NRC EVALUATION REPORT

OF THE

INDEPENDENT MANAGEMENT APPRAISAL

FOR THE

TURKEY POINT PLANT

U.S. Nuclear Regulatory Commission
Office for Analysis and Evaluation
of Operational Data
Division of Operational Assessment
Diagnostic Evaluation and Incident
Investigation Branch

Enclosure 1

OFFICE FOR ANALYSIS AND EVALUATION OF OPERATIONAL DATA
DIVISION OF OPERATIONAL ASSESSMENT

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TABLE OF CONTENTS

ACRONYMS

AEOD	Office for Analysis and Evaluation of Operational Data
AFW	Auxiliary Feedwater
CAR	Corrective Action Request
CTRAC	Commitment Tracking
EDO	Executive Director for Operations
FCN	Field Change Notice
FP&L	Florida Power and Light Company
I&C	Instrumentation and Control
IMA	Independent Management Appraisal
INPO	Institute of Nuclear Power Operations
GET	General Employee Training
JUMA	Joint Utility Management Audit
LER	Licensee Event Report
MOS	Management-on-Shift
MOV	Motor-Operated Valve
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OJT	On-the-Job Training
PM	Preventive Maintenance
PMS	Performance Monitoring System
PMT	Post Maintenance Testing
PSN	Plant Supervisor - Nuclear
PWO	Plant Work Order
QA	Quality Assurance
QC	Quality Control
QIP	Quality Improvement Program
QIS	Quality Improvement Story
RO	Reactor Operator
SALP	Systematic Appraisal of Licensee Performance
SET	Senior Evaluation Team
SIR	Security Incident Report
SLRB	Senior Level Review Board
SRO	Senior Reactor Operator
STA	Shift Technical Advisor
TS	Technical Specifications
TSG	Technical Support Group

1.0 INTRODUCTION

The Florida Power & Light Company (FP&L), in an October 7, 1987 letter to the Nuclear Regulatory Commission (NRC), committed to a number of initiatives for performance improvement of the Turkey Point Plant (Turkey Point) including a management appraisal performed by an independent contractor. The NRC confirmed FP&L's commitment to an Independent Management Appraisal (IMA) by NRC Order EA-87-85, dated October 19, 1987.[1]

FP&L contracted with ENERCON Services, Incorporated, to perform the appraisal. Between December 14, 1987 and March 30, 1988, an IMA team, composed of ENERCON personnel and selected specialized subcontractor support, conducted interviews, document reviews, surveys, and direct observations at Turkey Point, the FP&L corporate offices, and the St. Lucie Plant (St. Lucie). The final report of the IMA of Turkey Point and FP&L was submitted to the NRC on April 18, 1988.[2]

In April 1988, the Executive Director for Operations (EDO) directed the Office for Analysis and Evaluation of Operational Data (AEOD) to lead a formal NRC evaluation of the IMA. The purpose of the evaluation was to determine whether the appraisal of Turkey Point and FP&L was of sufficient scope, depth, and thoroughness to assure that the remaining significant problems adversely affecting Turkey Point performance, together with the underlying (root) causes, had been identified and accurately described.

The EDO requested that the NRC evaluation of the IMA specifically include:

- The quality and completeness of the appraisal including the appropriateness and completeness of the recommended corrective actions.
- The need for additional evaluations by FP&L or an independent NRC diagnostic evaluation of Turkey Point and FP&L, identifying any technical and organizational areas requiring further evaluation.
- A documented evaluation report on the above assessments for input to the NRC staff regulatory decision on lifting or modifying the NRC order to FP&L requiring an independent appraisal of Turkey Point and FP&L corporate organizations.

The results of the NRC evaluation are presented in the remaining sections of this report. Section 2.0 provides a description of the NRC evaluation plan and process. Section 3.0 provides a summary of the formal evaluation. The summary is presented in a sequence similar to the format of the IMA report. Section 3.1 is an evaluation of the quality and completeness of the IMA process which was used for identifying the Turkey Point performance problems and their root causes. Section 3.2 is the evaluation of the root causes for Turkey Point performance problems identified by the IMA team. Section 3.3 provides the results of the evaluation of the recommendations presented in the IMA report. Section 4.0 provides the detailed NRC evaluation results for each of the functional areas assessed by the IMA team and the detailed evaluation basis for the issues, findings, and conclusions addressed in Section 3.0. Section 5.0

provides the NRC team conclusions. Section 6.0 provides the NRC team recommendations, while Section 7.0 provides the list of references for the evaluation. Appendix A is the meeting handout provided by the NRC during its presentation to FP&L on June 9, 1988, on the results of the NRC evaluation of the IMA of Turkey Point.

2.0 NRC EVALUATION METHODOLOGY

To perform the evaluation, an NRC team composed of personnel from AEOD, the Office of Nuclear Reactor Regulation (NRR), and Region II, was established with the approval of the EDO. The NRC evaluation began with an in-office review of Turkey Point past performance and the IMA plan. This phase included:

- A review and evaluation of past and current performance data (e.g., Systematic Appraisal of Licensee Performance (SALP) reports, Licensee Event Reports (LERs), and NRC Inspection Reports) for problems within each functional area and the identification of reported causes and potential root causes.

- A review of the program descriptions for the self-assessment and improvement programs initiated by FP&L for each functional area and identification of the root cause basis for each initiative.

- A review of other available independent performance evaluation documents (e.g., Institute of Nuclear Power Operations (INPO) Evaluation Reports, FP&L Quality Assurance (QA) Audit Reports) and the evaluation of reported causes and potential root causes.

- A review of the planned scope, information inputs and methods for the IMA.

This review was followed by an in-office evaluation of the IMA report after issuance on April 18, 1988. This phase included:

- An evaluation of the IMA report with respect to quality and completeness of implementation of the appraisal plan.

- An evaluation of IMA report findings and conclusions with respect to quality, completeness and the supporting factual data and root cause analysis basis.

- An evaluation of the appropriateness and completeness of IMA recommendations for addressing the identified root causes.

- An evaluation and comparison for consistency of the IMA report performance problems and root cause findings and conclusions to the NRC team evaluation results of past performance.

- Identification of areas and questions for detailed discussion and data reviews at the ENERCON offices to fully understand the quality and completeness of the appraisal.

During May 9-13, 1988, the NRC team continued the evaluation at the ENERCON offices in Atlanta. During this phase, extensive meetings were held with the IMA team to discuss the methods used and the results obtained for the bases of the IMA report. Available supporting documentation for the IMA report was also reviewed. This visit was followed by a 1-week integrated assessment by the

team at NRC headquarters and a meeting with IMA team personnel at NRC headquarters to review and discuss the NRC team findings.

The scope and nature of the NRC team's assessment for each of the functional areas were as follows:

- Develop a composite assessment of the performance problems.
- Develop a composite assessment of the root causes for performance problems.
- Determine the adequacy of the appraisal. Identify the areas (if any) with performance problems which were not reviewed or not adequately reviewed. Identify areas (if any) with known performance problems for which the IMA root cause analysis was found to be inaccurate or incomplete.
- Determine the appropriateness and completeness of the recommended corrective actions. Identify any instances where recommended corrective action were found to be inappropriate or incomplete.
- Determine the need for either further licensee evaluation or an NRC diagnostic evaluation of Turkey Point and FP&L. Identify any technical or organizational areas requiring further evaluation.

3.0 NRC EVALUATION RESULTS

3.1 Quality and Completeness

In general, the NRC team found: (1) the IMA team appraisal process was performed in a quality and adequately complete manner; (2) the evaluation of problem areas within each functional area for contributing causes, and eventually root causes, was systematic and reasonably complete; (3) the root cause assessment process used by the IMA team addressed each of the significant performance problems they identified; (4) the corporate management root cause assessment and the organizational culture and climate evaluation were less systematic and rigorous than the other areas; and (5) the appraisal and report focused on the higher level management and organizational issues rather than programmatic level causes; (6) the IMA report did not contain many of the details found during the IMA. The results of the NRC team's evaluation of the quality and completeness of the IMA process is provided in further detail in the following paragraphs. Positive observations as well as weaknesses are presented.

To evaluate the nature and proximate cause of performance problems at Turkey Point, approximately 1700 documents were reviewed by the IMA team and catalogued by performance problems and proximate cause categories. The document cataloguing was stored on a computerized data base to facilitate sorting by various problem categories and cause codes. The data base contained performance problems identified in NRC Inspection Reports, INPO Evaluations, FP&L QA Audit Reports, LERs, and other documents. The NRC team found the IMA data base to be broad, comprehensive and relatively current with respect to the problems affecting Turkey Point performance. The data base, sorted by responsibility area (e.g., maintenance) and proximate cause code (e.g., personnel error) provided a good understanding of the proximate causes for significant recent problems in each functional area. This computerized data base was not provided to FP&L, but would be useful to Turkey Point and corporate management in understanding the plant performance problems and their root causes.

The IMA team supplemented this data with information developed from management surveys, observations, and interviews during the initial onsite phase. Extensive formal interviews were initially conducted: 90 at Turkey point; 50 at St. Lucie, and 30 at the FP&L corporate office. Management practice surveys were also administered to a total of 521 personnel at Turkey Point, St. Lucie, and the FP&L corporate office. The types of problems (e.g., inadequate safety evaluations) were gathered into performance issues (e.g., inadequate skills and training) which were evaluated for root causes. The identified potential performance problems were validated and evaluated by the IMA team for potential root causes through additional document reviews, interviews with FP&L and contractor personnel, and observations of meetings, work in progress and shift turnovers.

A Senior Evaluation Team (SET) was utilized by the IMA team to provide a periodic senior level review of the IMA team results. The SET was composed of a former NRC Chairman, a retired nuclear utility executive, a retired Navy

Admiral, and a human behavioral specialist. The issues presented by the IMA team to the SET were evaluated, screened, catalogued, and prioritized with SET assistance to focus the root causes and recommendations for those issues considered most critical to plant performance improvement. Issues which the SET questioned were directed back to the IMA team for further review. Interim findings of the IMA were communicated by the SET to an FP&L Senior Level Review Board (SLRB) consisting of FP&L's Chairman and Chief Executive Officer, President and Chief Operating Officer, Executive Vice President, and Senior Vice President-Nuclear.

IMA team personnel interviewed by the NRC team discussed the appraisal activities and the Turkey Point performance problems and issues in a knowledgeable manner. The bases provided by the IMA team for dismissing specific potential performance problems and investigating others in more detail were generally considered appropriate. The IMA records and discussions with IMA team members provided adequate evidence that appropriate documents were reviewed and appropriate personnel were interviewed. Although substantive IMA documentation had been destroyed in accordance with established IMA procedures, the available remaining records were sufficient to conclude that the appraisal had been generally conducted in accordance with the appraisal plan. The process of evaluating the plant and organizational performance data resulted in high level root causes. The most complete documentation that was available of the interim IMA findings evaluated for root causes was a series of viewgraphs prepared for the IMA team meetings with the SET. Although this material had not been provided to FP&L initially, the NRC team found that it would be useful in formulating corrective actions.

The IMA team made comparisons between St. Lucie and Turkey Point. However, the IMA report did not document the comparisons in a detailed manner. During interviews with IMA personnel, the NRC team determined that comparisons of personnel, work processes, management practices, and culture had been made and incorporated into the root cause analysis and the development of recommendations. For example, many managers at St. Lucie and the corporate organization were interviewed and asked to provide their views on the reasons for the differences in performance between the two stations. The relevant thoughts were then included in the IMA team's further validation and evaluation efforts.

There was considerable evidence that the evaluation of organizational culture and climate, and its impact on personnel behavior, morale, and performance for all organizational areas, was not conducted by the IMA team in as systematic or as rigorous a manner as indicated by the IMA Program Plan. A management survey was used to identify and compare the management practice as well as culture, climate and employee attitudes of equivalent work groups at Turkey Point and St. Lucie and to indicate which groups at Turkey Point should be evaluated in additional detail. The sample size for some departments was disproportionately small which tended to reduce the confidence in the survey findings. Behavioral consultants trained the IMA team members on how to conduct interviews and provided them with an interview observation checklist and a list of sample assessment questions. However, the NRC team could not verify the effectiveness of the above investigation and evaluation methods due to the very limited

available information on interview questionnaire responses and a lack of a summary report on the results of the interview evaluation. Therefore, the NRC team had difficulty in validating the extent to which the IMA team activities met the IMA program objective of identifying the underlying attitudes, opinions and plant culture. Notwithstanding these IMA weaknesses, the NRC team found the appraisal of organizational culture and climate did identify significant Turkey Point and FP&L organizational culture and climate issues adversely affecting Turkey Point.

The IMA Program Plan for the review of management and organization included organizational responsibilities, management controls, organizational accountability, staffing levels, personnel performance and competency, and communications. Within these areas the NRC team found that the IMA team appraisals of FP&L corporate line management and the corporate nuclear support staff were not as thorough or as detailed as the Turkey Point Plant management appraisal. The IMA team did not explicitly evaluate the FP&L corporate organization to determine corporate level problems and issues which could be identified as the root cause basis for Turkey Point plant problems. Neither did it appear that the IMA team actively or systematically pursued the identified root cause evaluations to the corporate level, to fully determine corporate root cause responsibility. The IMA team stated that corporate management and the support staff were evaluated only to the degree that it directly affected Turkey Point performance. This approach necessarily limited the corporate review. Notwithstanding these appraisal methodology weaknesses, the IMA team did identify a number of significant issues related to FP&L corporate line and support staff performance, and overall, the NRC team found the appraisal of management and organization to be adequate.

3.2 Root Causes

The IMA root cause analysis focused on plant management and organizational causes for previously documented problems, giving consideration to the recent corrective actions which FP&L had initiated. The IMA team identified five root cause areas for the significant performance problems at Turkey Point. The five areas involved inadequacies in leadership, management attention and follow-up, technical support, work performance and support, and operations and maintenance.

The NRC team agreed that each of the five areas were root causes for performance problems at Turkey Point. The NRC team found that many of the performance issues within the leadership and management attention and follow-up areas were applicable to the performance problems in many of the functional areas the NRC team evaluated. For example, weaknesses in setting and communicating meaningful goals, management resources diversion, accountability, and ineffective use of quality organizations were considered applicable to a wide range of functional areas. These and the other specific performance issues that were identified in the IMA report are evaluated in additional detail in Section 4.0.

In some cases the IMA report documented the causes which contributed to or provided the basis for the IMA identified root causes and performance issues.

However, in many functional areas the important contributing causes and problems were not documented. The NRC team viewed the contributing causes to be very important to its understanding of the basis for the identified root cause and, therefore, concluded that the absence of such information would make it difficult for FP&L to fully understand the identified root causes and to determine the scope and nature of the actions which would be needed to fully and effectively address them.

The IMA team stated that some of the contributing causes of performance problems that were not documented in the IMA report had been discussed with FP&L senior management in the SLRB meetings. The IMA team also indicated that most of the contributing causes and related supporting information had been left out of the IMA report to maintain its focus on the important high level root cause issues. The IMA team also considered it unnecessary to document the lower level causes since they would be corrected eventually if the higher level causes and critical recommendations (discussed later in Section 3.3) were effectively acted upon by FP&L. It was the IMA team's view that if FP&L were to "define the job requirements and fill the jobs with qualified people" then the lower level causes and problems would, with time, also be corrected as a matter of course. This may be true in principle, but in practice it would require significant additional time for the new Turkey Point management team to identify the lower level issues on their own and take corrective action. Additionally it was the IMA team's view that the Turkey Point culture was to overrespond and overcommit in the resolution of problems. Therefore, if too many details were provided to plant management, it could have an adverse impact. The NRC team did not agree that this was a valid basis to withhold such important information.

The NRC team agreed that the significant performance problems at Turkey Point could be traced to the five root cause areas identified by the IMA team. The NRC team found, however, that the underlying corporate accountability and responsibility for the presence of the root causes did not receive the appropriate importance and clarity in the IMA report. The NRC team found that many of the identified root causes had their origin in a lack of effective corporate leadership and direction and an inappropriate level of corporate management decisionmaking for the plant.

For example, the corporate nuclear group failed to effectively devolve company-wide goals and strategic policies into clear and meaningful goals appropriate to the nuclear group. The lack of leadership in setting clear and meaningful goals at the corporate level is, therefore, considered a root cause for the less than fully meaningful goals at Turkey Point. Additionally FP&L corporate line management did not provide sufficient leadership and direction to ensure that Turkey Point had a set of meaningful site goals that were clearly communicated to the plant staff, had specific tasks, priorities and schedules to be tracked, and had specific personnel assigned implementation responsibility. Senior corporate officers also failed to periodically review and discuss with site personnel the importance of the site goals and the importance of quality in the performance of all work activities and tasks. The common perception among site personnel found by the IMA team was that the appearance of quality was as important, or more important, than the achievement

of quality. This was viewed as one of several important cultural issues which could be traced back to corporate leadership and direction deficiencies.

Other Turkey Point performance issues where the extent and importance of corporate level performance deficiencies were only alluded to in the IMA report, but not explicitly stated as root causes, were in the lack of plant leadership and accountability. Broad and frequent overmanaging of the Turkey Point organization by corporate line and staff management was considered an important cause of the weak sense of leadership and accountability among Turkey Point management and supervisory personnel. Overmanagement included inappropriate corporate management plant-level decisionmaking and overloading the plant with corporate mandated programs. Further, the corporate initiated management development rotations also resulted in significant adverse impacts on accountability and teamwork at the plant. Over time, plant management grew dependent on corporate for decisionmaking and responsible plant managers felt only limited accountability for the successful implementation of the many ongoing programs.

The NRC team further found that the IMA report did not clearly call attention to the corporate management root cause responsibility for the extensive problems with the quality of plant maintenance. Past corporate emphasis on short-term availability rather than long-term reliability resulted in both poor maintenance work practices and "running equipment until it broke." The corporate emphasis on keeping the plant on-line resulted in the maintenance staff tending to fix equipment problems quickly rather than correctly, which contributed to the excessive maintenance backlog, a deteriorated plant material condition and frequent equipment breakdowns at Turkey Point.

Significant deficiencies in the technical leadership and direction provided to the Turkey Point staff by the corporate nuclear support staff also were clear root cause(s) for the performance issues in the corporate training, security, and licensing groups. The NRC team concluded that the root causes for the management and organizational issues at Turkey Point stemmed from both the IMA identified plant management deficiencies and the negative influence of corporate-level leadership and direction.

Within the root cause area of management attention and follow-up, the IMA team found that plant management was not effectively utilizing the QA and quality control (QC) groups' capabilities or effectively following up on their reports. The underlying causes for lack of effective utilization and follow-up were not addressed in the IMA report. The NRC team also found that although the IMA team had not effectively pursued the underlying cause(s) for these management deficiencies, they had concluded that the deficiencies were due to either insufficient awareness of the problems or insufficient pursuit of the corrective actions for the identified problems. Overall, the NRC team concluded that this performance issue would be adequately addressed provided FP&L effectively implemented the IMA recommendations.

The NRC team noted that the types of problems experienced in technical support indicated inadequately trained people at the working level, excessive reliance on contract engineering personnel, or failure to control their work. The

problem with contract engineering personnel was extensively reviewed by the IMA team, but was not identified as being a significant root cause of performance problems and, thus, was not discussed in the IMA report.

The IMA team cited the broad functional areas of plant operations and maintenance as a root cause area for the performance issues at Turkey Point. This section of the IMA report also included discussion of training effectiveness. The IMA report stated that the operations staff at Turkey Point operates the plant in a conservative, competent and safe manner. An exception to this finding identified by the NRC team was an inadequate response to slowly evolving off-normal conditions on at least four different occasions over the past year. The inadequate response to these conditions was the subject of an NRC team recommendation.

The IMA report discussed maintenance deficiencies in the plant work order (PWO) process, root cause determination, and plant support information availability as contributors to poor maintenance performance. The IMA team found many other significant shortcomings within the maintenance functional area, but the bulk of their maintenance findings were not documented in the report. Evidence reviewed by the NRC team suggested a worse situation in the maintenance organization than was depicted in the IMA report. The NRC team concluded that in several important respects, the maintenance organization is not properly prepared to carry out its responsibilities in an effective manner.

The NRC team found that an effective preventive maintenance (PM) program is not being implemented at Turkey Point. Although not documented in the IMA report, discussions with IMA team members indicated that maintenance technicians lack an understanding of the need for strict compliance with the detailed requirements associated with maintaining a nuclear facility. In this regard, the IMA report identified a significant weakness in instrumentation and control (I&C) maintenance support, but did not address the poor electrical and mechanical maintenance found by the NRC team. The evidence indicated the presence of poor work practices, inattention to detail, and an unaggressive approach to identifying and addressing electrical and mechanical maintenance needs.

The NRC team also found considerable evidence that maintenance training is weak. Although the Turkey Point maintenance training program had received INPO accreditation, interviews with the IMA team indicated that deficiencies in program implementation have resulted in the accredited program not achieving the desired results. In addition, IMA team efforts to determine the role of corporate management in maintenance performance were minimal, and the IMA report did not acknowledge the responsibility of corporate managers for maintenance shortcomings, as was previously discussed in this section.

There was compelling evidence that additional resources are needed at Turkey Point in maintenance and in various groups that support maintenance efforts. Although a staffing analysis was performed by the IMA team, it did not identify the necessity of increasing resources for timely improvement of the plant's performance. The NRC team concluded that additional resources would be needed

to overcome the present deficiencies and to develop and maintain a comprehensive and effective maintenance program.

The IMA team root cause evaluation of training performance issues resulted in a recommendation which focused on the Training Superintendent. However, the report did not contain sufficient information to allow FP&L to adequately address other significant issues in the corporate and site training departments. Some of these issues were not confirmed during the IMA. However, it is included in this report to assist FP&L in understanding the potential full scope of the Training Department performance issues. These significant issues included: (1) the occasional negative influence of the corporate training department on the site training department; (2) the lack of confidence in the site training department; (3) the failure to implement aspects of the INPO accredited training program; (4) the lack of acceptance by the Turkey Point Training Department of the St. Lucie Training Department's information or assistance; and (5) the lack of a sufficient number of staff to adequately fulfill the Turkey Point Training Department's responsibilities. Therefore, additional information concerning the problems found by the IMA team affecting corporate and site training will be necessary to implement effective corrective actions.

3.3 IMA Recommendations

The IMA report contained a total of 22 recommendations which are summarized in Section 4.1.2 of this report. The recommendations were clearly focused on higher level management issues rather than lower level specific problems. For example, the first four recommendations were: (1) Define job requirements and match them with skilled people; (2) Suspend the management development program rotations; (3) Establish more meaningful site goals; and (4) Effectively communicate goals to plant personnel. For the most part, the recommendations were directed at the plant management. However, they were intended to be applied broadly and the NRC team concluded that application to corporate managers would be appropriate.

The IMA recommendations generally provided appropriate principles from which FP&L can establish an action plan for effective and lasting improvement. Although the recommendations were supplemented by pertinent discussions, the NRC team found in some cases, the report discussion was too general or imprecise. Information in the report needs to be augmented with additional information to assure that actions will be defined in sufficient detail to provide high confidence that major deficiencies will be corrected.

The IMA team recommended establishing performance measures and providing feedback. In part, the recommendation stated that FP&L should:

> "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."

The NRC team found that it would also be important to implement the recommendation so as to also include corporate-level and site-level measures which indicate the overall success of the implemented corrective actions.

The IMA report made the recommendation to "match workload to resources." This section of the report stated: "The essential improvements must then be prioritized and scheduled such that they can be accomplished using the current plant resources." It was the position of the IMA team that greater efficiencies realized through improvement in the management and utilization of resources would enable the current work force to effectively implement the consolidated improvement programs and eventually bring about reliable performance. However, the NRC team found compelling evidence that additional resources are needed at Turkey Point to support corrective maintenance, PM, post-maintenance testing (PMT), QC, and PWO package development.

In the past year, FP&L has made significant changes in senior management positions at Turkey Point and at key corporate level positions. Although not explicitly stated in the report, the level of detail in IMA team recommendations was reduced in view of the qualification and experience of individuals who assumed key management positions. Changes have been made in the following positions: Senior Vice President, Nuclear; Vice President Turkey Point Nuclear Plant; Turkey Point Plant Manager; Operations Superintendent; Security Supervisor; and Technical Department Supervisor. In general, the IMA team stated that the recommendations on obtaining capable managers and setting appropriate goals obviated the need to make many specific recommendations at the programmatic level.

The IMA team premise for their recommended corrective actions relies heavily on the ability of the new Operations Superintendent to instill a new operator "culture" to correct the lack of plant "ownership" and leadership within the Operations Department. Accordingly, the IMA report did not make a recommendation specific to the Operations Department to instill a new operator culture. Although the IMA team reported that the current Operations Superintendent is having a positive effect on plant operations, the NRC team concluded that additional support and assistance (e.g., shift team building for each operations and support crew) would be necessary to change the passive operations culture which has become entrenched within the past years.

The IMA recommended replacing the current Management-on-Shift (MOS) program with a new program. In the new program, the Plant Supervisor, Nuclear (PSN), who is actually in charge of the shift, would fulfill the oversight function in the place of the other managers who are doing this job in the current program. Until the PSNs have demonstrated the necessary or appropriate degree of leadership and "ownership," the NRC team concluded that replacement of the current MOS program would be premature.

The IMA recommended expediting approval of Turkey Point's proposed new standard technical specification (TS). This is a needed action. The NRC team further noted that plant operators were under instructions to consult with licensing and operations managers whenever a technical specification interpretation was needed. The NRC team concluded it would be appropriate to upgrade operators' capabilities to correctly interpret TS in order to eliminate these restrictions.

One of the IMA report recommendations was to reduce external demands on Turkey Point by suggesting that organizations outside of Turkey Point, specifically, the FP&L corporate organization, INPO, and NRC, recognize the need for the plant to focus resources on solving identified problems and reduce the demands on the staff to respond to special inspections. Notwithstanding this comment, the NRC team noted that it should be expected that the NRC staff will carry out its responsibility to closely monitor FP&L's implementation of necessary corrective actions and the future performance of Turkey Point to ensure that improvements are effective and long-lasting.

4.0 DETAILED EVALUATION RESULTS

4.1 Management and Organization

The NRC team found that the appraisal of management and organization, although considerably less thorough at the corporate level than at the plant level, was on balance adequate. The IMA identified significant performance issues related to leadership and management attention and follow-up. The IMA recommendations generally focused on management issues such as obtaining skilled managers with proven track records, and establishing and communicating more meaningful goals. With regard to resources, in some areas the NRC team did not agree with the IMA conclusion that resource levels were adequate. Overall, the NRC team concluded that the IMA recommendations were appropriate, subject to more emphasis on corporate management and the need for additional resources in certain areas.

4.1.1 Implementation of IMA Program Plan

The IMA Program Plan for the review of management and organization included organizational responsibilities, management controls, organizational accountability, staffing levels, personnel performance and competency, communications, and the role of the corporate and plant safety review committees. The NRC team's review indicated that, except for a lack of emphasis on corporate management, the plan was generally implemented effectively. Appropriate documents and issues were reviewed and appropriate licensee personnel were interviewed. The evaluation process effectively raised the focus from specific problems to higher level management issues.

The NRC team found that the IMA team evaluations of FP&L corporate line management and the corporate nuclear support staff were not as thorough or as detailed as the Turkey Point plant management evaluation. The IMA team did not explicitly evaluate the FP&L corporate organization to determine corporate-level problems and issues which could be identified as the root cause basis for Turkey Point plant problems. Neither did it appear that the IMA team actively or systematically pursued the identified plant root cause evaluations to the corporate level, to fully determine corporate root cause responsibility. The IMA team stated that corporate management and the support staff were evaluated to the degree that they directly affected Turkey Point performance. This approach limited the corporate review. For example, corporate interviews were generally used to solicit corporate views on the site-based root causes for the Turkey Point performance. Conversely, potential performance issues or problems at corporate were generally identified based on the results of site-based interviews, but once identified were not, in general, fully investigated and evaluated at the corporate offices. Thus, IMA team members spent only a limited time at the corporate offices to conduct interviews or make observations to assess root cause responsibilities at the corporate level for site problems.

The analysis of management surveys and the conduct of corporate organizational culture and climate interviews were also limited. Thus, the appraisal and the report did not provide extensive insight into the problems and root causes at the FP&L corporate organization and its interface problems with the Turkey

Point site. Notwithstanding the above evaluation methodology weaknesses, the IMA team did identify a number of significant issues related to FP&L corporate line management and support staff performance.

4.1.2 Evaluation of IMA

The IMA team identified five root causes, each of which is associated with several performance issues. These root causes and associated performance issues can be summarized as follows:

1. Less than adequate leadership associated with:

   a. Management goals
   b. Communication of goals
   c. Management resource diversion
   d. NRC interface, and
   e. Control of commitments and changes

2. Insufficient management attention and follow-up associated with:

   a. Lack of accountability
   b. Ineffective use of quality organizations, and
   c. Insufficient emphasis on security program requirements

3. Ineffective technical support associated with:

   a. The organizational structure
   b. Skills and training, and
   c. Root cause analysis, trending and reliability engineering

4. Deficient systems and mechanisms for work performance and support associated with:

   a. Overtime
   b. I&C support
   c. The Plant Work Order process, and
   d. Information support for the plant

5. Operations and maintenance issues associated with:

   a. Operations "ownership" and leadership
   b. Training, and
   c. Plant Technical Specifications

Most of these root causes and performance issues emphasize management and organization characteristics. The NRC team agreed that leadership and management attention and follow-up represented root causes for performance problems at Turkey Point. The NRC team also generally agreed that the IMA team identified valid performance issues related to management and organization (e.g., the ineffective organizational structure for technical support).

The IMA report did not address the apparent performance issues within the corporate organization related to leadership. For example, the nuclear group within the corporate organization did not effectively devolve company-wide goals into clear and meaningful goals appropriate to the nuclear group. The lack of clear goals appropriate to the nuclear group is considered by the NRC team to be a root cause for the lack of fully meaningful goals at Turkey Point. Additionally, FP&L corporate line management did not provide sufficient leadership and direction to ensure that Turkey Point had a set of meaningful site goals that were clearly communicated to the plant staff, had specific tasks, priorities and schedules to be tracked, and had specific personnel assigned implementation responsibility. Additionally, the failure of senior corporate officers to periodically review and discuss the importance of site goals and quality achievement of the related tasks with plant personnel is considered a leadership deficiency at the corporate level.

Another example where the full extent and importance of corporate level performance deficiencies were only generally alluded to, but not explicitly stated as a root cause, was in the lack of accountability. The frequent rotation of personnel assignments at Turkey Point had a disruptive effect and resulted in direct and adverse impacts on accountability, but was not explicitly presented in the IMA report as a direct result of a corporate mandated program. Additionally, the broad overmanagement of the Turkey Point plant organization by corporate management and staff was also not presented explicitly as a corporate level root cause for the weak sense of accountability present at Turkey Point. Overmanaging included inappropriate involvement of senior corporate management and staff in routine plant-level decisionmaking. For example, there were instances where corporate managers would select personnel for key site positions without consulting the site managers responsible for supervising those individuals. This practice contributed to a lack of "ownership" (i.e., accountability) by plant personnel.

The IMA report contained a total of 22 recommendations. For the most part, the recommendations were directed at the plant management, although some recommendations were directed toward the corporate staff, NRC or INPO. The IMA team recommendations can be summarized as follows:

Critical Recommendations:

- Define job requirements and match them with skilled people.
- Suspend the management development program rotations.

Essential Recommendations:

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

Strategic Recommendations:

- Conduct management walk-throughs.
- Upgrade the physical condition of the plant.
- Corporate management acceptance of lower short-term availability.
- Accept personal responsibility for problem solution.
- Improve system engineering effectiveness.
- Control overtime.
- Improve maintenance performance.
- Achieve a better relationship with the NRC.
- Corporate staff must accept responsibility for knowledge transfer within FP&L.

Important Recommendations:

- Expedite approval of the new Technical Specifications.
- Emphasize quality.
- Improve engineering support.
- Streamline the technical support paperwork process.
- Improve plant information systems.
- Improve reliability engineering and root cause analysis.

The recommendations were clearly focused on higher level management issues rather than lower level specific problems related to management. Further, key recommendations appeared to apply only to the Turkey Point site. For example, the first recommendation stated that "Plant management must define the experience and skill requirements for each position and fill the positions with experienced people who match the required skills." The statement was followed by a list of example positions, all at the Turkey Point plant. IMA team members stated that the recommendation was intended to be applied broadly and include corporate personnel as well. Thus, the IMA team and the NRC team agreed that FP&L should apply the key recommendations related to leadership and management to corporate officers and managers responsible for the plant or for significant supporting roles.

In the past year FP&L has made significant changes in senior management positions at Turkey Point and at key corporate level positions which impact nuclear plant operations. Although not explicitly stated in the report, the level of detail in the IMA team recommendations was reduced in view of the qualification and experience of individuals who assumed key management positions. In general, the IMA team stated that the recommendations on obtaining capable managers and setting appropriate goals obviated the need to make many specific recommendations at the programmatic level.

The following is a partial list of key corporate and site personnel changes made by FP&L in order to improve Turkey Point plant performance:

Senior Vice President, Nuclear. The new senior vice president is highly regarded within the nuclear power industry and has extensive nuclear power experience. He can be expected to effectively provide the corporate leadership, direction, oversight and support necessary for Turkey Point management to implement corrective measures.

Turkey Point Plant Manager: A new Turkey Point Plant Manager was selected near the end of the IMA evaluation. He has a proven track record and is expected to be effective in setting the proper atmosphere for the plant.

Operations Superintendent. The new Operations Superintendent at Turkey Point previously held the equivalent position at St. Lucie, a plant which has performed very well in the past. The IMA team, based on first-hand interviews, observations and his previous record, expressed strong confidence in the ability of the new Operations Superintendent to personally instill in the Operations Department staff the leadership and professionalism needed to significantly improve department performance.

The IMA report made the recommendation to "match workload to resources." This section of the report said: "The essential improvements must then be prioritized and scheduled such that they can be accomplished using the current plant resources." The effect of this recommendation is that available resources would determine the rate of progress in improving plant reliability and performance. Discussions with the IMA team members indicated that the intent of this recommendation was to encourage FP&L management to review existing improvement programs at Turkey Point and consolidate them to eliminate overlapping provisions. The IMA team believed that greater efficiencies realized through improvement in the management and utilization of resources would enable the current work force to effectively implement the needed improvement programs to eventually bring about reliable performance.

The NRC team found that the resources that may be made available through increased efficiency are likely to be insufficient. In fact, the evidence is compelling that additional resources are needed at Turkey Point to support improvement in corrective maintenance, PM, PMT, QC and PWO package development. Further details are discussed in Section 4.5.2.2 of this report.

4.2 Organizational Culture and Climate

The NRC team found that the appraisal of culture and climate, although not conducted in a systematic and rigorous manner, did identify significant Turkey Point and FP&L culture and climate characteristics adversely affecting the performance of Turkey Point. The IMA-identified culture and climate issues affecting plant performance involved company-wide, plant-wide, and department-level characteristics. The NRC team concluded that significant culture and climate problems stemmed from both the IMA-identified management practices at the plant and the negative influence of corporate-level leadership and management deficiencies.

4.2.1 Implementation of the IMA Program Plan

The IMA Program Plan called for behavioral consultants to assist in the evaluation of responses to interview questions, the identification of underlying attitudes, opinions and plant culture, and the assessment of employee attitudes and dedication to accomplishing goals.

The responsibility of the behavioral consultants consisted of: conducting a management survey and evaluating the results of the survey; training team members on how to conduct interviews; and providing guidance and assistance to team members on the evaluation of information collected from interviews and observations. The management survey used, a "Survey of Management Practices" by Clark L. Wilson, pertains to management practices and reflects attitudes managers and supervisors may hold. For the purpose of the IMA, the survey was used to identify groups with significantly different management practices (Turkey Point versus St. Lucie) and to give an additional perspective as to what the team should be looking for in those areas. The survey focused on middle management, and the sample size for some Turkey Point departments was disproportionately small, which tended to reduced the confidence in the survey findings. The behavioral consultants also provided other members of the IMA team with an interview observation checklist and a list of sample assessment questions.

The NRC team could not verify the effectiveness of the above investigation and evaluation methods due to the very limited available information on interview questionnaire responses and the lack of a summary report on the results of the interview evaluation. From discussions with the IMA team members, the NRC team determined that the evaluation of organizational culture was not conducted as systematically or as rigorously as indicated by the IMA Program Plan. Therefore, the NRC team had difficulty in validating the extent to which the IMA team activities met the IMA program objective of identifying underlying attitudes, opinions, and plant culture, and of assessing employee attitudes and dedication to accomplishing goals.

4.2.2 Evaluation of the IMA

The IMA report made reference to aspects of organizational culture in several places. Practices, policies, and working relations were narrowly addressed for particular positions and for particular departments. References to the organizational culture were made in the report through identification of the following characteristics:

- Corporate management gave substantial direction for routine plant management decisions.
- Plant management had become dependent on corporate management for decisionmaking.
- Plant management committed to many improvement programs without examining the full impact on management's ability to effectively manage and provide staffing for their implementation.
- There was a lack of visible leadership at the plant.
- There was insufficient management attention and follow-up.
- A lack of goals, accountability and sense of "ownership" for problems and programs existed at the plant.

- Corporate initiated management development rotations has resulted in negative effects on teamwork and accountability at the plant.
- Excessive overtime existed plant-wide.
- The plant was overly burdened by outside (i.e., governmental, corporate, and industry) programmatic recommendations.
- The operations staff had become too tolerant of poor maintenance support, thereby requiring the operators to take compensatory actions.
- Corporate emphasis on short-term availability rather than long-term reliability had resulted in poor maintenance work quality and a deteriorated material condition of the plant.

However, the underlying reasons for the above characteristics were not fully provided in the IMA report.

The NRC team found that the IMA team had identified additional information not fully discussed in the IMA report on characteristics of the organizational culture such as: (1) an apparent lack of concern for quality performance and an attitude of focusing on the "appearance" of improvement programs rather than on "substance;" (2) operators viewed themselves as highly trained "lifeguards" who could proficiently "rescue" the plant in the event of a transient, but had little sense of responsibility or accountability to assure that the plant equipment was reliable and well-maintained so as to prevent problems; (3) inadequate personnel practices existed including an ineffective performance appraisal process, inequitable promotion practices, poor performance reviews which undermined the merit system, inadequate discipline policy, lack of effective communications; and (4) corporate involvement in the selection of Turkey Point personnel without input from Turkey Point managers to whom the personnel would report.

The IMA members indicated in interviews that the plant culture would become healthier once FP&L implemented the IMA recommendations and continued with the corrective actions presently underway. The NRC team agreed that the proper implementation of these recommendations should improve the plant culture and climate.

4.3 Operations

The NRC team found that the appraisal of the Operations Department was adequate to determine the significant issues affecting the department's performance. The performance issues identified by the IMA team were caused, in part, by the past focus on high plant availability rather than on plant reliability and a lack of a strong sense of plant ownership in the Operations Department. The NRC team concluded that overall, the IMA identified issues and proposed recommendations were generally accurate and sound. Several IMA report weaknesses were identified by the NRC team, however, and are presented in the following sections.

4.3.1 Implementation of the IMA Program Plan

The IMA adequately addressed the areas listed under "Conduct of Evaluations - Operations" of the IMA Program Plan. Although there was little available documentation of interviews due to interview question forms having been destroyed, and no interview summary data was available, there was evidence of direct observations, interactions with operators, document reviews, and a comparison with the St. Lucie Operations Department's performance and policies. Members of the IMA team spent approximately 6 weeks observing the control room operators and 2 weeks observing the turbine building equipment operators.

4.3.2 Evaluation of the IMA

One of the five root cause areas identified in the IMA report involved operations. The major performance issue in operations was the lack of a strong sense of plant "ownership" and leadership in the Turkey Point Operations Department. This and other performance issues contributing to Operations Department problems were identified in the "Operations and Maintenance" section of the report as follows:

1. Emphasis on high plant availibility rather than on plant reliability.

2. Multiple training problems. These included: lack of FP&L licensed instructors, simulator deficiencies, and poor training material.

3. Simultaneous use of both approved and proposed sets of TS in the operation of the plant.

While onsite, members of the IMA team observed operator response to several plant transients requiring immediate operator action, such as a turbine runback and a reactor trip. The IMA report commended the plant operators for their response to these transients.

Although the IMA noted that recent operator response to transients had been conducted in a competent and safe manner, the IMA team did not address inadequate operator response during recent events involving slowly evolving off-normal conditions. Several of these events occurred before the IMA team arrived onsite and included: (1) Repetitive loss of boric acid flowpath (Inspection Report 87-28), (2) Inadequate response to indicated quadrant power tilt (Inspection Report 87-33), and (3) Repetitive void accumulation in the reactor vessel head (Inspection Report 87-46). This type of event also occurred while the IMA team was onsite [inadequate operator response to intake cooling water strainer fouling (Inspection Report 88-02)], but the team attributed the inadequate operators' response to a lack of "ownership." Because the IMA team did not specifically address inadequate operator response to this type of event, site management should determine and implement the corrective actions necessary (i.e., enhanced operator training) to improve operator response to slowly evolving off-normal plant conditions.

The IMA team stated that if plant management's corrective actions in progress were effectively implemented they will "continue the current trend of

significant improvements in Operations Department performance." Some of the current and proposed corrective actions cited in the IMA report included:

- The appointment of a new Operations Superintendent in late 1987 to strengthen the role of the Operations Department in improving the performance of Turkey Point.

- A "Manager on Shift" program that emulates the current "Management on Shift" (MOS) program and is intended to replace it. The proposed Manager on Shift program would have an additional PSN on shift to provide the oversight function performed by site management.

While effective implementation of these corrective actions should improve the department's performance, the NRC team did not find that the Manager on Shift program was ready to replace the current MOS program. The IMA report stated that while some of the operations supervisors are responding in a positive manner to management's emphasis on increased leadership, some of the supervisors are finding the transition difficult. The IMA team indicated that the current group of PSNs have between five and ten years of experience at Turkey Point. Until the PSNs have demonstrated the leadership and "ownership" qualities necessary to change the current plant culture, the current MOS Program should be continued.

A number of the IMA report recommendations are applicable to the Operations Department. Some of the more general report recommendations such as establishment of plant goals, personal responsibility, and knowledge transfer should have a positive impact on the Operations Department performance. Recommendations specific to improving Operations Department performance such as upgrading the plant's physical condition and controlling overtime by increasing operations staffing are sound and should have a positive impact on the overall plant performance. However, several issues not adequately addressed by the IMA report warrant additional licensee attention:

1. The IMA team premise for their recommended corrective actions relies heavily on the ability of the new Operations Superintendent to instill a new operator "culture" to correct the lack of plant "ownership" and leadership within the Operations Department. This reliance on the Operations Superintendent was acknowledged and confirmed during discussions with the IMA team. Although the current Operations Superintendent is having a positive effect on plant operations, the NRC team concluded that additional management support and assistance (e.g., shift team building for each operations and support crew) will be necessary to change the passive operations culture which has become entrenched within the past years.

2. Inadequate operator response to slowly evolving off-normal conditions was not discussed in the IMA report. FP&L should determine and implement corrective actions to address the root cause(s) for inadequate operator response to these events.

3. The IMA team recommendation to expedite approval of the proposed TS should correct the problems caused by concurrent use of the current and proposed TS. However, the IMA team identified other problems concerning TS which they did not address in the report, corrective actions or recommendations. These problems included the internal operating order requiring joint TS interpretations (which "significantly dilutes the leadership of the operators") and the problems operators have had in correctly interpreting TS requirements. Site management should determine and implement the corrective actions necessary to improve the ability of the licensed operators to correctly interpret technical specifications. In addition, corrective actions should be taken to establish PSNs' accountability for equipment operability determinations.

4.4 Training

The NRC team determined that the appraisal of training was adequate to identify the significant problems. The IMA report documented some of these problems and the contributing causes, but did not provide sufficient information for FP&L to address all of the significant issues. The NRC team determined that lack of positive corporate influence was a significant contributing cause of training problems. Implementation of the IMA and NRC recommendations along with corrective actions underway or planned should be adequate to improve training at Turkey Point.

4.4.1 Implementation of the IMA Program Plan

The IMA team adequately addressed the areas listed under "Conduct of Evaluations - Training" of the IMA Program Plan. However, some of the IMA team's findings on training were not documented in the report. Although there was little available documentation of interviews due to interview question forms having been destroyed, and no interview data summary was available, there was evidence of direct observations, document reviews, and a comparison with the St. Lucie Training Department's performance and policies. This comparison was documented by summary sheets, issue sheets, and notes on activities related to the IMA Program Plan.

4.4.2 Evaluation of the IMA

The IMA report addressed Turkey Point training problems under the root cause heading "Operations and Maintenance" and provided a number of contributing factors to the Training Department inadequacies. The inadequacies cited included:

- Poor training material
- Instructors lacking the necessary qualifications and experience
- A lack of FP&L licensed instructors
- Simulator deficiencies

- Deficient screening process for nonlicensed operators
- A lack of identifying plant training needs

The above inadequacies resulted in a 60 percent pass rate on the NRC license examination for reactor operators (ROs) over the past two years. The IMA report further stated that there is no evidence that corporate oversight has had a positive influence on the Turkey Point training results. The report provided information on corrective actions underway to address the above inadequacies as follows:

- Selecting a new Training Superintendent
- Upgrading training materials
- Upgrading instructor qualification
- Enhancing operator candidate screening and testing
- Establishing a closer working relationship between operations management and training management
- Improving management and administrative controls for training and examinations
- Developing a long-range plan for recruiting, training, and qualifying adequate numbers of operators and training personnel to support future plant operations
- Emphasizing the role and direct responsibility of the Operations and Maintenance Superintendents for training of their personnel

The IMA report recommendation specific to training fell under the general recommendation: "Define job requirements and match them with skilled people who have proven track records." The report stated that the Training Superintendent lacks training management experience and, therefore, 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 Training Superintendent with the required training experience and expertise. Other report recommendations such as establishment of goals, accountabilities, performance measures and feedback processes were also applicable to training.

The IMA root cause assessment identified training as a contributing cause for poor operational performance. It did not identify the underlying cause(s) for these training problems, but identified contributory factors. Because the IMA recommendation focused on the Training Superintendent, it implied that the Training Superintendent was the major underlying (root) cause of training problems. However, the report did not provide sufficient information or basis to substantiate this implication.

Discussions with the IMA team resulted in additional information on Training Department problems which led the NRC team to conclude that other potential causes were involved in addition to the Training Superintendent. Some of this information was not confirmed during the IMA; however, it is included in this report to assist FP&L in understanding the potential full-scope of the Training Department performance issues. For example: (1) Corporate training department has sometimes had a negative influence on the site training department such as: pushing resources toward preparation for INPO accreditation rather than addressing in a timely manner the 165 training deficiencies identified by a QA training assessment; accepting inadequate contractor training materials; lack of oversight of St. Lucie and Turkey Point differences on simulator readiness; and failure to establish proper procedures for testing, retesting, documentation, and resolution of simulator problems; (2) Lack of Turkey Point Operations Department staff confidence in the Training Department due to the perception that: it is occasionally used as a "dumping ground for nonperformers;" instructors who failed requalification exams are sometimes used to prepare licensed operators for the same examination; students needing to overcome poor training materials; instructors lacking Turkey Point plant-specific experience; and instructors teaching plant systems as designed, but not as actually built and operated; (3) Lack of implementation of aspects of the INPO-accredited training program; (4) Lack of acceptance by Turkey Point Training Department of St. Lucie Training Department information transfer and assistance; and (5) Lack of sufficient number of staff to adequately fulfill the Training Department's responsibilities including being responsive to customer needs, offering continuous licensed operator classes, timely incorporation of lessons learned and operator feedback into training lesson plans.

The above information on Training Department problems indicated that management deficiencies related to training are far more widespread than a single individual (i.e., the Training Superintendent). The NRC team determined that the lack of a positive corporate influence is a significant contributing cause of training problems. Overall, the IMA report did not provide sufficient information to enable FP&L to appropriately address all the significant issues in the corporate and site training departments.

4.5 Maintenance

The NRC team found the IMA effort in the maintenance area was adequate overall. The bulk of the IMA team's maintenance findings were not documented in their report because they were judged not to be significant root causes. However, the NRC team considered the detailed maintenance findings to be important to FP&L's understanding of Turkey Point's maintenance problems and their ability to develop appropriate corrective actions. With the exception of the recommendation to match workload to resources (see Section 4.1.2), the recommendations affecting maintenance made in the IMA report were considered generally appropriate.

4.5.1 Implementation of the IMA Program Plan

The IMA was generally conducted in accordance with the IMA Program Plan. One notable exception was that the role of corporate management in Turkey Point maintenance performance was not well explored. The NRC team concluded that an emphasis on availability over reliability by corporate managers had led to many

poor maintenance practices. In addition, although a staffing analysis was performed by the IMA team, it did not identify the necessity of increasing resources for timely improvement of the plant's performance. The NRC team did not agree with the IMA team's conclusion that resources are not a significant contributing factor to the problems at Turkey Point.

4.5.2 Evaluation of the IMA

4.5.2.1 Maintenance

The IMA team identified "operations and maintenance" as a root cause for the ongoing problems at Turkey Point. The section of the IMA report dealing with this root cause was primarily centered on operations, and discussion of maintenance performance was limited. Other parts of the IMA report discussed deficiencies in the PWO process, root cause determination, and plant support information availability as contributors to poor maintenance performance. Many other significant shortcomings within the maintenance functional area were identified by the IMA team, but not documented in the report.

For example, the IMA report noted that there have been persistent problems in a large number of safety-related and nonsafety-related systems that have led to numerous reactor trips and entries into limiting conditions for operation. Affected systems included auxiliary feedwater (AFW), component cooling water, intake cooling water, radiation monitoring, chemical and volume control and main turbine control oil. The failure of Operations to insist on adequate support from Maintenance and other support groups was given as the cause of these ongoing problems. However, there was very little discussion of the internal workings of the maintenance organization, its programs, or the status and effectiveness of those programs. Without this insight, there can be little assurance that Operations setting work priorities and insisting that Maintenance do a better job will result in the improved maintenance performance needed to resolve the plant's chronic equipment problems.

There was extensive evidence that in several important respects the maintenance organization was not properly prepared to carryout its responsibilities in an effective manner. Problem areas included PM, procedure compliance, corrective maintenance, maintenance technician training, and resources. These are discussed below.

The NRC team concluded that an effective PM program was not being implemented at Turkey Point. The IMA report briefly mentioned the Turkey Point Analytically Based Preventive Maintenance Program and encouraged its continuation. However, the report did not comment on its effectiveness even though the program had been in place for 1-1/2 years. The plant's chronic, repetitive equipment problems identified in NRC and INPO inspection results, and interviews with IMA team members suggested that the PM program has not matured and cannot yet be considered adequate. To illustrate, there was no formal motor-operated valve (MOV) maintenance program, pressure gauges were not routinely calibrated for the AFW nitrogen system, and records were not kept on

missed PMs. Discussions with IMA personnel also indicated that a tendency existed at Turkey Point to work off problems during outages that might be prevented or better addressed by performing routine PM.

Procedure noncompliance continued to be a significant problem in the conduct of maintenance activities, as evidenced by the NRC team's review of Turkey Point LERs and NRC inspection reports. Although not documented in the IMA report, discussions with IMA team members indicated that maintenance technicians lack an understanding of the need for strict compliance with the detailed requirements associated with maintaining a nuclear facility.

With regard to corrective maintenance, the IMA report identified a significant weakness in instrumentation and control (I&C) support, but was silent on the adequacy of electrical and mechanical maintenance. A review of Turkey Point MOS reports, LERs, and INPO reports indicated to the NRC team that significant deficiencies also existed in these areas. Examples included failure to perform periodic battery capacity tests, misaligned and stripped gears on a charging pump supply breaker, many failures of MOVs to operate on demand, environmentally unqualified grease used in MOVs, an internal leak in a component cooling water heat exchanger that went undetected for an extended period, and numerous intake cooling water pump problems, including the burnup of a pump motor following mechanical maintenance. These events indicated the presence of poor work practices, inattention to detail, and an unaggressive approach to identifying and addressing electrical and mechanical maintenance needs.

The NRC team found evidence that maintenance training was weak. An analysis of recent LERs showed Turkey Point to have a higher than average incidence of maintenance and testing errors as compared to other established Westinghouse plants, and the maintenance rework rate was estimated to be greater than 30 percent. Although the Turkey Point maintenance training program had received INPO accreditation, interviews with IMA team members indicated that its implementation was not achieving the desired results, and the IMA team viewgraphs used in briefing the SET indicated that maintenance classroom training and on-the-job training (OJT) were weak. In addition, IMA team members stated that maintenance supervision did not maintain records of the OJT and classroom training completed by maintenance technicians and had to rely on memory in attempting to assign personnel with the proper qualifications for each job. Although the IMA report specifically discussed the need to significantly upgrade the training given to system engineers, Power Plant Engineering personnel and operators, it failed to discuss the shortcomings in maintenance training. Knowledge of these shortcomings should be of great benefit to FP&L in identifying actions to improve Turkey Point's performance.

The NRC team found that the IMA team did not consider the role of corporate management in maintenance performance to be of significance. As a result, the IMA team expended little effort in exploring this area, and the IMA report did not acknowledge the responsibility of corporate managers for maintenance shortcomings. For example, high plant availability was emphasized rather than high plant reliability. This led to practices such as fixing things quickly rather than correctly, building up excessive maintenance backlogs, and "running

equipment until it broke." These practices could only exist with the tolerance of the corporate managers responsible for plant oversight.

The evidence discussed above suggested a worse situation in site maintenance existed than was depicted in the IMA report. The extent of the maintenance problems was characterized in viewgraphs used by the IMA team to brief the SET. The viewgraphs stated that the "plant is unreliable and in real need of substantial improvement in the total maintenance program and support system," and "a major upgrade of the approach to maintenance is urgently needed."

4.5.2.2 Resources

There was compelling evidence that additional resources are needed at Turkey Point in maintenance and in various groups that support maintenance efforts. Turkey Point's chronic equipment problems and large, chronic work backlog indicated that needed plant work was not getting done, despite the use of substantial overtime. The NRC team found evidence that suggested the lack of a commitment by site and corporate management to reduce the work backlog to an acceptable level and to control it at this level over the long-term. Two Turkey Point Quality Improvement Stories (QISs) from early 1987 entitled "Trend Indication and Forecasting" and "Prioritizers" appeared to indicate that FP&L management had accepted the notion that the rapid buildup of a large work backlog between outages is to be expected. These QISs showed that in early 1987 an average of one out of every four PWOs generated were added to the backlog, for a net addition of ten PWOs each day. One of the QISs was focused on meeting temporary manpower requirements during outages, and the second discussed the proper priority level to assign PWOs. Neither considered making changes such that the work backlog would be controlled at an acceptable level on an ongoing basis.

The IMA report noted that FP&L had started a "System of the Week" initiative to reduce PWO backlog; however, discussions with IMA team members revealed that this program is not well defined and that meaningful progress could not be made by focusing on a system for only one week at a time.

As Turkey Point management moves forward in an effort to improve reliability of plant equipment, additional resource demands will be placed on the plant. For example, as the PM program is developed and new PM items are identified, more man-hours will be required to implement the PM program. The SALP and the IMA report pointed out ongoing problems with PMT. Interviews with IMA team members revealed that responsibility for PMT was not clearly defined. When these problems are resolved, a higher level of PMT activity would be expected which will require additional man-hours.

Several of the recommendations contained in the IMA report will exert pressure to increase staffing levels. The recommendations "upgrade the physical condition of the plant" and "control overtime" appeared to be at odds with each other, for example. The IMA report advocated "improved prioritization of work and better utilization of the current work force" to reduce overtime and improve work output, and these were extremely important considerations that warrant management attention. However, the magnitude of the work to be done at

Turkey Point indicated that additional resources are required to achieve the goal of high plant reliability. A viewgraph used in briefing the SET indicated that the Turkey Point maintenance "staffing level appears satisfactory for normal maintenance tasks," but "is inadequate for the many improvement programs." The current performance level at Turkey Point may not be fairly described as "normal," and the level of effort required of maintenance in achieving the desired plant performance will be considerably above the current level.

The IMA report recommended that plant management "use the QA/QC organizations to assist in performance monitoring, especially in surveillance of operations and maintenance activities." Increased application of QA/QC expertise in the maintenance area would potentially be of great benefit in reducing the rework rate and will require additional man-hours to effectively implement, particularly in the QC area.

The IMA report recommended that "more technical resources be applied to the planning phase of the PWO package development." Increasing the technical knowledge of present planner/schedulers through training, as was suggested by some IMA team members, appeared to be only a partial solution. Other IMA team personnel reported that present planner/schedulers had strong computer skills, but little or no maintenance experience, and that there were simply too few of them.

The IMA team reported that Turkey Point management had recognized the significance of the high I&C turnover rate and had begun to address it. Corrective actions underway included hiring additional I&C technicians in advance to allow time for training and turnover, and hiring only personnel with at least four to five years of prior I&C experience. Providing for turnover time will be helpful, but will not significantly raise the overall experience level of the I&C Department. Although prior I&C experience will also be helpful, it will not improve the site-specific experience level while the I&C technician turnover rate remains high.

NRC Inspection Report 87-9 and the most recent SALP report noted the need for more qualified maintenance technicians, especially in the I&C area, and more field supervisors to maintain a suitable ratio between craftsmen and supervision. A viewgraph used by the SET in briefing the FP&L SLRB agreed with this assessment in recommending consideration be given to contracting experienced I&C technicians. In addition, some IMA team members acknowledged during interviews that additional personnel would help Turkey Point's improvement efforts. The evidence discussed above indicated that the need for more resources continues at Turkey Point.

4.6 Engineering

The NRC team determined that the appraisal of Engineering was generally adequate. Overall management and organizational structure were identified as root causes, and the recommendations specified in the report to correct these root causes were also generally appropriate. However, often these recommendations were too general and imprecise to assure the adequacy and

completeness of corrective action. FP&L should identify corrective actions in sufficient detail to provide confidence that the identified deficiencies will be corrected.

4.6.1 Implementation of the IMA Program Plan

In accordance with their IMA Program Plan and procedures, the IMA team reviewed and evaluated documents associated with the FP&L corporate offices, Turkey Point and St. Lucie to identify items which had an adverse impact on plant performance. The IMA records and discussions with IMA team members provided adequate evidence that appropriate documents were reviewed and appropriate personnel were interviewed; however, very few St. Lucie engineering/technical support personnel were interviewed as part of the validation process. Although the overall process was reasonably verifiable, it was not possible for the NRC team to specifically trace a particular deficiency identified in the document review to its associated performance issue, and thus to the high level root cause identified in the IMA report. Some of the documentation had been destroyed in accordance with IMA procedures. However, the performance issues documented in the remaining IMA team files were broad enough to encompass the deficiencies identified in the documents reviewed by the NRC team.

4.6.2 Evaluation of the IMA

The IMA team personnel interviewed by the NRC team discussed their evaluation of Turkey Point problems in a knowledgeable manner. They understood the problems which they validated, and presented logical reasons for dropping some items and investigating others in more detail. The files available supported development of specific plant problems and types of problems into issues, with assignment of priorities and responsibilities. An "Engineering Action Plan" based on the issues was sufficiently detailed to indicate the process used by the IMA team.

The process of evaluating the data into successively higher (more comprehensive) causes that resulted in essentially a single root cause of inadequate technical support, was less visible through supporting documentation. The most visible documentation for this process was the series of viewgraphs prepared for the SET meetings.

Ten of the 22 recommendations identified in the IMA report were related to the root cause of inadequate technical support. Two of the 10 recommendations were specific to technical support, involving changes to the system engineer function and organization changes to improve engineering support (i.e., nuclear plant engineering should be organized within the Nuclear Engineering Division). All but four of the other recommendations (i.e., management walk-throughs, short-term availability, control overtime and relationship with the NRC) appeared to be related to inadequate technical support.

The IMA report provided recommendations (and associated corrective actions) which had not been initiated at the time the report was put in final form. It did not generally discuss history, the details of corrective actions which are underway, or lower level root causes and requirements for changes which could

distract attention from the major recommendations. This lack of detail made it difficult to assess the situation existing at the time of the IMA.

The recommendations to improve system engineering effectiveness consisted of five actions (in addition to those already initiated by FP&L), which included accountability, definition of responsibilities and authority, and staffing to replace contractor personnel with FP&L employees having the required skills and experience. Effective implementation of the recommendations should result in more effective technical support to Turkey Point. The NRC team understands that past FP&L efforts to upgrade system engineer positions and personnel have not been fully successful. Therefore, FP&L management should determine detailed implementing actions to successfully carry out the recommendations and allow measurement of future successes in this area. For example, the corrective actions should identify hiring and training goals, dates for issuance of new implementing procedures and some methods to evaluate improved performance.

The IMA report recommendations for organizational changes to improve engineering support stated that the organization(s) should be streamlined to provide effective functional, administrative, and technical control in the line organization. It was also specifically recommended that root cause analysis and system reliability engineering be consolidated into the Technical Support Group (TSG) located at the plant site. Since past reorganizations and realignments have not resolved the performance problems in this area, specific items should be defined to successfully carry out the recommendations and enable management to evaluate progress.

Centralization of reliability engineering and root cause analysis, combined with skilled and experienced personnel and clearly defined responsibilities and authorities, should aid in resolving problems of repetitive component failures and personnel error. Particular attention needs to be paid to integrating new organizational changes with previously initiated changes and evaluating the overall results of the changes.

The IMA report did not identify some items in the functional area of engineering which the NRC team considers significant. The number of specific problems identified in the NRC team's independent document review indicated that a serious problem exists perhaps due to inadequately trained personnel at the working level, excessive reliance on contract engineering personnel or failing to adequately control contractor work. Problems with contract engineering personnel were extensively reviewed and evaluated by the IMA team, but was not identified as being a significant root cause of performance problems and, thus, were not discussed in the report.

The Turkey Point deficiencies related to engineering (technical support) should be corrected when the recommendations specified in the IMA report are effectively implemented by FP&L. However, in order to effectively implement the recommendations, FP&L should obtain and review the information developed by the IMA team but not included in the IMA report.

4.7 Security and Safeguards

The NRC determined that the appraisal of security and safeguards was adequate to identify the significant problems. The root cause of security problems was found to be a lack of management attention. The report would be more useful if the cause(s) for the lack of management attention was identified. In addition, there were significant details collected by the IMA team which were not included in the report.

A number of corrective actions were noted to be underway and the IMA team made several good recommendations. Implementation of the IMA and NRC recommendations, when combined with the corrective actions, should adequately improve security at Turkey Point.

4.7.1 Implementation of the IMA Program Plan

The IMA team adequately addressed the areas listed under "Conduct of Evaluation - Security and Safeguards" of the IMA Program Plan. There was documentation of five formal interviews and there was also evidence of direct observations, document reviews and comparison with the St. Lucie Security Department's performance and policies. Evidence was in the form of summary sheets, issue sheets, and notes on activities related to the IMA Program Plan.

The IMA report addressed Turkey Point security problems under the root cause heading "Management Attention and Followup" and provided a few contributing factors to Security Department inadequacies.

Insufficient management attention, although recently improved, was cited as the root cause for the following inadequacies:

- Lack of sensitivity of employees to security
- Inadequate security information in General Employee Training (GET)
- Insufficient security guard training until recently
- No written goals by either corporate or plant security
- No personal ownership of security problems (lack of accountability)
- Insufficient nuclear site experience by security personnel
- Lack of request for corporate support from Turkey Point Security
- Lack of communication between plant security staff and construction management, and
- The Site security plan and security equipment are out-of-date.

The above inadequacies resulted in excessive security violations and events (e.g., 433 lost access badges during 1987 with no resulting personnel discipline).

The report provided information on corrective actions underway to address the inadequacies listed above. The corrective actions were as follows:

- A major upgrade of security equipment over a 24-month period had been scheduled.
- A new site security manager was assigned.
- Two additional FP&L security personnel were temporarily assigned to the site.
- Corporate authorized Turkey Point to hire five additional FP&L site security personnel with the intention of having a FP&L security person on each shift.
- A new video tape emphasizing security was developed to supplement GET.
- FP&L contracted with an outside company to rewrite the site security plan and procedures.
- Guard training was upgraded.

4.7.2 Evaluation of the IMA

The NRC team identified some additional information on Security Department problems not fully described in the report. This additional information primarily came from discussions with IMA team members, a review of IMA security evaluation "issue" forms, and a review of correspondence between NRC and FP&L. For example, (1) the turnover rate of security contractor personnel has been over 40 percent per year, (2) there were equipment deficiencies that the IMA report did not describe, and (3) details on the September 1987 Turkey Point QA Department self-assessment of security identified most of the existing security problems. With respect to the QA effort, little attention was paid to determining the root causes, and the real impact of this assessment on Turkey Point and FP&L was not apparent. Additionally, Turkey Point has a security Quality Improvement Program (QIP) team, and although this team has identified some of the specific security problems, their efforts require a significant amount of resources. The benefits from this effort are not yet apparent and there is evidence that the QIP team is concerned with appearance as much as requirements. For example, the QIP problem statement is as follows: "from September 1986 through September 1987, there have been 3 Security Incident Reports (SIR) related to security officers being inattentive to duty, specifically: sleeping on duty which exceeds a zero target and results in a negative impression by the NRC and Public."

The NRC team did not consider it necessary to include all of the details related to security, such as those examples above, in the IMA report. However, details of contributing causes would have made the report more effective as long as the root causes were kept in perspective. The equipment deficiencies (as the IMA report points out) place extra work on the security staff, but they

do not necessarily reduce security. The causes for the lack of management attention were not pursued by the IMA team. The results of several interviews by the IMA team indicated there was a perception that site management was not sensitive to security.

The IMA report included several good recommendations specific to security. For example, under the recommendation to "Define job requirements and match them with skilled people who have proven track records," the five new FP&L security personnel, intended to provide an FP&L person for each shift, were specifically mentioned. Also "increased plant-wide emphasis on security" was listed as a specific recommendation under "Establish more meaningful site goals."

In addition, several other recommendations implicitly apply to security and conversations with the IMA team confirmed that this was the intention. For example, the recommendation "control overtime" was intended to include overtime of security personnel. Implementation of the IMA team and NRC team recommendations along with the corrective actions underway should improve security at Turkey Point.

4.8 Regulatory Interface

The NRC team found that the appraisal of the regulatory interface area was adequate. The IMA team identified areas that need improvement, such as better defining the organizational responsibilities for interfacing with the NRC. With one exception, the NRC team agreed with the IMA team findings.

4.8.1 Implementation of IMA Program Plan

The IMA Program Plan for regulatory interface included information flow to and from the licensing organizations, organizational structure, responses to selected issues, effectiveness of commitment management and effectiveness of the interface between corporate and plant licensing organizations and the NRC. The NRC team's review indicated that the evaluation plan was effectively carried out.

4.8.2 Evaluation of the IMA

The major root causes of Turkey Point's performance problems were not found in the regulatory interface area. The IMA team did examine the areas and recommended changes that closely follow those made for the other areas. In general, they are: establish policy and goals for the area of regulatory interface; and fill the positions with individuals matched to the jobs. The IMA team also made the following recommendations specific to the regulatory interface area: Define what constitutes a commitment and who has the authority to make commitments; move responsibility for commitment tracking to the onsite Regulatory Compliance Group; and centralize the regulatory interface functions through the proposed reorganization of the Nuclear Energy Department.

The changes proposed should reduce problems associated with poorly defined job functions and should eliminate duplication of effort in the organization. While there have historically been problems in relations between the NRC and

Turkey Point, the NRC team does not agree with the assertion in the IMA report that these poor relations are a cause of the high level of NRC attention that Turkey Point has received. The increased level of NRC attention at Turkey Point is due to the NRC policy of focusing inspection efforts on plants with demonstrated poor performance. Past problems with the interface between the resident inspectors and plant staff had largely been resolved prior to the IMA. The IMA team made recommendations for further improving this relationship.

The recommendations in the report appear to be appropriate for the regulatory interface area and should adequately address the major changes needed to allow the new managers to effectively manage this area.

4.9 Quality Programs

In general, the NRC team found the appraisal of quality programs to be adequate and conducted in accordance with the IMA Program Plan. Conclusions regarding performance issues were found to be adequately supported based on independent document reviews. For one performance issue, management under-utilization of quality organizations, the underlying root cause was not identified. This should not have a significant effect provided FP&L effectively implements the IMA recommendations.

4.9.1 Implementation of IMA Program Plan

The IMA team adequately addressed the areas listed under "Conduct of Evaluations - Quality Program" of the IMA Program Plan. Although there was very limited information, a review of the IMA records and discussions with IMA team members did provide sufficient evidence that appropriate documents were reviewed and appropriate licensee personnel were interviewed. Approximately 7.5 total man-weeks of effort were spent in the field of which 6 man-weeks were at Turkey Point, one man-week at St. Lucie, and approximately 1/2 man-week at corporate headquarters. In addition, approximately 100 interviews were documented at Turkey Point, 10 at St. Lucie, and 15 at corporate headquarters.

4.9.2 Evaluation of the IMA

The IMA team concluded that plant management was not effectively utilizing the QA and QC group capabilities and the data from their reports to improve plant performance and reduce problems. Discussions with IMA team members revealed that this conclusion was based on the history of repetitive violations at Turkey Point which were primarily due to personnel errors. Approximately 40 percent of the reactor trips which occurred in 1987 were due to personnel errors. The IMA team's analysis of Turkey Point documentation indicated that approximately 25 percent of reported problems were due to personnel errors or failure to follow procedures. However, the IMA team's review of quality program activities revealed that although the QA and QC function was being performed in a reasonable manner, program emphasis had not been effectively focused in problem areas to prevent or reduce the recurrence of personnel errors. Quality programs, particularly QC were found not being effectively used to monitor activities and areas that are particularly sensitive or justify

additional attention, such as system lineups, to avoid problems. Repetitive violations and events continue to occur in the areas of security, fire protection, tagging, and surveillance testing.

Based on the NRC team's independent document review and discussions held with appropriate NRC regional, NRC headquarters, and IMA team members, this conclusion appeared to be adequately supported although limited documentation was available from the IMA team for review. Qualifications of personnel in the Turkey Point QA organization reflected a high level of technical and operational expertise which provided the organization with strong capabilities to carry out its functions. However, despite this strong capability, audit program emphasis, until very recently, was focused on conducting programmatic reviews rather than technical reviews. The results of the IMA team comparison between Turkey Point and St. Lucie regarding quality organizations, although not reported, indicated that there were not significant differences between the two sites regarding the technical capabilities of the quality program organizations. Thus, these additional observations further support the IMA team conclusion that the performance issues of the quality organizations at Turkey Point were more of an under-utilization issue, rather than a technical capability issue. However, the IMA team did identify other factors which have significantly impacted the effectiveness of the QC organization at Turkey Point and which were not documented in the IMA report in several cases.

The management rotation program has had a negative impact on the continuity of the QC organization's leadership. Within the last three years the organization has had three managerial changes. In addition, although the current QC supervisor has been with the organization for approximately 13 months, this was only in an acting capacity. The current QC organization was found to be understaffed to effectively carry out its assigned responsibilities, and the organization was assigned additional responsibilities not related to its principal function of surveillance and inspection of plant activities. The IMA team members acknowledged that because QC reported within the line organization, a potential conflict of interest problem could have existed and contributed to QC's overall lack of aggressiveness in identification of performance issues. However, no conclusive evidence could be found to support that this potential conflict resulted in an adverse impact.

In addition to the lack of effective use of the capabilities of the quality organizations, the IMA team concluded that the data from quality organizations reports were not fully utilized by plant management. In particular, results from the QA audit and surveillance programs were not being effectively used by plant management to anticipate problems and avoid events. Discussions with IMA team members revealed that this conclusion was based on a comparison of NRC findings to QA identified findings. There were approximately 37 NRC violations identified in 1987, of which QA had previously documented approximately half of the problem areas. However, the IMA team concluded that plant management was either not sufficiently aware of these problems or did not pursue these problems with sufficient vigor to correct them.

Although no documentary evidence could be provided by IMA team members, NRC document reviews tend to support the above conclusion. The following three

cases cited in NRC inspection reports are examples of a lack of management follow-up and attention to QA identified deficiencies.

1. NRC Inspection Report No. 50-250/87-32 documents that although measures were established to assure that noncompliances were promptly identified, they were not promptly corrected. QA corrective action request (CAR) 86-763 cited a noncompliance where licensed and nonlicensed operators were being allowed to assume duties while greater than 13 weeks delinquent on reviewing training materials. Management's response to CAR 86-763 indicated that all training would be completed by January 1987. QA determined management's response to be inadequate because operators were continuing to assume duties without reviewing training records. In February 1987, an NRC inspection found that the licensee did not implement the proposed corrective actions and still found operators assuming duties while delinquent in reviewing training materials. Despite previous QA and NRC findings, in July 1987, QA again cited (CAR 87-028) a noncompliance in which operators were still delinquent in reviewing training records.

2. NRC Inspection Report No. 50-250/86-39 documents that in September 1985, QA identified that portions of procedure AP0103.36, "Control of Operator Aids and Temporary Information Tags," was not being properly implemented. In June 1986, QA again identified deficiencies regarding the implementation of the procedure, and in September 1986, an NRC Inspection found additional problems regarding the licensee's procedure implementation.

3. NRC Inspection Report No., 50-250/87-02, documents that in March 1986, QA identified that field change notices (FCNs) were not being incorporated into primary design documents in a timely manner. Management's response to QAs noncompliance outlined the necessary actions that were to be completed by June 1986. In June 1986, QA verification of required actions revealed incomplete implementation of corrective actions. Management again outlined additional corrective actions to close out the finding by January 1987. In January 1987, a QA verification audit revealed many of the previously identified FCNs still open. The audit finding was escalated to senior management and additional corrective actions were implemented. However, the scope of the effort to close out the outstanding FCNs would be considerable, due to the large number of design drawings which were impacted.

While the IMA team's major conclusions of the Turkey Point quality organization's performance were generally accurate and supported by independent document reviews, the underlying root cause(s) for inadequate utilization of quality organizations and the lack of management attention and follow-up to QA identified findings was not addressed in the IMA report. Subsequent discussions with IMA team members revealed that, although the question was pursued, the IMA team did not determine the underlying cause(s) for this issue. Examples of potential root causes are too much other work , failure to escalate

problems to the attention of management, failure to characterize and prioritize problems identified or lack of management support to quality organizations and quality achievement. This is not expected to have significant impact provided FP&L effectively implements the IMA recommendations.

A number of the IMA report recommendations were applicable to quality programs. Some of the more general report recommendations such as establish more meaningful site goals regarding achieving quality work performance and high plant reliability, establish performance measures regarding quality of work, and emphasizing quality during management walkthroughs and meetings should have a positive impact on the overall quality of work performance. Recommendations specific to improving the performance and effectiveness of quality organizations such as removal of line responsibilities of the commitment tracking (CTRAC) system from the QC organization, providing more visible support to QA and QC, and making better use of quality organizations and their products have the potential to provide an adequate basis for establishing additional plant corrective actions. However, FP&L's corrective actions should also address the role that corporate management must play in emphasizing excellence of quality within the work force.

4.10 Radiation Protection and Chemistry

Based on its review of the IMA team's work, the NRC team found that the appraisal of this area was carried out in accordance with the IMA Program Plan and the IMA conclusions were generally accurate and supportable.

4.10.1 Implementation of the IMA program Plan

In accordance with their Program Plan and Procedures, IMA team members reviewed and evaluated documents associated with FP&L, Turkey Point, and St. Lucie. The IMA document data base was computerized to facilitate sorting by various problem categories and other key words. A sort of this data base was reviewed by the NRC team. It contained references to NRC Inspection Report, INPO Evaluations, FP&L QA Audit Reports, CARs, LERs, and other documents. Many of the documents reviewed by the NRC team were referenced in the computer listing.

The IMA used the document data base to identify types of problems (i.e., symptoms), and supplemented this data with information developed from management surveys and interviews with key managers at Turkey Point, St. Lucie and the corporate staff. The symptoms or problems developed from the background review were then examined further via interviews, observations and document reviews. Issues that could be validated were considered for further development and/or inclusion in the report.

Although some documents had been destroyed in accordance with IMA procedures, the remaining documents augmented by interviews with IMA team members were sufficient for the NRC team to determine that the appraisal plan had been effectively carried out.

4.10.2 Evaluation of the IMA

The IMA team found that activities in the Radiation Protection and Chemistry areas were reasonably well managed and conducted. Department goals and guidance were provided in the Chemistry Department Manual and the Health Physics Handbook. Counterpart meetings and discussions were held among the staffs at St. Lucie, Turkey Point and the corporate staff and cooperation was apparent to assure consistent approaches to issues. The functioning of these departments at Turkey Point did not appear to be greatly different than the functioning of the same departments at St. Lucie.

The IMA team recognized longstanding equipment problems such as the lack of good physical facilities in the chemistry laboratory and the lack of an automated secondary sampling system. However, these areas were not discussed in the IMA report because the problems were known and improvements were scheduled for installation. There had also been weaknesses in not taking timely action to minimize steam generator corrosion by addressing problems such as oxygen concentrations in the demineralized water system, air in-leakage into the condensers, and sodium chloride concentrations in the feedwater system. However, these areas were not discussed in the IMA report because the Chemistry Department, under the direction of a new Chemistry manager, was taking action to perform additional sampling and studies to address the problems.

A need for additional staff was recognized in Radiation Protection as well as Chemistry. Excessive overtime appeared to be having a detrimental effect on morale and performance. The Radiation Protection staff had already received management approval for a substantial increase in staff size and the Chemistry staff was working on a similar request. These needs were mentioned in the IMA report.

5.0 NRC CONCLUSIONS

The NRC team found that the IMA was generally performed in a quality and complete manner. The IMA report was hard-hitting and focused on relatively high level management issues such as obtaining highly qualified managers with proven track records and realigning the organizational structure for technical support. The NRC team found that the report lacked supporting details collected by the IMA team, such as maintenance and training deficiencies, that is needed to fully understand the problems and causes for developing corrective actions.

Aside from the engineering support and regulatory interface areas, the IMA team's efforts to evaluate corporate line managers and corporate supporting staff were not as rigorous and systematic as the efforts to evaluate Turkey Point management and staff. In addition, root causes of problems were not always pursued in terms of corporate management responsibilities. The NRC team concluded that many of the identified root causes had their origin in a lack of effective FP&L corporate leadership and direction and an inappropriate level of corporate management decisionmaking for the plant. Therefore, it appeared that St. Lucie's successful operations was in part due to resisting overmanaging by the corporate office. It was concluded that the IMA report under-reported the extent and significance of corporate management root cause responsibility.

The IMA report indicated that, except for a few specified areas, staffing and resources at Turkey Point were generally adequate and the workload (plant changes and improvement programs) should be adjusted to match the resources available. The NRC team found strong evidence that this approach would not adequately support an appropriate improvement program in addition to normal plant operation. For example, it appeared that there was a lack of adequate resources in maintenance.

The NRC team concluded that the IMA report, together with the additional supporting details from ENERCON and this report, will provide an adequate basis for FP&L to understand Turkey Point's significant problems and their root causes. The recommendations in the IMA report, together with the recommendations given in this report, provide the appropriate principles from which FP&L can establish an action plan for effective and lasting improvement.

6.0 NRC RECOMMENDATIONS

Based on the evaluation of the IMA report recommendations, the review of independent performance evaluation documents and the evaluation of past and current NRC performance data, the NRC team provides the following recommendations:

1. The handouts for the last three SET meetings should be obtained by FP&L and reviewed with the assistance of ENERCON so that FP&L can gain a full understanding of the overall performance issues identified by the IMA report (see Section 3.1).

2. The performance problems and low level contributing causes that were identified by the IMA team, but not documented in the report, should be obtained to enhance FP&L's understanding of the root causes and ability to carry out timely corrective actions. Examples include: the computerized performance problem data base, problems with the use of engineering contractors, training weaknesses and programmatic weaknesses identified in maintenance (see Sections 3.1 and 3.2).

3. The IMA recommendations related to leadership and management should be applied to the corporate officers and managers responsible for the plant line management performance and important supporting roles (see Sections 3.1, 3.2, and 3.3).

4. Site management should determine and implement the corrective actions necessary, such as enhanced training to improve operator response to slowly evolving off-normal plant conditions (see Section 3.2).

5. FP&L should determine and implement the corrective actions necessary to improve corporate and site training departments and enhance the site training department performance (see Section 3.2).

6. The new Turkey Point management team should consider the full extent of the workload of an accelerated improvement program in addition to normal plant operation in evaluating the need for additional resources (see Sections 3.2 and 3.3).

7. Additional management support and assistance (e.g., shift team building for operations and support crews) should be provided to enhance near-term operator performance (Section 3.3).

8. Until the PSNs have demonstrated the leadership and "ownership" qualities necessary to change the current plant culture, FP&L should consider continuation of the current MOS Program (see Section 3.3).

9. Site management should determine and implement the corrective actions necessary to improve the ability of the licensed operators to correctly interpret technical specifications. In addition,

corrective actions should be developed to establish the operator's accountability for equipment operability determinations (see Section 3.3).

10. FP&L should develop corrective actions in sufficient detail and monitor their implementation to assure that the specific deficiencies and causes associated with each of the IMA recommendations are effectively addressed (see Section 3.3).

11. FP&L should extend the IMA recommendation concerning the establishment of effective performance measures to include corporate level and site level measures which indicate the overall success of the implemented corrective actions, including those actions implemented for the organization culture and climate issues (see Section 3.3).

7.0 REFERENCES

1. Letter from J. M. Taylor, Deputy Executive Director for Regional Operations, NRC, to C. O. Woody, Group Vice President, Nuclear Energy Department, FP&L, dated October 19, 1987, Subject: Order (Effective Immediately) and Notice of Violation and Proposed Imposition of Civil Penalty. NRC Order EA 87-85.

2. Letter from J. J. Hudiburg, Chairman of the Board, FP&L, to J. Nelson Grace, Regional Administrator, Region II, NRC, dated April 18, 1988, L-88-181, Re: Turkey Point Units 3 and 4, Independent Management Appraisal.

3. Letter from C. O. Woody, Executive Vice President, FP&L, to J. Nelson Grace, Regional Administrator, Region II, NRC, dated December 30, 1987, L-87-539, RE: Turkey Point Units 3 and 4, Independent Management Appraisal.

APPENDIX A

PRESENTATION

TO

FLORIDA POWER AND LIGHT

ON THE RESULTS OF THE

NRC EVALUATION

OF THE

ENERCON INDEPENDENT MANAGEMENT APPRAISAL

OF

TURKEY POINT

I. INTRODUCTION

BACKGROUND

- NRC ORDER EA 87-85 (OCTOBER 1987)
- V. STELLO MEETING WITH J. HUDIBURG (DECEMBER 1987)
- ENERCON REPORT (APRIL 1988)
- NRC STAFF EVALUATION (MAY 1988)

PURPOSE

- PROVIDE A SUMMARY OF THE RESULTS OF THE NRC EVALUATION OF THE ENERCON INDEPENDENT MANAGEMENT APPRAISAL (IMA) OF FP&L AND TURKEY POINT.
  - QUALITY AND COMPLETENESS OF THE IMA
  - ADEQUACY OF THE ROOT CAUSE ASSESSMENT AND ENERCON RECOMMENDATIONS
- PROVIDE NRC RECOMMENDATIONS AND FOLLOW-UP ACTIONS.

II. SUMMARY OF NRC CONCLUSIONS

- THE ENERCON APPRAISAL WAS GENERALLY PERFORMED IN A QUALITY AND COMPLETE MANNER.

- THE ENERCON REPORT, ALTHOUGH HARD-HITTING AND FOCUSING AT THE MANAGEMENT LEVEL, UNDER-REPORTED THE EXTENT AND SIGNIFICANCE OF CORPORATE MANAGEMENT ROOT CAUSE RESPONSIBILITY AND DID NOT DOCUMENT SUPPORTING DETAILS IN THE AREAS ADDRESSED.

- THE ENERCON REPORT, TOGETHER WITH ADDITIONAL SUPPORTING DETAILS FROM ENERCON PLUS NRC'S EVALUATION OF THE REPORT, WILL PROVIDE AN ADEQUATE BASIS FOR UNDERSTANDING TURKEY POINT'S AND FP&L'S SIGNIFICANT PROBLEMS AND THEIR ROOT CAUSES.

- THE RECOMMENDATIONS IN THE ENERCON REPORT, TOGETHER WITH THE NRC RECOMMENDATIONS, PROVIDE THE APPROPRIATE PRINCIPLES FROM WHICH FP&L CAN ESTABLISH AN ACTION PLANT FOR EFFECTIVE AND LASTING IMPROVEMENT.

III. QUALITY AND COMPLETENESS OF THE ENERCON APPRAISAL

- GENERALLY PERFORMED IN A QUALITY AND COMPLETE MANNER.
- FOCUSED ON MANAGEMENT AND ORGANIZATIONAL ISSUES.
- ROOT CAUSES GENERALLY ADDRESS SIGNIFICANT PERFORMANCE PROBLEMS.
- RECOMMENDATIONS BROADLY ADDRESS THE DOCUMENTED ROOT CAUSES, ARE GENERALLY SOUND AND ARE REASONABLY PRIORITIZED.

IDENTIFIED WEAKNESSES

- IMPORTANT SUPPORTING INFORMATION, ALTHOUGH COLLECTED, WAS NOT DOCUMENTED, THEREBY UNDERMINING A COMPLETE UNDERSTANDING OF THE ROOT CAUSES AND RECOMMENDATIONS, E.G., MAINTENANCE, TRAINING.
- RECOMMENDATION RELATED TO HUMAN RESOURCES ADEQUACY IS CONSIDERED UNREALISTIC FOR A TROUBLED PLANT.
- CORPORATE MANAGEMENT ROOT CAUSES WERE GLOSSED OVER.

IV. CORPORATE MANAGEMENT ROOT CAUSES WERE GLOSSED OVER

ALTHOUGH THE SITE-BASED ROOT CAUSES WERE CLEARLY DESCRIBED:

- .. LEADERSHIP WEAKNESSES
- .. POOR PERSONAL ACCOUNTABILITY
- .. TECHNICAL SUPPORT DEFICIENCIES
- .. STAFF WORK PERFORMANCE AND SUPPORT PROBLEMS
- .. WEAK OPERATIONS OWNERSHIP AND LEADERSHIP

THE CORPORATE-BASED ROOT CAUSES WERE GLOSSED OVER:

- .. FOSTERING A FOSSIL APPROACH: SHORT-TERM AVAILABILITY OVER RELIABILITY
- .. QUALITY APPEARANCE VS QUALITY ACHIEVEMENT
- .. OVERLOADING AND OVERMANAGING THE SITE
- .. LINE MANAGEMENT LEADERSHIP AND DIRECTION DEFICIENCIES
- .. TECHNICAL SUPPORT STAFF DEFICIENCIES

V. NRC RECOMMENDATIONS

TO ENSURE EFFECTIVE AND LASTING IMPROVEMENT AT TURKEY POINT FP&L NEEDS TO ADDRESS THE FOLLOWING:

- APPLY THE ENERCON RECOMMENDATIONS, AS APPROPRIATE, TO THE CORPORATE ORGANIZATION AS WELL AS TO THE TURKEY POINT SITE.
- OBTAIN THE SIGNIFICANT SUPPORTING INFORMATION COLLECTED BY ENERCON - E.G., MAINTENANCE AND TRAINING DEFICIENCIES.
- ENSURE THAT TURKEY POINT'S NEW MANAGEMENT TEAM CONSIDERS THE FULL EXTENT OF THE WORKLOAD OF AN ACCELERATED IMPROVEMENT PROGRAM IN ADDITION TO NORMAL PLANT OPERATION.

VI. NRC FOLLOW-UP ACTIONS

- REVIEW AND APPROVAL OF FP&L'S PLANNED ACTIONS IN RESPONSE TO THE ENERCON IMA AND NRC EVALUATION REPORTS.
- CLOSE MONITORING OF FP&L'S IMPLEMENTATION.
- LONG-TERM MONITORING OF TURKEY POINT PERFORMANCE TO ASSURE IMPROVEMENTS ARE EFFECTIVE AND LONG LASTING.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket Nos. 50-250
50-251

Florida Power & Light Company
ATTN: J. J. Hudiburg
Chief Executive Officer
9250 West Flagler Street
Miami, Florida 33102

Gentlemen:

This letter forwards our evaluation of the independent management appraisal (IMA) of the Florida Power & Light Company (FP&L) Turkey Point Plant that was conducted in response to NRC Order EA 87-85. The evaluation was conducted by a team of NRC headquarters and regional personnel with team leadership and support provided by the Office for Analysis and Evaluation of Operational Data. This evaluation included a week's visit to the offices of your IMA contractor (ENERCON Services, Inc.) in Atlanta, Georgia. The NRC team's findings, conclusions and recommendations were discussed with you and other company executives in your corporate office on Thursday, June 9, 1988.

The NRC effort involved an assessment of the quality and completeness of the IMA, the adequacy of the IMA root cause assessments and recommendations and formulation of NRC team recommendations. The NRC team concluded the IMA appraisal was generally performed in a quality and complete manner. However, the team found the IMA report, although hard-hitting and focusing at the management level, under-reported the extent and significance of corporate management root cause responsibility and did not document supporting details in the areas addressed. Nevertheless, we found that the report, together with additional supporting details from ENERCON, plus NRC's evaluation of the report, will provide an adequate basis for FP&L to understand Turkey Point's significant problems and their root causes.

We also found that the recommendations in the IMA report, together with the NRC recommendations, provide the appropriate principles from which FP&L can establish an action plan for effective and lasting improvement. I understand you are responding to the NRC recommendations discussed in our meeting at the same time you respond to the IMA recommendations. If your review of the enclosed report provides additional information that affects your response, then we would expect you to revise the response where appropriate.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosure will be placed in the NRC Public Document Room. If you have any questions or

Enclosure 2

desire additional clarifications on our review of the ENERCON evaluation, please contact either Edward L. Jordan or R. Lee Spessard of AEOD.

Sincerely,

J. Nelson Grace
Regional Administrator

Enclosure: NRC Evaluation Report of
the Independent Management Appraisal
for the Turkey Point Plant

cc w/encl:
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ENCLOSURE 1

TABLE OF CONTENTS

SUMMARY

St. Lucie Unit 1 and Turkey Point Units 3/4 have been in commercial operation for 12 and 16/15 years respectively, during which time they have been in compliance with applicable NRC seismic requirements and during which time they have provided, and still provide, adequate protection of the public health and safety.

There has been no finding that the seismic criteria for St. Lucie Unit 1 and Turkey Point Units 3/4 are unsatisfactory compared to current criteria (IEEE 344-75) or to the seismic criteria created from test and experience data which are being proposed for use by Generic Letter 87-02.

Generic Letter 87-02 specifies that "the seismic adequacy of certain equipment in operating nuclear power plants must be reviewed against seismic criteria not in use when these plants were licensed". This resolution was determined by the Committee to Review Generic Requirements to be a backfit within the meaning of 10CFR50.109 and consequently in late 1986 the staff was instructed to perform a systematic and documented analysis to provide evidence that there would be a substantial increase in the overall protection of the public health and safety and that the direct and indirect costs of the implementation of the information request would be justified. The analysis which was performed was generic and can be found in NUREG 1211, issued with the Generic Letter in February of 1987.

This generic analysis addresses the potential change in the risk to the public from the accidental off-site release of radioactive material using generic data and concludes that a potential risk to the public of 940 man-rem could be reduced by an order of magnitude (to effect a net risk reduction of 846 man-rem).

FPL has reproduced the above analysis using methodology identical to that used by the NRC staff but substituting site specific data for St. Lucie Unit 1 and Turkey Point Units 3/4 in place of the generic data.

At St. Lucie Unit 1, the potential risk reduction is only 15 man-rem and at Turkey Point Units 3/4, the potential risk reduction is only 8 man-rem. It could well be that the collective dose to the persons responding to the information request (i.e., walkdown personnel) might equal these figures in which case there would be an actual exposure increase instead of a potential exposure reduction. Using the NRC accepted figure of $1,000 per man-rem, the maximum value to St. Lucie Unit 1 and Turkey Point Units 3/4 would be $15,000 and $8,000 respectively. FPL also believes the actual values should be less for reasons explained in the section of this report documenting analysis and conclusions.

From the foregoing, FPL maintains that it would not be prudent management of FPL's resources to authorize an expenditure of at least $750,000 per unit to satisfy an information request which has such minimal value or to commit FPL to new seismic criteria when there is no reason to believe that seismic criteria now in use at the FPL plants do not provide adequate protection of the public health and safety.

In conclusion, FPL requests that the staff affirm, on the basis of the technical data supplied herein, that satisfactory resolution of Generic Letter 87-02 and USI A-46 has been achieved for St. Lucie Unit 1 and Turkey Point Units 3/4.

BACKGROUND DATA

In the late 1970's, the NRC felt that operating nuclear power plants designed to seismic criteria prior to IEEE 344-75 might possibly not withstand the Safe Shutdown Earthquake (SSE). This concern formed the basis for Unresolved Safety Issue (USI) A-46, created in 1980.

The NRC realized that requiring all operating plants to conform to IEEE 344-75 would be cost prohibitive and so the NRC agreed to a program for the creation of new generic seismic criteria, (including generic floor response spectra) based on test data and experience data from heavy industrial (non-nuclear) facilities around the world.

It was the intention of the NRC when the new generic seismic criteria had been developed, to issue a 10CFR50.54(f) information request to cause the utilities to perform a self evaluation against the new generic seismic criteria. "Deficiencies" under the new generic seismic criteria would then require JCOs and engineering or plant modifications. The cost of fixing "deficiencies" would be in addition to the cost of the self evaluation. Also, the new generic seismic criteria would be in effect for the balance of the life of the plants.

During the 1980's, while the new generic seismic criteria were being developed, two major changes occurred in the nuclear industry, both of which affected A-46.

The first change was the maturing of risk analysis methodology and its recognition and adoption by the NRC.

The second change (in October 1985) was the adoption of 10 CFR50.109, which itself recognized risk analysis methodology and recommended its use in the Value/Impact studies which were now mandated before the NRC could implement new staff positions.

On October 16, 1986, the NRC staff presented the proposed final resolution of USI A-46 to the Committee to Review Generic Requirements (CRGR). The CRGR is chartered, among other things, to assure that the provisions of 10CFR2.204, 10CFR50.109, and 10CFR50.54(f) are met as regards generic requirements. Tools used by the CRGR include Value/Impact analysis and risk assessment.

At the meeting, the NRC staff informed the CRGR that it intended to issue a 10CFR50.54(f) information request to implement the Generic Letter. However the CRGR, supported by the Office of General Counsel, present at the meeting, instructed the NRC staff that the Generic Letter's request for information was subject to the 10CFR50.109 provisions as a backfit and that a Value/Impact analysis would be required before the Generic Letter could be issued.

This analysis was subsequently prepared by the NRC staff and can be found in NUREG 1211, issued with the Generic Letter.

The CRGR also commented at the October 16, 1986 meeting that the cost to the industry to develop the new generic seismic criteria was already tens of millions of dollars and that the final cost of the proposed resolution would be in the 50 to 100 million dollar range.