Gulf States Utilities)
- o Recognized in Industry for successful plant performance
- o Bachelor Mechanical Engineering, Registered Professional Engineer

KEY PROJECT PERSONNEL

Joseph M. Hendrie - SET Member

- Former Chairman and Commissioner, Nuclear Regulatory Commission
- Member of several Utility Corporate Safety Review Committees
- Management Consultant to a number of utilities
- Participated in several utility management/organization evaluations
- Senior Scientist, Brookhaven National Laboratory
- Member, Advisory Council, INPO
- Former member and Chairman ACRS
- PH.D., Columbia University

KEY PROJECT PERSONNEL

Wanda Myers - Human Behavior Specialist/SET Member

- Executive Director and founder of Behvioral Consultant Services, Inc. in Beaumont, Texas and Wilmington, Delaware

- Conducted assessments, training and/or special management projects for over 50 of the Fortune 500 companies

- Designed the training process for strategic, leadership, and operational levels - which has been delivered to 100,000 persons in major corporations

- M.S. in Education and Psychology, 20 years clinical, administrative and management experience

- Assisted E.I. duPont in their Business Excellence Process for past six years

KEY PROJECT PERSONNEL

William C. Neel - SET Member

- Retired Rear Admiral, United States Navy
- Naval Nuclear Propulsion Plant Command Experience
- Numerous Navy Commendations
- Personally Supervised training of Senior Naval Officers who were prospective commanding officers of nuclear powered ships
- Extensive inspection and audit management experience
- B.S., United States Naval Academy

KEY PROJECT PERSONNEL

E. P. (Woody) Stroupe - Project Manager

- 23 years of technical and management experience in the commercial nuclear power industry
- Extensive experience managing large projects and large organizations
- Extensive NRC interface experience
- Prepared/reviewed numerous report for submittal to the NRC
- BS/MS Chemical Engineering, Registered Professional Mechanical Engineer
- J.D., Law

KEY PROJECT PERSONNEL

Ronald L. Cowley - Evaluation Team Leader

- 26 years business management experience
- 12 years Nuclear Utility experience
- 20 years Project Management experience
- Seven management audit projects
- Project Leader on 5 audit projects
- B.S. Business Management

KEY PROJECT PERSONNEL

Paul Hayes - Evaluation Team Leader

- o 18 years nuclear power plant experience
- o Utility Radiation Protection Supervisor for BWR and PWR plants
- o Certified INPO Evaluator for Radiation Protection, Chemistry, and Emergency Preparedness
- o Project Team Leader for 10CFR50.54(t) evaluations
- o Conducted over 20 in-depth operational nuclear power plant evaluations in radiological protection and chemistry

KEY PROJECT PERSONNEL

John D. Richardson - Evaluation Team Leader

- 12 years technical and management nuclear plant PWR and BWR experience
- Utility plant operations, licensing and engineering experience
- Utility Operations Superintendent and Manager of Safety and Licensing
- Extensive experience interfacing with NRC Region and Headquarters
- Certified SRO
- MBA
- B.S., Electrical Engineering, Registered Professional Engineer

KEY PROJECT PERSONNEL

Gerald J. Walke - Evaluation Team Leader

- 30 years experience in nuclear power plant design, analysis, and plant operation
- Management of nuclear power plant operations and maintenance activities
- Directed all technical aspects of nuclear plant operations for a BWR and PWR plant; held a "cold" RO License
- 8 years management consulting experience
- Conducted Management Assessments for 9 utilities
- Certified Lead Auditor
- B.S., Mechanical Engineering
- M.S., Public Health - Environmental Sciences and Nuclear Engineering

QUALITY IMPROVEMENT PROGRAM

The Quality Improvement Program (QIP) is a management system of total quality control which FPL uses to translate its "customer" needs and reasonable expectations into outcomes and accomplishments which satisfy these needs and expectations. Customers may be internal to the organization (e.g., operations is a customer of maintenance) or they may be external (e.g., the community). The QIP is used to ensure that the services and products of each organization conforms to the customer requirements. There are three main thrusts to the process. These are Policy Deployment, QIP Teams and Quality in Daily Work (QIDW).

Policy Deployment focuses on projects developed from the corporate vision (long term plan), fundamental objectives (mid term plans) and tactical agenda items (short term plans). These project efforts concentrate organization wide resources on a few priority issues. They are intended to produce step-change improvements.

QIP Teams focus on problem identification, problem solutions, and acting upon improvement opportunities through the use of statistical tools. By doing so, these problems are validated in terms of their real effects on the system. All teams utilize a common process for orienting these efforts around valid customer requirements and reasonable expectations. QIP identifies anyone, internal or external to FPL, who receives products and service from an organization or its customer. This process is reflected in the QI Story, a presentation of the steps used in identifying and solving a problem.

The QIP Story is a required product of any QIP Team and it is generated in a sequence of steps as follows:

1. The Reason for Improvement
2. Current Situation
3. Analysis
4. Countermeasures
5. Results
6. Standardization
7. Future Plans

A QIP Team's interim progress is reviewed at specific checkpoints in relation to preset quality, accuracy, and completeness criteria. This allows the team to be realigned with the QIP team process if members have drifted away from the intended purpose of the process, coached if they are deficient in requisite skills, and recognized for their efforts to that point. In short, the process itself maintains accountability among team members for their accomplishments. The final product is an Improvement Action Memorandum which identifies the specific problem, the recommended action and anticipated improvements.

QIDW focuses on improving the process of daily work flow. It is a process which enables individuals and organizations to clarify their specific contributions towards achieving customer satisfaction, and to maintain gains achieved through improvement projects. In essence, this process identifies the accomplishments resulting from an individual's job, and the

customers of those accomplishments. This serves the purpose of highlighting just which aspects of that job are most critical to achieve customer satisfaction, and those which are not important towards this end. The process then requires that standards for acceptable performance be set, and that a process be determined to ensure that these job accomplishments continue to meet customer needs.

To assist in the implementation of QIP at Turkey Point a Site Lead Team has been formed. This team is made up of the following key management personnel:

1. C. J. Baker - Plant Manager
2. D. A. Chaney - Engineering Project Manager
3. H. J. Dager - VP of Engineering, Project Mgmt, and Construction
4. J. W. Kappes - Maintenance Superintendent
5. J. D. Kirk - Project General Manager
6. L. W. Pearce - Operations Superintendent
7. B. T. Sharp - NTQC Coordinator
8. G. M. Smith - Nuclear Services Manager
9. F. H. Southworth - Senior Technical Advisor
10. H. T. Young - Site Project Manager

ATTACHMENT

RE: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
NRC Bulletin 87-02 Response

ACTION 1:

Describe a) the characteristics currently examined during receipt inspection of fasteners (i.e., head markings for grade and manufacturer symbols, review of certified material test report or certificate of conformance), and b) internal controls utilized during storage and issuance from stock to ensure the appropriate use of fasteners.

RESPONSE:

a) An initial receiving inspection is performed to determine quantity received and whether any obvious damage of material exists. The material is then placed on hold pending a detailed inspection by quality control inspectors. Receipt inspection for most material is currently performed by the construction QC department and inspected in accordance with Construction Quality Control Technique Sheet (TS) 7.1 "Receipt Inspection PTP 3 & 4". (See attached procedure.) A similar procedure and process is used for plant QC inspected material. The QC receipt inspector reveiws the purchase order (PO) requirements and vendor supplied documentation for compliance with the PO and then determines what additional physical characteristics should be inspected on the material received. Fasteners are usually inspected for ID & markings, heat codes, workmanship, physical damage to head or threads, and general cleanliness of material. The inspection parameters are then reviewed and approved by the receipt inspection QC supervisor. A sample of the shipment is then randomly selected, with sample size dependent on the shipment size. Each item of the sample is inspected for the predetermined charateristics. This inspection is then documented on a unique receipt inspection report (RIR) provided for each shipment.

b) Material that has satisfactorily completed receipt inspection is released to stores under a material release notification for tagging and/or marking. For construction QC inspected material, the material is controlled in accordance with plant administrative site procedure ASP-9 "Material Control". (See attached procedure.) This procedure requires that all material which may be used in a safety-related application, purchased as quality level QL-1, QL-2, or QL-3, be tagged or otherwise marked with the receipt inspection report (RIR) number for material control and/or tracebility. Bolting material, due to its size and quantity, is usually marked

#8802170400

by placing an ID number on the storage container. Material is then issued from stores under a Requisition on Storekeeper (ROS) form. The ROS is required to specify the work order that the material will be used on and the quantity required. The storekeeper, prior to issuing the material, records the RIR number for each material issued on the ROS. This provides the mechanism to trace material from the receipt inspection to the job it was used on.

ACTION 2:

Select a minimum sample of ten (10) non-safety related fasteners (studs, bolts, and/or cap screws), and ten (10) safety-related fasteners (studs, bolts, and/or cap screws) from current, in use, stock. The sample is to be obtained by the licensee with the participation of an NRC inspector. Fasteners procured to meet the following chemical and mechanical properties are of interest: A-193 grades B7, B8, and B16; SAE J429 grades 5 and 8; A-449: A-325 Types 1, 2, or 3; A354 grades BB, BC, BD; A-490; A-320 LTM; A-307; A-563; or equivalent.

RESPONSE:

See Attachment 1 for samples selected.

ACTION 3:

For the selected samples of fasteners in item 2, include a sample of typical nuts that would be used with each fastener (one-for-one). In particular, nuts purchased to the chemical and mechanical specifications of A-194 are of interest.

RESPONSE:

See Attachment 1 for sample selected.

ACTION 4:

Chemical testing shall be performed on all samples. Mechanical testing shall be performed on each safety-related fastener. Hardness testing shall be performed on each nut and non-safety-related fastener. All testing shall be

performed by a laboratory which the licensee has qualified for this type of testing and appears on the licensee's approved vendor list. Testing performed shall be done in accordance with the requirements of the fastener's specification, grade, and class, and the test shall evaluate the ultimate tensile strength, hardness and chemical properties as required by the fastener's specification, grade, and class. Each sample shall be tagged with the sample's ID number.

RESPONSE:

See Attachment 1 for sample selected and Attachment 2 for test results.

ACTION 5:

The results of all tests, together with the supporting information, are to be reported to the NRC utilizing the format shown in Attachment 1 and 2 of this bulletin. Include the names and addresses of the suppliers and the manufactures of the safety-related and, to the extent possible, of the non-safety-related fasteners. For any fasteners found out of specification, provide an evaluation of the safety significance including consideration of the most limiting application.

RESPONSE:

See Attachment 1 for the sample selected, Attachment 2 for test results, and Attachment 3 engineering analysis. The addresses of the vendors and suppliers are provided below.

A & G Engineering Co., Inc.
4640 East Lapalma Ave.
Anaheim, CA 92806

Nova Machine Products Corporation
18685 Sheldon Rd.
P. O. Box 30287
Middleburg Heights, OH 44130

Cardinal Industrial Products, Inc.
3873 West Oquendo
Las Vegas, NV 89118

Florida Bolt & Nut
825 Northwest 6th Ave.
Ft. Lauderdale, FL

Texas Bolt Co.
3233 West 11th St.
P. O. Box 1211
Houston, Tx 77001-0000

ACTION 6:

Based on the results of the testing and review of the current procedures, describe any further actions being taken to assure that fasteners used in the plant meet the requisite specifications and requirements and that the operability of safety-related plant components is not affected.

RESPONSE:

No new actions are expected as a result of this review. The current FPL inspection practice will continue with the following features: 1) Purchase orders will continue to be reviewed for adequate material specification and testing requirements prior to material purchase. 2) Vendor documentation will continue to be reviewed to ensure that the proper material certifications and testing results are provided. 3) A sample of each material intended for safety-related use will continue to be inspected in accordance with the appropiate receipt inspection procedures.

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-63353-2-A

Fastener Description: Stud, Bolt, 5/8"-11 X 3 3/4" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-193 Grade B7 ASME SECTION III, Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
B7 H

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor:
A & G Eng. Co.

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] FOR PAH Date 1/26/85

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Nut: PTN-S-030-54365-7-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54365-7-A

Fastener Description: Nut, Heavy Hex Head, 5/8" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME-SA-194 Grade 2H
ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

2H (H)

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

A & G Eng. Co.

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature JWilbur for PAH Date 1/28/88

***The sample ID# shall have a prefix that contains the licensee facility initials.**

****If applicable, please provide an explanation for your classification system.**

Associated Stud: PTN-S-030-63353-2-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-62212-3-A

Fastener Description: Stud, Carbon Steel, 1"- 8 x 4 - ½" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASTM A-193 Grade B7 Class 2A

Head Marking (Specification and Manufacturer):
B7 N

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Feedwater Regulator Bypass

Vendor:
Nova Machine Products

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Nut: PTN-S-030-54380-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54380-1-A

Fastener Description: Nut, Heavy Hex Head, 1" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194, Grade 2H Carbon Steel ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

2H A

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

Cardinal Industrial Products

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature Jarlkey FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Stud: PTN-S-030-62212-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-63347-8-A

Fastener Description: Stud, Bolt, ½"-13 x 3", Continuous Thread

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-193 Grade B7 ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

B7 H

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

A & G Engineering Company

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature J. Wilkins FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Nut: PTN-S-030-54360-6-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54360-6-A

Fastener Description: Nut, Heavy Hex Head, ½" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194 Grade 2H ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

2H Ɵ

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

A & G Engineering Company

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Stud: PTN-s-030-63347-8-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-05428-9-A

Fastener Description: Rod, Threaded, Heat Treated Continuous Thread 1" - 8 threads per inch x 12'

Description of Sample Stock Location: 957 Warehouse

Material Specification as Documented by Licensee Records: ASME SA 193, Grade B-7 ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

B7 (-)

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

A & G Engineering Company

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature JWalberg FOR PAH Date 1/28/86

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Nut: PTN-S-030-54380-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54380-1-A

Fastener Description: Nut, Heavy Hex Head, 1" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194 Grade 2H
ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
2H A

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor: Cardinal Industrial Products

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/26/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Stud: PTN-S-032-05428-9-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58717-4-A

Fastener Description: Screw, Hex Head, 3/4" x 3½" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-307 Grade B
ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
TB

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:
Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature J. Wilkins for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Nut: PTN-S-080-54370-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54370-3-A

Fastener Description: Nut, Heavy Hex-Head 3/4" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194 Grade 2H Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
2H T

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor:
Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature DWilkey FOR PAH Date 11/20/86

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Screw: PTN-S-030-58717-4-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58703-4-A

Fastener Description: Screw, Hex Head, ½" x 2" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-307 Grade B
ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
TB

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor:
Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Nut: PTN-S-030-54360-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID#PTN- S-030-54360-6-A

Fastener Description: Nut, Heavy Hex Head, ½" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME Section III Class 2, 1983 Edition thru Summer 1983 Addednum, ASME SA-194 Grade 2H

Head Marking (Specification and Manufacturer):

2H T

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:
Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-58703-4-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54900-1-A1

Fastener Description: Nut, Steel, Black ½" - 13

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA- 194 ,2H
ASME Section III, Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
2H T

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-58707-7-A1

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-030-58707-7-A1

Fastener Description: Screw, Hex Head, ½" x 2½" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-307 Grade B ASME Section III Class 3 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
(–)

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor:
A & G Engineering Company

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature JWilkes FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-54900-1-A1

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58707-7-A

Fastener Description: Screw, Hex Head, ½" x 2½" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA 307, Grade B ASME Section III Class 3 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

TB

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-3-S-030-54900-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54900-1-A

Fastener Description: Nut, Steel, Black ½" - 13

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194, 2H
ASME Section III, Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
2H T

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor: Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] FOR PAH Date 1/28/86

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-58707-7-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58713-1-A

Fastener Description: Screw, Hex Head, 5/8" x 3¼" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-307 Grade B ASME Section III Class 3 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

TB (ERO)

**Class/Procurement Level: Class Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

Texas Bolt

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature JWelkey FOR PAH Date 1/26/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-54365-7-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54365-7-A

Fastener Description: Nut, Heavy Hex Head, 5/8" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194 Grade 2H ASME Section III Class 2 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
2H ⊖

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:
A & G Engineering Company

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature JWilkin FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample PTN-S-030-58713-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58725-5-A

Fastener Description: Screw, Hex Head, 7/8" x 4 ¼" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA 307 Grade B
ASME Section III Class 3, 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):

C D

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor:

Cardinal Industrial Products

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature Gavelkey for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-58930-4-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58930-4-A

Fastener Description: Nut, Heavy Hex Head, 7/8" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASTM A563 Grade C

Head Marking (Specification and Manufacturer):

C

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)

Pressure Boundary

Vendor: Cardinal Industrial Products

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [illegible] for PAH Date 1/28/98

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-58725 -5-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-58715-8-A

Fastener Description: Screw, Hex Head, 3/4" x 3" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA 307 Grade B
ASME Section III Class 3, 1983 Edition thru Summer 1984 Addendum

Head Marking (Specification and Manufacturer):
M

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor:
Cardinal Industrial Products

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-S-030-54370-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-S-030-54370-3-A

Fastener Description: Nut, Heavy Hex Head, 3/4" Carbon Steel

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: ASME SA-194 Grade 2H
ASME Section III Class 2 1983 Edition Thru Summer of 1984 Addendum

Head Marking (Specification and Manufacturer):
2H ⊖

**Class/Procurement Level: Safety Related

General Plant Application (e.g., Pressure Boundary, Structural)
Pressure Boundary

Vendor: A & G Engineering Company

QA Requirements Imposed on Vendor: FPL's Nuclear Safety Related QA Program

Licensee Representative: Paul A. Hogan

Signature Jarilkey for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Asssociated Sample: PTN-S-030-58715-8-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-95601-3-A

Fastener Description: Screw Cap, Hex Head, Zinc Plated, ½" - 13 x 1"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:

Steel Grade 5

Head Marking (Specification and Manufacturer):

S

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (Receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature Jurlkoz FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-69901-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-69901-1-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated ½" - 13

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:

None

Head Marking (Specification and Manufacturer):

None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor:

Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (Receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature J. W. Wilkey FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN - C - 029-95601-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-97101-2-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated ½" - 13 x 2"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: Steel Grade 5

Head Marking (Specification and Manufacturer):

KS

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (Receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-69901-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-69901-1-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated ½" - 13

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:

None

Head Marking (Specification and Manufacturer):

None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor: Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (Receipt Inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-97101-2-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-97601-4-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated, ½" - 13 x 2½"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: Steel Grade 5

Head Marking (Specification and Manufacturer):

KS

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor:

Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: none (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] For PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-69901-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-69901-1-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated ½", - 13

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
None

Head Marking (Specification and Manufacturer):

None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor:

Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-97601-4 -A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C--30-07101-1-A

Fastener Description: Screw Cap, Hex Head, Zinc Plated, 3/4" - 10 x 4"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: Steel Grade 5

Head Marking (Specification and Manufacturer): KS

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (Receipt Inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-030-55400-4-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-030-55400-4-A

Fastener Description: Nut, Black Steel 3/4" - 10

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
ASTM A-194 Grade 2H

Head Marking (Specification and Manufacturer):
2H E

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor:

Florida Bolt & Nut

QA Requirements Imposed on Vendor: None

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-030-07101-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-030-09801-7-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated 7/8" - 9 x 3½"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records: Steel Grade 5

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-71800-7-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-71800-7-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated 7/8" - 9

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
None

Head Marking (Specification and Manufacturer):
None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature Javelly FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-030-09801-7-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-030-03301-2-A

Fastener Description: Screw, Cap, Hex Head, Zinc plated 5/8" - 11 x 3½"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
Steel Grade 5

Head Marking (Specification and Manufacturer):
S

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature *J. Wilkins for PAH* Date *1/28/88*

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-070701-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-70701-3-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated 5/8" - 11

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
None

Head Marking (Specification and Manufacturer):
None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature Jkurlkey FOR PAT Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN C-030-03301-2-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-030-03601-1-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated, 5/8" - 11 x 4"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
Steel Grade 5

Head Marking (Specification and Manufacturer):
S

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature J Wilkey for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-70701-3-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID#   PTN-C-029-70701-3-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated 5/8" - 11

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
None

Head Marking (Specification and Manufacturer):

None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature ~~J. W. Daly~~ FOR PAH   Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-030-03601-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-95301-4-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated ½" - 13 x 3/4"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
Steel Grade 5

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-69901-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-69901-1-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated ½" - 13

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
None

Head Marking (Specification and Manufacturer):
None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature J. Walker FOR PAH Date 11/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-95301-4-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-030-03801-4-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated 5/8" - 11 x 4½"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
Steel Grade 5

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [illegible] FOR PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN - C -029 - 70701 - 3 -A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-70701-3-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated 5/8" - 11

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
None

Head Marking (Specification and Manufacturer):
None

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)

General Plant Use

Vendor:

Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-030-03801-4 -A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-030-06801-1-A

Fastener Description: Screw, Cap, Hex Head, Zinc Plated 3/4" - 10 x 3"

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
Steel Grade 5

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor: Distributed thru Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature Jourlhey per PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-029-71101-1-A

Attachment 1

Fastener Testing Data Sheet

*Sample ID# PTN-C-029-71101-1-A

Fastener Description: Nut, Hex Heavy, Steel Zinc Plated 3/4" - 10

Description of Sample Stock Location: 957 Warehouse Bin

Material Specification as Documented by Licensee Records:
none

Head Marking (Specification and Manufacturer):
none

**Class/Procurement Level: Commercial Grade

General Plant Application (e.g., Pressure Boundary, Structural)
General Plant Use

Vendor:
Distributor was Florida Bolt

QA Requirements Imposed on Vendor: None (receipt inspection was performed by the Licensee)

Licensee Representative: Paul A. Hogan

Signature [signature] for PAH Date 1/28/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Associated Sample: PTN-C-030-06801-1-A

Attachment 2

Data Summary

ID#	Mechanical Analysis			Chemical Analysis[1]						
	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
PTNS-030-63353-2-A	29Rc	137.0	120.0	.431	.83	.019	.011	.26	.15	.98
PTN-S-030-54365-7-A	29Rc			.413		.013	.009			
PTN-S-030-62212-3-A	33Rc	145.0	131.0	.429	.86	.022	.012	.23	.21	.93
PTN-S-030-54380-1-A	30Rc			.430		.023	.019			
PTN-S-030-63347-8-A	22Rc	127.6	110.4	.432	.98	.019	.014	.25	.24	.98
PTN-S-030-54360-6-A	28Rc			.454		.022	.019			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1] The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Attachment 2

Data Summary

	Mechanical Analysis			Chemical Analysis[1]						
ID#	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
PTN-S-030-05428-9-A	32.5Rc	137.8	120.0	.414	.80	.015	.014	.27	.16	1.00
PTN-S-030-054380-1-A	30 Rc			.430		.020	.019			
* PTN-S-030-58717-4-A	79 R_B	80.5	68.4	.203		.022	.009			
PTN-S-030-58717-4-B (Retest)		76.8	57.0							
PTN-S-030-54370-3-A	34 Rc			.461		.017	.015			
PTN-S-030-58703-4-A	90.5Rc	94.8	82.8	.182		.022	.024			
PTN-S-030-54360-6-A	31 Rc			.454		.017	.019			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1] The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Attachment 2

Data Summary

	Mechanical Analysis			Chemical Analysis[1]						
ID#	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
* PTN-S-030-58707-7-A1	$72R_B$	59.2	49.2	.176		.017	.008			
PTN-S-030-58707-7-B1 (Retest)		58.8	50.8							
PTN-S-030-54900-1-A1	32Rc			.426		.022	.018			
* PTN-S-030-58707-7 -A	$91R_B$	88.8	77.9	.172		.018	.021			
PTN-S-030-58707-7-B (Retest)		82.8	70.4							
PTN-S-030-54900-1-A	31 Rc			.430		.020	.018			
PTN-S-030-58713-1-A	$86R_B$	76.6	59.4	.187		.11	.005			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1] The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Attachment 2

Data Summary

	Mechanical Analysis			Chemical Analysis[1]						
ID#	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
PTN-S-030-54365-7-A	29Rc			.413		.016	.009			
PTN-S-030-58725-5-A	$77R_B$	64.0	60.4	.058		.022	.016			
PTN-S-030-58930-4-A	29.5Rc			.425		.015	.010			
PTN-S-030-58715-8-A	$81R_B$	146.0	143.0	.126		.021	.023			
PTN-S-030-54370-3-A	32.Rc			.461		.023	.015			
PTN-C-029-95601-3-A	30Rc			.319		.015	.010			
PTN-C-029-69901-1-A	$90R_B$			.052		.017	.004			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1]The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Attachment 2

Data Summary

	Mechanical Analysis			Chemical Analysis[1]						
ID#	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
PTN-C-029-97101-2-A	27Rc			.322		.018	.010			
PTN-C-029-69901-1-A	20Rc			.063		.019	.006			
PTN-C-029-97601-4-A	27Rc			.329		.011	.012			
PTN-C-029-69901-1-A	$92R_B$			.068		.019	.007			
PTN-C-030-07101-1-A	30Rc			.396		.015	.011			
PTN-C-030-55400-4-A	25Rc			.420		.016	.005			
PTN-C-030-09801-7-A	27Rc			.383		.019	.024			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1] The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Attachment 2

Data Summary

	Mechanical Analysis			Chemical Analysis[1]						
ID#	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
PTN-C-029-71800-7-A	$94R_B$			.077		.012	.013			
PTN-C-030-03301-2-A	30Rc			.376		.015	.010			
PTN-C-029-70701-3-A	$96R_B$			.060		.022	.013			
PTN-C-030-03601-1-A	33Rc			.356		.010	.011			
PTN-C-029-70701-3-A	20Rc			.059		.013	.010			
PTN-C-029-95301-4-A	31Rc			.346		.016	.022			
PTN-C-029-69901-1-A	$89R_B$			.068		.009	.007			
PTN-C-030-03801-4-A	27Rc			.345		.012	.012			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1]The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Attachment 2

Data Summary

	Mechanical Analysis			Chemical Analysis[1]						
ID#	Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
PTN-C-029-70701-3-A	20Rc			.059		.014	.006			
PTN-C-030-06801-1-A	30Rc			.397		.022	.011			
PTN-C-029-71101-1-A	$91R_B$			.081		.011	.008			

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

[1]The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

ATTACHMENT 3
EVALUATION OF SAFETY SIGNIFICANCE

ABSTRACT:

The following evaluation is in response to a request from Nuclear Energy to review the test data on fasteners, as directed by NRC Bulletin 87-02, Fastener Testing to Determine Conformance with Applicable Material Specifications. Twenty-two (22) safety-related fasteners and twenty (20) commercial grade fasteners were tested. The results of the evaluation indicated that all of the fasteners were acceptable for use. Three (3) of the safety-related bolts/studs tested slightly low in material properties. The discrepancies do not affect the performance of the fasteners and may be attributed to testing errors. In general, the test results were very similar to the material test reports provided by the material manufacturers.

EVALUATION:

Item 1: PTN-S-030-58717-4-A ASME-SA-307 Grade B 3/4" x 3 1/2 " hex head bolt

The tensile strength, hardness, and chemistry requirements were tested and found to be within the specification. The cerified material test report (CMTR) provided similar results. The elongation was slightly low, 16.8% vs. 18% minimum. The elongation requirement is for bolts that are larger than 1 3/8" diameter and thus does not apply to these bolts at 1/2" diameter. The bolts are therefore acceptable for use.

Item 2: PTN-S-030-58707-7-A1 ASME-SA-307 Grade B 1/2-13 x2 1/2" hex head bolt

The hardness and chemistry requirements were found to be within specification. the CMTR provided by the material manufacturer provided similar results. The tensile strength was tested and found to be slightly low, 59.2 KSI vs. 60 KSI minimum. This reduction in strength is approximately 1%. This is considered not to be significant since it is within the test method error range. The CMTR provided a tensile strength of 70 KSI. The bolts are therefore considered acceptable for use.

Item 3: PTN-S-030-58707-7-A ASME-SA-307 Grade B 1/2-13 x2 1/2" hex head bolt

The tensile strength, hardness, and chemistry requirements were tested and found to be within specification. The CMTR provided by the material manufacturer provided similar results. The elongation was somewhat low, 14.2 % versus 18% minimum. The elongation requirement is for bolts larger than 1 3/8" diameter and thus does not apply to these bolts at 1/2" diameter. The bolts are therefore acceptable for use.

SUMMARY:

The safety-related fasteners were all determined to be acceptable for use. The test results in general were very similar to the results provided in the CMTRs. There is no evidence to suggest that the information provided by or tests performed by the fastenser manufacturers were in error.

FLORIDA POWER & LIGHT COMPANY

CONSTRUCTION QUALITY CONTROL
TECHNIQUE SHEET

RECEIPT INSPECTION

PTP 3 & 4

TS	7.1
Rev.	2
Date	04-02-87
Page	1 Of 19

APPROVAL

JPC:QC TECHNICAL CONCURRENCE: L. Parker 3/26/87
MANAGER OF CONSTRUCTION QC DATE

APPROVED BY: J. O'Brien 3/24/87
PROJECT QC SUPERVISOR DATE

Purpose and Scope

This Technique Sheet (TS) establishes the inspection requirements for the receipt inspection of safety related materials and equipment. It is also applicable to the receipt inspection of non-safety related material and equipment when requested in accordance with Site procedures.

Note

For receipt inspection and handling of measuring and test equipment controlled under the QC calibration system, refer to TS 12.1.

INFORMATION ONLY

Definitions

1. Safety Related Quality Level One (QL-1) - This classification will be used when one or more of the following conditions exist:

   a) The item of service is for use in, or in conjunction with, a safety related system and the item or service does not meet the definitions of a "Commercial Grade Item".

   b) The originator desires to upgrade an item or service or assure that only QA approved suppliers are used when purchasing the item or service.

   c) Specifications for the items or services require the Seller to comply with the requirements of 10CFR21.

2. Safety Related Quality Level Two (QL-2) - This classification is used when the following set of conditions exist:

   a) The item is for use in, or in conjunction with, a safety related system and

Form 3532B (Non-Stocked) Rev. 8/82

b) The item or service meets the definition of a "Commercial Grade Item" and

c) Quality Assurance documentation (i.e. C of C, Mill Test Report, Chemical or Physical Test Reports, etc.) is required from the supplier when the functional and/or material characteristics cannot be verified after receipt.

d) The originator desires to upgrade an item or service or assure that only QA approved suppliers are used when purchasing the item or service.

3. Safety Related Quality Level Three (QL-3) (RIR) - This classification is used when the following conditions exist:

   a) The item or service is used in, or in conjunction with, a safety related system, and

   b) The item or service meets the definition of "Commercial Grade Item", and

   c) The functional and/or material characteristics of the item or service can be verified after receipt and no QA documentation is required from the supplier.

4. Non-Nuclear Safety Related (NNSR) - This classification may be used when the item or service is not for use in, or in conjunction with, a safety related system.

General Requirements

5. Warehouse personnel receive, handle, process, and store all Site material and equipment in accordance with Stores QI's. FPL Construction QC is provided with a "Notice of Material Received" (NMR) as notification from the warehouse that material is ready for receipt inspection.

Note

All receipt inspections shall be planned in advance including the identification of the required documentation to be reviewed at time of receipt inspection.

6. The Receipt Inspection QC Supervisor or his designee shall prepare the inspection checklist (Figure 3) identifying the inspections required by the Purchase Order and/or design documents. Where sampling is to be performed, the QC Supervisor shall indicate by checking the appropriate block on the RIR.

7. The inspection checklist on the Receipt Inspection Report (RIR), Figure 3, Items 18 through 34, shall be approved by the Receipt Inspection QC Supervisor prior to inspection.

8. Identify safety related (QL-1, QL-2, and QL-3 (RIR)) materials by the unique QC Receipt Inspection Report (RIR) number consisting of the letter designation "R", the last two digits of the year, and a sequential number (e.g. R86-001).

   In cases where more than one heat, batch, or lot number is applicable to the same type of material, add a suffix letter to the RIR number for each item (e.g. R86-001A, R86-001B, etc.). Use a suffix for shipments which contain look-alike items; for example, pipe of the same diameter with differing wall thickness or material type (304, 316).

   Note

   RIR numbers for instrumentation, components, equipment, and materials containing unique serial numbers or unique tag/label identification need not be suffixed.

9. An RIR log shall be maintained to track Receipt Inspection Reports (Figure 2 or equivalent).

Instructions for Inspection of Safety Related Materials or Equipment

10. Cognizant Receipt Inspector - Prepares the Receipt Inspection Report, Figure 3, and a Material Release Notice (MRN), Figure 4. Complete the RIR and MRN to the maximum extent possible prior to performing the inspection. Obtain approval of the prepared form.

    Note

    The assigned QC inspector shall take appropriate measures to assure that items are not subject to contamination during the receipt inspection and the inspection shall be performed in an area equivalent to the level of storage requirements for the item.

11. Inspect the items or equipment using the approved checklist and indicate either accept or reject based on comparison with the applicable acceptance criteria. If no specific accept/reject requirements are provided, use the guidelines for inspections on Figure 3A of this TS.

Note

The assigned receipt inspector shall verify that quality related supporting documentation is in compliance with the purchasing documentation.

The assigned receipt inspector shall verify that all witness or hold points designated in the purchase order are either witnessed or waived by memo or surveillance report from the FPL Quality Assurance Department. In addition, he shall review the memo or surveillance report to ensure that any additional QC requirements stated therein are accomplished.

For QL-1 and QL-2 purchases, the cognizant inspector shall verify that items have been shipped from the proper location when specified in the purchase documents.

12. When bulk quantities are received and sampling has been indicated by the QC Supervisor on the RIR (Item 14), use Table I to determine the correct sample size. If a lot is found to be rejectable, unless otherwise directed, inspect each item in the lot and reject only those items that are discrepant.

13. Submit the RIR and MRN for review and approval by the cognizant QC Supervisor.

14. Release acceptable material to Stores for appropriate tagging and/or marking of the RIR number in accordance with ASP-9. Verify all tagging and/or marking and provide a copy of the MRN to Stores after it has been determined to be acceptable.

15. After the receipt inspection has been completed, attach the MRN to the NMR. Line through the lower half of the NMR and mark "N/A, See Attached".

16. If the material is found to be unacceptable, initiate an NCR or DR in accordance with TS 15.1, "Identification and Control of Discrepant Conditions", and forward it to the QC Supervisor for review and processing.

    a) Attach a "Hold Tag" (see TS 15.1) referencing the NCR or DR.

    b) Arrange for Stores to place rejected material in a hold area or arrange for its segregation to prevent inadvertent use.

    c) When the NCR or DR is closed, remove the "Hold Tag" from the material and provide a copy of the completed MRN to Stores for retention.

d) When the DR or NCR is dispositioned "Return to Vendor", the QC Supervisor shall:

1. Forward the DR or NCR with "Hold Points" attached to Stores for shipping notification and QC verification.

2. Upon shipment of the material to the vendor, complete the "Hold Point" inspection and return the DR or NCR along with a copy of the shipping documents for closure.

Instructions for Inspection of Non-Safety Related Material

17. Perform receipt inspection for non-safety related material and equipment in accordance with and when specified by a Material Receipt Instruction (MRI) prepared in accordance with ASP-9.

Receipt of Weld Material

18. Document Receipt Inspection of weld material in accordance with Figures 5 and 5A.

19. QC Clerical - Transmit informational copies of CMTR's for all weld rods to the FPL Welding Supervisor and SDC.

Documentation

20. Cognizant Receipt Inspector - Complete the RIR (Figure 3) and MRN as specified in this TS.

Note

A typical Receipt Inspection Report Record Package should be in accordance with Figure 1.

21. Process discrepancies noted during receipt inspection in accordance with TS 15.1.

22. QC Clerical - File RIR packages for work assigned to the Project Site Manager until transmitted to SDC. Partial documentation transmittals to SDC are acceptable. Upon completion of the CWO or PC/M, transmit the documentation for retention in accordance with ASP-12. Transmit vendor documentation for M&S materials to Stores for further processing in accordance with Stores QI's. Transmit RIR packages for Plant material to Plant QC on a periodic basis as established by the AQCS.

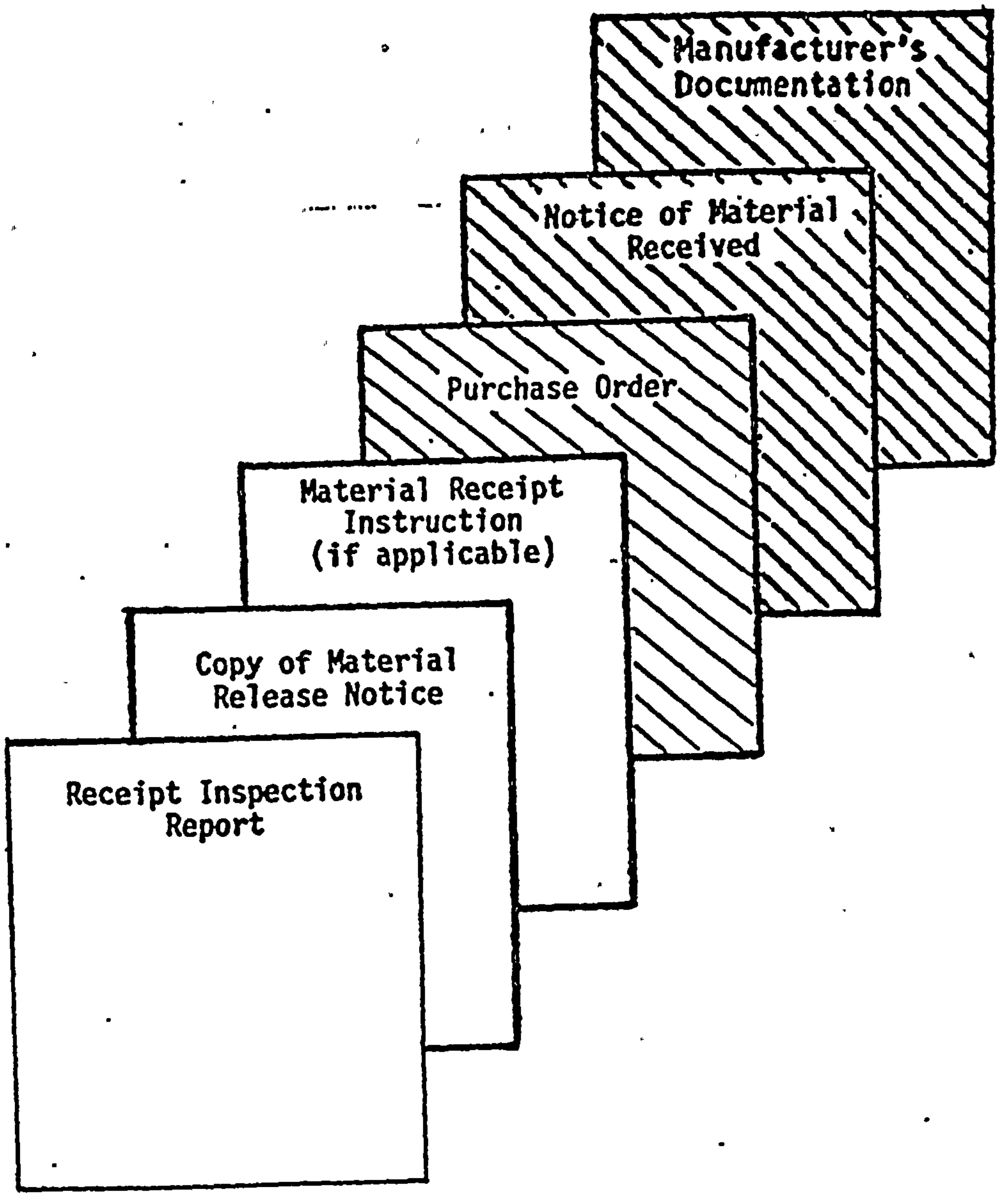
TABLE I
SAMPLING

(Not permissible for shipments totaling 19 or less per P.O. line item)

LOT OR BATCH SIZE	SAMPLE SIZE	ACCEPT Number of Discrepancies	REJECT Number of Discrepancies
2 to 8	2	0	1
9 to 15	3	0	1
16 to 25	5	0	1
26 to 50	8	0	1
51 to 90	13	0	1
91 to 150	20	0	1
151 to 280	32	0	1
281 to 500	50	0	1
501 to 1200	80	0	1
1201 to 3200	125	0	1
3201 to 10000	200	0	1
10001 to 35000	315	0	1
35001 to 150000	500	0	1
150001 to 500000	800	0	1
500001 to over	1250	0	1

FIGURE 1

Typical Receipt Inspection Report Record Package



Provided by FPL Construction QC

Provided by Construction Stores

FLORIDA POWER & LIGHT COMPANY

CONSTRUCTION QUALITY CONTROL
TYPICAL RECEIPT INSPECTION REPORT
LOG

Page ________

RIR/NHR No.	P.O. No.	Material Inspected	Matl. Held DR/NCR No.	Material Released

Form 3532B (Non-Stocked) Rev. 8/82

FLORIDA POWER & LIGHT COMPANY

CONSTRUCTION QUALITY CONTROL
TECHNIQUE SHEET

RECEIPT INSPECTION

PTP 3 & 4

FIGURE 2

TS 7.1
Rev. 2

FIGURE 3
(Front)

FLORIDA POWER & LIGHT COMPANY

CONSTRUCTION QUALITY CONTROL

RECEIPT INSPECTION REPORT
(TS 7.1)

RIR NO. 2		5
NMR NO. 3		☐ QL-1 ☐ QL-2
UNIT 4		☐ QL-3 ☐ NNSR

CWO/PCM/PWO: 1

Page ___ of ___

MATERIAL DESCRIPTION: 6					
SUPPLIER: 7		P.O. NUMBER: 8		SUPPLEMENTS: 9	
SUB.SUPPLIER: 10		SUB.P.O. NUMBER: 11		SUB.SUPPLEMENTS: 12	
SUPPLIER APPROVED: 13 ☐ YES ☐ NO ☐ N/A			SAMPLING: 14 ☐ PERMITTED ☐ NOT PERMITTED		
SPECIFICATION NUMBER: 15			DRAWING NUMBER: 16		
ACCEPT/REJECT CRITERIA SOURCES 17					

	INSPECTION ITEMS	ACCEPT/REJECT REQUIREMENTS	A	R	N/A	
18	Identification and Markings					
19	Manufacturer Documentation					
20	Protective Covers & Seals					
21	Coatings & Preservatives					
22	Inert Gas Blanket					
23	Desiccant					
24	Physical Damages					
25	Cleanliness					
26	Chemical Properties					
27	Mechanical Properties					

(Rev. 4/87)

2

FIGURE 3
(Reverse)

	INSPECTION ITEMS	ACCEPT/REJECT REQUIREMENTS	A	R	N/A	REMARKS
28	Dimensions					
29	Weld Preparation					
30	Workmanship					
31	Lubricants and Oils					
32	Electrical Insulation					
33	Special Inspection					
34	Witness and Hold Points'					

CHECKLIST APPROVED FOR USE BY: 35 ______ TITLE ______ SIGNATURE ______ DATE

RELEASE INFO: 36

☐ Full Release Mat'l Release No.: ______

☐ Partial Release Mat'l Release No.: ______

☐ Other Related RIR: ______

☐ All Item on Hold: ______

SAMPLED: 37

REMARKS:

38 ______ INSPECTOR'S SIGNATURE ______ DATE

DISCREPANCIES:

☐ N/A

☐ DR Nos. ______

☐ NCR Nos. ______

REMARKS:

APPROVED BY: 39 ______ TITLE ______ SIGNATURE ______ DATE

(Rev. 4/87)

2

FIGURE 3A

Use the following guidelines when performing receipt inspection. Indicate either "Accept" or "Reject" based on comparison with the applicable acceptance criteria. Items 27-33 may be omitted at the option of the Receipt inspection QC Supervisor if documentation is provided indicating an inspection was performed at the source by FPL or an agent of FPL.

RIR

1) CWO/PCM or PWO: Obtain from P.O. or NMR (if no PCM is assigned or no PWO provided for Plant Purchase Orders, enter "N/A").

2) RIR No.: Assigned and logged by QC.

3) NMR No.: Obtain from NMR (same as RIR).

4) Unit: Obtain from CWO/PCM printout.

5) QL-1, QL-2, QL-3 (RIR), and Non-Safety: Obtain from P.O.

6) Material Description: Obtain information from NMR or P.O. List Item.

7) Supplier: Obtain from P.O.

8) P.O. Number: Obtain from P.O.-check against NMR.

9) Supplements: Changes to a P.O. and are typically found with the P.O.

10) Sub-Supplier: Obtain from P.O., if applicable.

11) Sub-P.O. Number: DWA Number and is found on P.O. and NMR, if applicable.

12) Sub-Supplements: A supplement or change to a DWA and is found with P.O.

13) Supplier or Subtier Supplier Approved: Determine from FPL "Approved Suppliers List".

14) Sampling: Reference Table I.

15) Spec. Number: Obtain from P.O., if applicable.

16) Drawing Number: Spec. Drawing Number-obtain from P.O., if applicable.

17) Accept/Reject Criteria Sources: TS 7.1 and current revision, P.O. and Spec., ASME, and ASTM, if applicable-Obtain from P.O.

18) Identification and Markings: Verify that identification and markings are in accordance with procurement documentation and the applicable standard, if required.

19) Manufacturer's Documentation: Verify that required documentation has been provided in compliance with purchase documentation and contains the appropriate level of signature approval consistent with the applicable SQAD requirements.

20) Protective Covers and Seals: Visually inspect to assure that covers and seals are intact and meet the indicated requirements.

21) Coatings and Preservatives: Verify that coatings and preservatives have been applied and maintained as required by Specifications, Purchase Order, or Manufacturer's Instructions.

22) Inert Gas Blanket: Verify that the inert gas pressure is within the indicated limits.

23) Dessicant: Verify that the dessicant is not saturated.

24) Physical Damage: Visually inspect to assure that parts of items are not broken, cracked, missing, deformed, or misaligned, and that freely rotating parts turn without binding. Verify that accessible internal and external areas are free of detrimental gouges, dents, scratches, and burns.

25) Cleanliness: Visually inspect to assure that accessible internal and external areas are within the limits for dirt, soil, mill scale, weld splatter, oil, grease, or stains. Specification 5177-M52 is used for inspecting cleanliness on piping. If the documentation indicates that inspection for cleanliness was performed prior to sealing and shipping, and inspection upon receipt indicates that there has been no penetration of sealed boundary, then inspection for internal cleanliness is optional. If no internal inspection is made, it shall be noted on the RIR.

26) Chemical Properties: Verify that chemical properties conform to the indicated requirements, and that test reports, if required, meet the listed requirements of the applicable documents.

27) Mechanical Properties: Verify that mechanical properties conform to the indicated requirements, and that test reports, if required, meet the listed requirements of the applicable documents.

28) Dimensions: Verify that the required dimensions are within the specified limits (i.e. base plate mounting holes, overall external size, configuration and orientation of parts).

29) Weld Preparations: Verify that weld preparations are in accordance with specified requirements.

30) Workmanship: Visually inspect accessible areas to verify that workmanship meets the indicated requirements.

31) Lubricants and Oils: Verify presence of required lubricants and oils and prescribed levels.

32) Electrical Insulation: Verify, as applicable, insulation tests for motors, generators, instruments, control and power cable to ensure conformance with indicated requirements.

33) Special Inspection: If additional inspections are required, the Receipt Inspection QC Supervisor will indicate these inspections and acceptance criteria on Continuation Sheets, and reference these additional sheets in Block #17 of the RIR form.

34) Witness and Hold Points: Verify that all witness and hold points designated in the Purchase Order were either witnessed or waived in writing by Quality Assurance Procurement.

35) Checklist approved for use by appropriate supervisor.

36) Release Information: Check applicable block and fill in MRN Number.

37) Sampled: When sampling is used, record the stem description, lot, batch, or heat number of material here.

38) Signature of inspector performing actual inspection.

39) Approved By: Appropriate supervisor.

FIGURE 4
(Front)

FLORIDA POWER & LIGHT COMPANY

CONSTRUCTION QUALITY CONTROL

MATERIAL RELEASE NOTICE
(TS 7.1)

MRN No. 5
NMR No. 6
RIR No. 7

Page____ of____

SUPPLIER 1

P.O. No. 2 | QL-1 ☐ | QL-2 ☐ | QL-3 3 ☐ | NNSR ☐ | CWO/PCN/PWO: 4

ITEMS INSPECTED: (P.O. LINE ITEM NO.) 8

☐ Partial Release
☐ Full Release
☐ All Items on Hold
☐ Temporary Released
Ref.: NCR-____
DR-____

QTY	ITEM:	A	R	QTY	ITEM	A	R
	9						

☐ Additional Information on Back
☐ No Additional Information on Back

The material marked as acceptable above is authorized to be released:

________ TITLE   10 ________ SIGNATURE   ________ DATE

(Rev. 4/87)

FIGURE 4
(Reverse)

QTY	ITEM	A	R	QTY	ITEM	A	R

ON QC HOLD PER: NCR NO:________ DR NO:________

Remarks:

(Rev. 4/87)

FIGURE 4A

MATERIAL RELEASE NOTICE
(Refer to Figure 4)

1) Supplier: Obtain from P.O.

2) P.O. Number: Obtain from P.O.

3) QL-1, QL-2, QL-3, and NNSR: Obtain from P.O.

4) CWO/PCM or PWO: Obtain from P.O.

5) MRN: Obtain from RIR Number followed by a sequential number starting with "1" for each MRN issued.

6) NMR Number: Obtain from NMR.

7) RIR Number: Obtain from Receipt Inspection Report.

8) Items Inspected: List those items physically inspected.

9) Quantity and Item: Obtain from P.O. or NMR.

10) Signature: By appropriate supervisor.

FIGURE 5

RECEIPT OF WELD MATERIAL

CODE NO.	TYPE	SIZE	HEAT NO.	LOT NO.	PURCHASE ORDER	RIR	CWO

FIGURE 5A

Special Instructions for Receipt of Weld Material (Electrode, Bare Wire, and Inserts)

Receipt Inspection QC Supervisor:

1) Upon acceptance of the weld material, assign a 4-digit code, sequentially numbered from 0001 to 9999, and record it in Block #17 of the RIR and on the release transmittal.

2) Upon clearance of discrepancies and release of weld material, assign the 4-digit code. This number will be identified on the discrepancy report and release transmittal.

3) Assign the 4-digit number from a sequential log. Assign a unique number for weld material having a unique size, heat, or lot. The RIR number will be identified to the documentation.

4) The log shall contain the following information:

   A. Code Number - Assign these numbers sequentially from 0001 to 9999.

   B. Type - This indicates type of:

Examples:	E-7018	ER-308L
	E-10016-D2	EB-inserts stainless
	E-208-16	EB-inserts carbon steel
	E-309-19	Bare wire-carbon steel

   C. Size - This wire or electrode size:

Examples:	3/32"	1/8"
	1/16"	5/32"

   D. Heat Number - Obtain this number from documents accompanying the weld material.

   Example: 402C9481-3
   Note: This is not required in some types.

   E. Lot Number - Obtain this number from documents accompanying the weld material.

   Example: 14-4B4D

   F. Purchase Order - Self-explanatory.

   G. RIR - Receipt Inspection Report Number

5) Weld material purchased for non-safety related application shall be uniquely identified by marking the word "Non-Safety" along the face of the container or by tagging when a container is not used. In addition, the Weld Material Log shall have the initials "NNSR" entered in the RIR column to indicate non-safety related.

FLORIDA POWER & LIGHT COMPANY	CONSTRUCTION PROCEDURES MANUAL	ASP-9
	PLANT CONSTRUCTION ADMINISTRATIVE SITE PROCEDURE TURKEY POINT PLANT "MATERIAL CONTROL"	Rev. 5 Date 04/03/86 Page 1 of 28

REVIEWED BY: [signature] DATE: 4-4-86
Project Quality Assurance Engineer

[signature] DATE: 4/4/86
Project Quality Control Supervisor

[signature] DATE: 4/4/86
Document/Records Control Center Supervisor

B. C. [signature] DATE: 4-8-86
Contractor

APPROVED BY: [signature] for DATE: 4-18-86
Plant Manager - Nuclear

4/17/86

H. T. Young DATE: 4/21/86
Project Site Manager

REVISION: Second major revision in Material Control Program as noted.

INFORMATION ONLY

1.0 PURPOSE, SCOPE and APPLICATION

The purpose of this procedure is to provide interface responsibilities and methods to control all Backfit material throughout receiving, handling, storage, issuance and installation. This procedure applies to all Backfit material. 5

2.0 REFERENCES:

2.1 FPL Quality Assurance Manual

2.2 ASP-7, Procurement

2.3 ASP-8, Corrective Action

2.4 Stores Department Quality Instruction Manual

3.0 ATTACHMENTS:

3.1 Material Receiving Instruction (MRI)
3.2 Notice of Material Received (NMR)
3.3 Pending Inspection and Material Release Tag
3.4 Receipt Inspection Report (RIR)
3.5 Material Release Notice (MRN)
3.6 Requisition on Storekeeper or Material Returned (ROS)
3.7 Material Transfer Memo
3.8 Material Status Report
3.9 Preventive Maintenance Control Card
3.10 Requisition on Purchasing Agent (RPA)
3.11 Material Identification Tag

4.0 DEFINITIONS:

4.1 Controlled Storage Area - Any fenced or contained area for which the Stores Supervisor is responsible.

4.2 Material - The term material includes, where appropriate, all safety and non-safety related equipment, parts, components and items as defined in corporate procedures.

4.3 Receiving - Taking delivery of material at a designated location.

4.4 Receipt Inspection - An inspection performed by Quality Control through examination of both hardware and documentation to determine the conformance of materials and documentation to predetermined requirements at the time of receipt.

4.5 Traceability - Maintaining identification for the purpose of preventing the use of incorrect or defective materials, components or modules. For the purpose of this procedure, traceability shall be implemented through the use of a unique identifier (e.g., RIR number, heat, serial, tag, batch) which provides for a specific item (e.g., pipe, fitting, valve, "EQ" relay) to be traced throughout its manufacturing, fabrication and installation cycle.

4.6 Control - Provided by the ability to distinguish the significant attributes (e.g., size, shape, thickness) of an item by its physical appearance.

4.7 QL-1, QL-2, QL-3 (RIR) - The level described by the FPL Quality Assurance Program to designate procurement requirements. The identification of an item as QL-1, -2, or -3 at the time of procurement does not establish the traceability or control requirements for final installation. The requirement for item traceability is identified on the applicable process sheet, installation list, Nonconformance Report (NCR) disposition, or Field Sketch (FSK), as applicable, by the Project Field Engineer (PFE). 5

4.8 Hold Area - A secure area under the control of the Stores Supervisor for the storage of materials disposition of a discrepant condition.

4.9 Satellite Issuing Station - An extension of PTN Stores controlled and maintained by Stores personnel.

4.10 Materials and Supplies (M&S) - Florida Power and Light Company's classification and identification number. T.D 86-013

5.0 RESPONSIBILITIES:

5.1 The Turkey Point Nuclear Stores Supervisor is responsible for:

A. Receiving, identifying, marking, storing, issuing, and controlling all material through the warehouse, including satellite material issue stations in accordance with applicable Stores Quality Instructions. 5

B. Reviewing all ROS's submitted for a CWO number, for proper signature authorization, and annotating the RIR or M&S number by each line item on the ROS as specified by Paragraph 6.3.6. T.D. 86-013

C. Verifying that the quantity of each line item requested on the ROS is the same quantity issued.

D. Providing an independent verification that the RIR or M&S numbers on the ROS are correct prior to issuance of material. T.D. 86-013

E. Providing the individual who is signing the ROS as having received the material with a copy of the completed ROS and filing a copy of all completed ROS's in the Stores file.

F. Transmitting completed ROS forms (for Construction permanent Plant materials) to DRCC for storage and handling in accordance with ASP-12, QA Records.

5.2 The Project Field Engineer (PFE) or his designee is responsible for: T.D. 86-013

A. Specifying storage requirements on all permanent plant material RPA's.

B. Identifying preventive maintenance requirements for material received that requires such care.

C. Assuring that required preventative maintenance is performed on equipment from receipt on site until turnover to Plant Operations.

D. Identifying unique receipt inspection requirements. These requirements shall be indicated on a Material Receiving Instructions Form (Attachment 3.1).

E. Identifying on the applicable process sheet, installation list, NCR disposition, or FSK those items which require traceability.

F. Assuring that each item on the ROS has a traceability (T) or control (C) designation and has a appropriate quality level shown. T.D. 86-013

G. Approving ROS's prior to submittal to Stores, and ensuring the correct CWO/PC/M number is handwritten on the ROS. CWO number "A-X" shall not be utilized for permanent plant material ROS's.

5.3 The Project Quality Control Supervisor is responsible for:

A. Receipt inspection of material in accordance with the applicable PTN:TS's, Purchase Order and Material Receiving Instruction (when applicable).

B. Performing material control installation and surveillance inspections and subdivided material I.D. transfer surveillances in accordance with the applicable PTN:TS's. 5

C. Identifying nonconforming material in accordance with ASP-8. T.D. 86-013

5.4 The Project Field Superintendent is responsible for:

A. Ensuring that material traceability or control is maintained after issuance from Stores. 5

B. Notifying QC to document the RIR number for items requiring traceability prior to installation for those instances where the RIR number will not be visible after installation.

5.5 The Document Records Control Center (DRCC) Supervisor is responsible for :

A. Maintaining an informational copy file of all weld rod CMTR's transmitted by Quality Control.

B. Filing all completed and approved Material Transfer Memo's (Attachment 3.7) received from the PFE in the appropriate CWO or PC/M packages. 5

C. Storage of completed ROS forms (transmitted by Stores) in accordance with ASP 12.

6.0 <u>PROCEDURE</u>

6.1 <u>Material Receiving</u>:

6.1.1 The Stores Supervisor, in accordance with Stores QI's, shall perform a receiving check on all incoming material. The check is to include.

A. a comparison with the freight bill,

B. a comparison of the packing list with actual items in the shipment,

C. a visual check for shipping damages such as fire, rough handling, environmental damage, tie-down failure or excessive exposure, and

D. the collection of any documentation received with the material.

6.1.2 For material requiring a QC receipt inspection, Stores personnel shall initiate a Notice of Material Received (NMR, Attachment 3.2) upon completion of the receiving check and attach a Pending Inspection and Material Release Tag (Attachment 3.3) to the material.

A. The NMR shall be identified by a unique number consisting of the last two digits of the year, and a sequential number (e.g., 81-001). The identification number shall be provided by QC and shall be the same number as the Receiving Inspection Report number.

B. In cases where there is more than one heat number, batch number or lot number associated with the same type of material, a suffix letter which will be provided by QC shall be added to the RIR number (eg. R86-001 A) for identification of the RIR number to the specific heat, batch, etc. received. RIR numbers for instrumentation, components, equipment and materials containing unique serial numbers or unique tag/label identification need not be suffixed.

5

6.1.3 The material shall be placed in a pending inspection area to await QC receipt inspection. Material which cannot be placed in the pending inspection area shall be controlled to prevent inadvertent use. Its location shall be noted on the NMR.

6.1.4 The Stores Supervisor shall notify the receiving inspector that material is ready for QC receipt inspection by submission of the Notice of Material Received form, an approved copy of the FPL Purchase Order with all revisions or supplements, any vendor quality documentation received with the materials, and a copy of the Material Receiving Instruction (if applicable).

6.2 Receipt Inspection:

6.2.1 The inspector shall perform a receipt inspection and generate a material release notice (MRN, Attachment 3.5) in accordance with PTN:TS 7.1. This MRN shall be attached to the NMR form. In lieu of recording results on the MRN, they may be recorded on the NMR form which documents the inspection results. 5

6.2.2 The RIR, MRN and applicable DRs and NCRs are reviewed and approved by the cognizant Q.C. Supervisor or his designee.

6.2.3 Material found to be acceptable by QC shall be released to Stores for appropriate tagging and/or marking in accordance with paragraph 6.3, 6.4 and 6.5 of this procedure.

6.2.4 QC shall verify all tagging and/or marking and provide a copy of the MRN to Stores after the item has been determined to be acceptable.

6.2.5 Material found to be unacceptable by QC shall be placed in the Hold Area or segregated. Quality Control shall attach a Hold Tag and initiate the MRN and DR or NCR, as applicable.

A. The DR or NCR number shall be noted on the Hold Tag.

B. The DR or NCR shall be processed in accordance with ASP-8, "Corrective Action". 5

C. When the DR or NCR is closed, Quality Control shall remove the Hold Tag from the material and provide a copy of the completed MRN to Stores for retention.

D. When the DR or NCR disposition requires "Return to Vendor";

1. Quality Control shall forward the DR or NCR to Purchasing for coordination with the vendor and then to Stores for shipping.

2. Upon shipment of the material to the vendor, Stores shall return the completed DR or NCR to Quality Control with a copy of the shipping documents.

3. An RPA shall be generated to return items to the vendor for repair or replacement, as required. The RPA shall be routed and reviewed in accordance with ASP-7.

E. Stores shall retain a copy of the completed MRN.

6.2.6 Vendor quality verification documents accompanying the shipment shall be retained by Quality Control until transmitted to DRCC. Partial documentation transmittals to DRCC are acceptable. Upon completion of the CWO or PC/M, Quality Control shall transmit the documentation for retention in accordance with ASP-12. QC shall transmit informational copies of CMTR's for all weld rod to the FPL Welding Supervisor and to DRCC. Vendor documentation for M&S materials shall be transmitted by QC to Stores for further processing in accordance with Stores QI's. 5

6.2.7 Material transferred from Plant Stores:

A. The transfer of any permanent Plant materials from Operating Plant Stores or Fossil Stores, other than M&S/Hard Card materials, shall require an approved RPA generated by the PFE in accordance with ASP-7. T.D. 86-020

B. Upon receipt Stores shall initiate an NMR and forward a copy to QC for receipt inspection.

C. QC shall receipt inspect to the requirements of the RPA, or the original Hard Card requirements, as applicable. T.D. 86-020

6.3 <u>Material Identification</u>

6.3.1 QL-1, QL-2 and QL-3 items shall be marked and/or tagged for the purpose of providing material traceability or control as applicable.

6.3.2 For items requiring traceability, the identifier shall be maintained on or with the material (or on records traceable to the item) until Construction Q.C. has verified that only correct and acceptable material has been used for fabrication and installation, and QC has documented the traceability number on the applicable inspection report.

6.3.3 Verification of material acceptability will be accomplished at time of installation inspection by JPC:QC in accordance with approved Technique Sheets.

6.3.4 Material acceptability shall be documented as follows;

A. For material requiring traceability, the OC inspector shall record the material RIR number and, if desired, other more specific identifier (such as serial number, batch or lot number, etc.) on the applicable inspection report. 5

B. For material requiring only control, the applicable inspection report will only require an "ACCEPT or REJECT" determination. (see Para. 6.3.3.)

6.3.5 Items requiring traceability, but whose identification is lost will be processed as nonconforming in accordance with ASP-8.

6.3.6 The unique identifiers will be as follows:

A. Material Requiring Traceability - RIR Number (except concrete), and, if desired, other more specific identifier (such as serial number, batch or lot number, etc.) 5

B. Material Not Requiring Traceability and QL-3 Material - RIR number on the ROS.

6.3.7 The application of the I.D. shall be in accordance with section 6.4 and 6.5 of this procedure.

6.4 <u>Identification Methods and Practices for Material Requiring Traceability</u> 5

6.4.1 Physical identification shall be used to the maximum extent possible. Where physical identification is either impractical or insufficient, physical separation, procedural control or other appropriate means shall be employed. Identification may be either on the item or on records traceable to the item, as appropriate. 5

6.4.2 Identification methods shall not be detrimental to the material and shall be clear, unambiguous and indelible. Identification methods may be by stamping, vibrating tool, tagging, stenciling or other fluid marking. Code stamp plates shall be altered only with documented manufacturer's approval. 5 TD# 86-035

6.4.3 When material is initially marked by Stores and/or further cutting/dividing/marking is to be performed by the field to maintain traceability as required by the process sheet, installation sheet, NCR disposition or FSK, the following provisions apply when identifying material. 5

A. Metal stamping dies shall be of the blunt nose continuous or blunt nose interrupted dot (low stress) type and shall not be used on pressure retaining material less than 5/16 inch (.3125") thick.

B. Vibrating marking tools shall be fitted with a carbide marking tip or equivalent and shall provide a rounded impression to a depth not exceeding .010 inch.

C. Tags shall be of a material which will retain the marking and will withstand weathering and normal handling effects. Tags shall be securely affixed to the items and displayed in an area that is readily accessible. When utilized tags shall be affixed to QL-1, QL-2, and QL-3 materials as shown on Attachment 3.11. <u>Note:</u> Items suitable for use in EQ Applications are also designated by the use of this tag. 5 TD# 86-031

D. Where surfacing operations such as sand blasting or wire brushing would remove surface markings, markings shall be applied with metal die stamps or vibrating tool, except as noted in paragraph "A" above. 5

6.5 Marking Material Requiring Traceability

6.5.1 Carbon steel piping, plate and structural material subjected to outside storage shall be marked, as a minimum, by low-stress stamping or vibro-etching per 6.4.3 A & B.

6.5.2 Identification of material subjected to outside storage shall be sufficient to withstand weathering and normal handling without deterioration.

6.5.3 Piping material shall be marked or identified by applying the I.D. Number and the pipe schedule approximately one foot from the end of the material.

6.5.4 Plate materials shall be marked by applying the I.D. number on one face.

6.5.5 Structural bars and shapes shall be marked or tagged by applying the I.D. number approximately one foot from the end of the material. When materials are bundled, only one item need be marked or tagged until the bundle is subdivided.

6.5.6 Bulk materials or small items shall be marked or tagged with the I.D. on the container or bundle. Duplicate tags will be prepared by stores for issues from bulk containers.

6.5.7 Welding material containers shall be marked or tagged with the RIR number until issued from Stores. After issue, the welding materials shall be controlled in accordance with ASP-6.

6.5.8 Pipe fittings shall be marked/tagged with the RIR number. 5

6.5.9 Bolting materials shall be marked or tagged with the I.D. number on the container.

6.5.10 Whenever stainless steel materials or components are to be marked or identified with fluid markings, only those fluid markers "Certified for Use in Containment" may be used.

6.5.11 When material size prohibits physical markings, identification shall be maintained by tagging.

6.6 Subdividing Material Requiring Traceability: 5

6.6.1 When an item is subdivided by Stores personnel prior to issuance to the field, Stores personnel shall transfer the unique I.D. to each subdivision or container.

6.6.2 When an item is subdivided in the field after issuance from Stores, the craftsman shall transfer the unique I.D. to each subdivision or container.

6.6.3 If the RIR number for items requiring traceability will not be visible after installation, the craft superintendent and/or craftsman shall contact QC to document traceability while the RIR number is still visible. 5

6.7 Material Storage

6.7.1 Material shall be stored in accordance with the general storage requirements identified in Appendix A, or as specified by the vendor, Project Field Engineer, or Project/JPE Engineering.

6.7.2 Where practical, materials shall be segregated and stored by CWO or PC/M number.

6.7.3 Material requiring traceability may be transferred from one CWO or PC/M to another only when approved by the PFE. Any transfer and its approvals shall be documented with a Material Transfer Memo (Attachment 3.7) from the PFE to Stores. Any material transferred by this method shall meet the minimum procurement requirements (including documentation) of the new CWO or PCM. The PFE shall ensure that DRCC receives two xerox copies of all completed and approved material transfer memo's for filing in the original and new CWO or PC/M packages. 5

6.7.4 Special material handling, storage, and marking requirements shall be listed on the Material Receiving Instruction (MRI, Attachment 3.1) by the PFE or his designee, as necessary.

6.8 Material Issue

6.8.1 Material may only be issued by Stores personnel from Stores controlled areas. Issuance of material is contingent upon receipt of a completed ROS (Attachment 3.6), approved by the PFE or his designee. T.D. 86-013

6.8.2 The ROS shall be for a specific CWO or PCM with only quantities requested for that task. Stores personnel shall hand write the RIR number by each line on the ROS as specified by Paragraph 6.3.6 prior to issuing the material. Stores personnel shall also verify that the quantity of each line item requested on the ROS is the same quantity issued.

6.8.3 The person receiving material on the ROS shall sign the ROS as having received the material. After issuing the material, Stores personnel shall provide the individual who is signing for receipt of the material with a copy of the completed ROS. 5

6.9 Material Returned

6.9.1 When excess material is returned to the Backfit Warehouse, it shall be accomplished through the use of a Material Returned Memo (Attachment 3.6).

6.9.2 Stores shall notify Q.C. whenever any QL-1, QL-2 or QL-3 material is returned. Q.C. shall inspect the material for proper identification, damage and cleanliness.

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6.9.3 If acceptable, Q.C. shall sign and date the Material Return Form and release the material to be placed back in storage. If unacceptable, Q.C. shall process in accordance with ASP-8.

6.10 Preventive Maintenance

6.10.1 The Stores Supervisor or his designee prepares a Material Status Report (Attachment 3.8) which lists the materials received that day.

6.10.2 The PFE or his designee shall review this report and identify any material or equipment that requires preventive maintenance to assure its quality.

6.10.3 If the PFE or his designee determines that received material/equipment requires preventive maintenance, he shall initiate a Preventive Maintenance Control Card (Attachment 3.9) by completing the appropriate blocks on the front of the card and indicating the preventive maintenance requirements on the back of the control card.

6.10.4 The PFE shall coordinate all preventative maintenance as designated on the Preventative Maintenance Control Card. He shall maintain a file and have custody of the PM Control Cards.

6.10.5 The PFE shall transmit the PM Control Card to the Project Field Superintendent, or his designee, at the beginning of the month when the PM is due.

6.10.6 The Project Field Superintendent shall sign and return the PM Control Card after the PM has been completed.

6.10.7 After turnover of the equipment to the Plant, the PFE will transmit the completed PM Control Card to the DRCC for incorporation into the PC/M document package.

7.0 RECORDS

7.1 The following completed documents constitute QA Records and shall be filed with the Receipt Inspection Report Record Package in accordance with PTN:TS's.

Receiving Inspection Report
Material Release Notice
Material Receiving Instruction
Notice of Material Received

7.2 The following completed documents constitute QA Records and shall be retained in the CWO/PCM file in accordance with ASP-12.

Preventive Maintenance Control Card
Material Transfer Memo
Requisition on Storekeeper or Material Returned Memo

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APPENDIX A
Page 1 of 2

GENERAL STORAGE REQUIREMENTS

I. Controlled storage areas shall be established by the Stores Supervisor. The storage levels shall be maintained to minimize the possibility of damage or lowering of quality due to corrosion, contamination, deterioration or physical damage from the time an item is stored, until the item is issued from storage.

II. Material of similar kind shall be stored in the same area to the extent practical. Material shall be stored in a neat and accessible manner, and those items that require special protection shall receive required attention consistent with classification levels.

III. The storage areas shall be maintained in accordance with the following requirements:

A. Access to enclosed, fenced or designated storage areas shall be controlled by the Stores Supervisor and limited to personnel designated by him.

B. Cleanliness and good housekeeping practices shall be enforced at all times in the storage area.

C. Fire protection commensurate with the type of storage area and the material involved shall be provided and maintained.

D. Food, drinks, salt tablets, etc. shall not be permitted in the warehouse storage area.

E. Measures shall be taken to prevent the entrance of rodents and other animals into indoor storage areas or equipment to minimize possible contamination and mechanical damage.

IV. Storage methods should comply with the requirements described as follows:

A. All items shall be stored in such a manner as to permit ready access for inspection or maintenance without excessive handling to minimize risk of damage.

B. Items stacked for storage shall be arranged so that racks, cribbing or crates are bearing the full weight without distortion of the item.

APPENDIX A
Page 2 of 2

GENERAL STORAGE REQUIREMENTS

C. Hazardous chemicals, paints, solvents and other materials of a like nature shall be stored in accordance with applicable approved safety procedures (e.g., NFPA, ANSI, N45.2.2 and OSHA 28 CFR Part 1926)..

D. All items and their containers shall be plainly marked so that they are easily identified without excessive handling or unnecessary opening of crates and boxes.

E. Weatherproof coverings, when used for outdoor storage, shall be flame resistant type of sheeting or tarpaulins. They shall be placed so as to provide drainage and to ensure air circulation to minimize condensation. They shall be tied down to prevent moisture from entering laps and to protect the coverings from wind damage.

F. Stainless steel items and materials shall not be stored in direct contact with carbon steel.