ENCLOSURE

SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE
INSPECTION REPORT NUMBER
50-250/88-15
50-251/88-15

FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT UNITS 3 AND 4

JUNE 1, 1987 THROUGH JUNE 30, 1988

I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated Nuclear Regulatory Commission (NRC) staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance based on this information. The SALP program is supplemental to normal regulatory processes used to determine compliance with NRC rules and regulations. The SALP program is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to licensee management in order to promote quality and safety of plant construction and operation.

An NRC SALP Board, composed of the staff members listed below, met on August 23, 1988, to review the collection of performance observations and data to assess licensee performance in accordance with guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's safety and management performance at Turkey Point Units 3 and 4 for the period June 1, 1987, through June 30, 1988.

SALP Board for Turkey Point Units 3 and 4:

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Attendees at SALP Board Meeting:

M. L. Ernst, Deputy Regional Administrator, RII
R. V. Crlenjak, Chief, Reactor Projects Section 2B, RPB2, DRP, RII
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II. CRITERIA

Licensee performance is assessed in selected functional areas depending on whether the facility has been in the construction, preoperational, or operating phase during the SALP review period. Each functional area normally represents an area which is significant to nuclear safety and the

environment and which is a normal programmatic area. Some functional areas may not be assessed because of little or no licensee activity or because of a lack of meaningful NRC observations. Special areas may be added to highlight significant observations.

One or more of the following evaluation criteria was used to assess each functional area; however, the SALP Board is not limited to these criteria and others may have been used where appropriate.

A. Management involvement in assuring quality
B. Approach to the resolution of technical issues from a safety standpoint
C. Responsiveness to NRC initiatives
D. Enforcement history
E. Operational and construction events (including response to, analysis of, and corrective actions for)
F. Staffing (including management)
G. Training and qualification effectiveness

Based upon the SALP Board assessment, each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety or construction quality is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and are concerned with nuclear safety; licensee resources are adequate and are reasonably effective such that satisfactory performance with respect to operational safety or construction quality is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear to be strained or not effectively used such that minimally satisfactory performance with respect to operational safety or construction quality is being achieved.

The functional area being evaluated may have some attributes that would place the evaluation in Category 1 and others that would place it in either Category 2 or 3. The final rating for each functional area is a composite of the attributes tempered with the judgment of NRC management as to the significance of individual items.

The SALP Board may also include an appraisal of the performance trend of a functional area. This performance trend will only be used when both a definite trend of performance within the evaluation period is discernable

and the Board believes that continuation of the trend may result in a change of performance level. The trend, if used, is defined as:

Improving: Licensee performance was determined to be improving near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period.

III. SUMMARY OF RESULTS

A. Overall Facility Evaluation

The licensee has continued to make improvements during this SALP period. Although the initial portion of this period indicated a definite need for improvement, which resulted in the issuance of a Confirmatory NRC Order in October 1987, management attention to deficiencies identified in the Confirmatory Order has produced results during the latter portion of the rating period. The licensee has made a series of personnel changes using people not previously assigned to the Turkey Point facility in order to obtain a new look at the problem areas. The initiation of several new programs, such as Management on Shift, an in-depth plan of the day, shift briefings, and an emphasis on accountability and ownership have had an impact on reversing adverse characteristics of culture and climate previously existing at the plant. There has been a definite shift in management philosophy in the conservative direction to shut down the plants or extend shutdown periods to allow equipment repairs to be completed to help improve unit reliability. The security program continues to show a weakness as indicated by the continued number of violations which are repetitive in nature. The new maintenance building and the simulator were completed during the period and should show tangible benefits in the future. Corporate management has committed to expend tremendous resources at the site to enhance the safe and reliable operation of the units. Throughout the rating period, there have been numerous meetings between the licensee and the NRC to resolve issues over the licensee's proposed Technical Specifications (TS), which were submitted in October of 1986. These modified standard TS will provide a significant improvement over the old custom TS.

In April 1988, an Independent Management Appraisal (IMA) of the Turkey Point facility was completed and submitted to the NRC. The IMA was evaluated by the Office for Analysis and Evaluation of Operational Data (AEOD) and immediately after the SALP period, this evaluation was provided to FPL. Initial indications show that FPL has been very responsive to implementing the recommendations of the IMA and the AEOD evaluation. However, due to the history of poor performance in a number of functional areas, it is incumbent upon FPL and the NRC to maintain close management scrutiny of performance indicators, site organizations and effectiveness of the various corrective actions.

B. Facility Performance Summary

The performance categories for the current and previous SALP period in each functional area are as follows:

Functional Area	May 1, 1986 - May 31, 1987	June 1, 1987 - June 30, 1988
Plant Operations	2	3 Improving
Radiological Controls	2	2
Maintenance	2	3 Improving
Surveillance	2	2
Fire Protection	N/R	2
Emergency Preparedness	1	2
Security and Safegurds	3	3
Outages	2	2
Quality Programs and Administrative Controls Affecting Quality	2	2
Licensing Activities	2	2
Training and Qualification Effectiveness	3	2
Engineering Support	3	2

N/R = Not Rated

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

During the first half of this SALP period, licensee performance in the area of Operations was marginal as demonstrated by equipment problems, plant availability, number of escalated enforcement actions, and number of special NRC inspections. Recent management changes and implementation of program improvements have significantly improved Operations toward the end of the SALP period.

For the last six months of 1987, Unit 3 had an availability factor of less than 10%. During the first half of 1988 this improved to about 71%. Following the repairs to the conoseal leak, Unit 4 returned to service in July and had an up and down operational history for the remainder of 1987. Availability factors for Unit 4 were about 63% for the first half of the SALP period and 73% for the second half.

The previous SALP report noted improvements in the Operations area, although an event that occurred at the end of the SALP period, which resulted in loss of the required boric acid flow paths, was discussed. A special NRC inspection conducted in June 1987 resulted in escalated enforcement action and a civil penalty (violation b). In July 1987, another event occurred resulting in a Severity Level III violation. This involved a

turbine operator who closed backup nitrogen supply valves to the Auxiliary Feedwater System (AFW). Then in September 1987, an unauthorized, unlicensed individual was allowed to manipulate the dilution controls of Unit 3 with the reactor at power. At least four licensed operators observed the event without intervening. A management observer reported the event to several members of the plant management who hold or have held Senior Reactor Operator licenses. However, appropriate action was not taken to evaluate and resolve the circumstances leading to the event for over one week.

This event, along with other observations made by the management observer, raised concerns as to the adequacy of professional conduct on shift. Continuous NRC control room observations were conducted in late September and early October 1987 to evaluate control room demeanor and conduct of operations.

In October 1987, voids were detected in the Unit 4 reactor head region with the plant at cold shutdown. Evaluation determined that nitrogen from an accumulator had entered the primary system through a leaking accumulator isolation valve. A total of seven voiding events occurred between October 21 and November 3, 1987. Several of these were avoidable had the desired valve lineups been maintained. A special NRC inspection was conducted in November to investigate the circumstances surrounding these occurrences.

A review of the Operations related violations, special NRC inspections and Licensee Event Reports (LERs) shows the preponderance of these to occur in 1987. The NRC's Office for Analysis and Evaluation of Operational Data (AEOD) reviewed 65 LERs for the two Turkey Point units over this SALP period. Fifty-one LERs were submitted in the last seven months of 1987 and 14 were submitted in 1988. Further analysis of these LERs is later in this section.

Four reactor trips occurred during this evaluation period for Unit 3. Unit 4 did not trip during this period. Three of the trips were while operating above 15% power. Two were due to personnel error and one due to equipment malfunction. This represents an improvement over the previous evaluation period and is slightly above the national average for trips per 1000 critical hours for plants of this type.

The deficiencies identified in the summer and fall of 1987 resulted in licensee generated corrective actions, which were confirmed by an NRC Order (87-85) issued on October 19, 1987. One confirmatory item included a commitment to conduct an Independent Management Appraisal (IMA) to be performed by a third party, qualified, outside organization. The IMA was performed between December 14, 1987, and March 30, 1988, and included interviews, document reviews, surveys and direct observations at the Turkey Point Plant and the FPL corporate offices. A final report was issued in April 1988. An NRC evaluation of the IMA to determine its quality and completeness

was completed in June 1988. The licensee's response and action plan to implement the IMA findings were submitted for NRC review after the close of the evaluation period.

It was determined that operational performance issues stemmed from root causes related to operations ownership and leadership, training and implementation of Technical Specifications. Poor performance was caused, in part, by past focus on near term plant availability rather than long term plant reliability and a lack of strong sense of plant ownership in the Operations Department. Over the long term, this resulted in operators using compensatory measures and backup methods to operate the plant safely when equipment was not operating properly. These practices resulted in operators who did not take a leadership role in the operation and maintenance of the plant.

The leadership of the operators has also inadvertently been diluted through corrective actions in response to identified problems. For example, several incorrect Technical Specification interpretations have been documented over the past several years. In an effort to prevent recurrence, support groups, such as the Regulatory Compliance Group and Operations Department Supervisors, were utilized to confirm the decisions of the control room supervisors. Over time, this led to a dependence on outside help in complying with required actions. This problem has been compounded during the upgrade of the custom Technical Specifications to a standardized format.

The performance problems which occurred early in the assessment period were analyzed by the licensee and corrective actions were implemented. It was recognized that an increased emphasis on management and accountability was necessary, and to this end a series of personnel changes were made which spanned the assessment period. Each change was implemented using personnel not previously assigned to the Turkey Point facility in an effort to obtain fresh insight into problem areas.

A new Site Vice President was appointed in August 1987. Shortly after his arrival, a significant initiative was taken to place a management representative on operating shifts to help identify deficiencies in performance. This "Management-On-Shift" (MOS) program was instrumental in identifying areas needing improvement. A corrective action tracking program was established for identified discrepancies. The MOS program provided increased sensitivity relative to plant material condition, planning and scheduling, leadership and professionalism, procedural compliance and inter-departmental communications. Subsequent to the September 1987 operation of the Unit 3 dilution controls by an unauthorized individual, the MOS program was expanded and confirmed by NRC Order. It is significant that the professionalism questions raised by the dilution event were initially identified by a MOS observer participating in the then voluntary enhancement program. One important initiative derived from analysis of the MOS

observations was the development of a Plan-of-the-Day (POD) document to correlate, schedule and manage daily plant activities. The POD addresses the daily work lists for each plant department, surveillance schedules, chemistry results, plant modification schedules, priority maintenance item status and status of all Technical Specifications limiting conditions for operation. The POD is evaluated daily at a planning meeting attended by all plant departments.

The MOS program successfully emphasized improving the shift turnover process. Shift briefings, performed by a licensed Senior Reactor Operator, are performed after each shift assumes its duties. These briefings provide information relative to goals and objectives for the subsequent shift. They are attended by all shift personnel including maintenance disciplines. As a result of the POD and shift briefing programs, general awareness of site activities has been enhanced and complex evolutions have been performed more smoothly.

In December 1987, a new Operations Superintendent joined the Turkey Point staff. This change resulted in improved department morale, just as the change in the Site Vice President resulted in improved site morale. Promptly apparent was a renewed emphasis on personal accountability and operations "ownership" of the decision making processes that impact equipment operability. Additional initiatives included the involvement of the licensed Senior Reactor Operators in the MOS program to assist in establishing and improving their visibility as managers of the power block. Also a "Standards of Professionalism" document was developed to clearly define the responsibilities of personnel assigned to each licensed shift position. This document, which was developed with considerable input from licensed operators, sets out in clear terms new stringent standards of conduct and performance against which the operators will be evaluated.

A new Plant Manager was appointed late in the assessment period. His initial efforts to develop accountability on the supervisory level have been well received and appear to be succeeding. Although, he has not been in the position long enough to have had a clear impact on sustained performance, his renewed emphasis on leadership, professionalism and accountability have had an immediate impact on reversing adverse characteristics of culture and climate, which have existed at the plant.

Operations has made and continues with efforts to equalize and minimize overtime for on shift personnel. Trainees were utilized where possible to perform duties not requiring a licensed operator. Although the current staffing level provides for enough operators during normal plant operations, overtime is routinely utilized during outages, forced load reductions, and to fill vacancies during vacation periods or illness. At present, 21 operator and senior operator trainees are scheduled

for exams in October 1988. This should aid in reducing the amount of overtime presently required. In August of 1988, an individual will be assigned full time to coordinate advanced scheduling and filling of vacancies. This should aid in minimizing excessive use of overtime by arranging in advance for off-shift personnel to work vacancies where possible.

The NRC Office for Analysis and Evaluation of Operational Data (AEOD) reviewed 65 Licensee Event Reports (LERs) for the two Turkey Point units in the assessment period from June 1, 1987, through June 30, 1988. Of the LERs reviewed, eight were deemed to be significant by AEOD's screening process. Four of those LERs reported long-standing design deficiencies that were discovered by the licensee's selected safety system/design basis reconstitution review. The other four significant events are listed below in violations a, b, and j and the unauthorized manipulation of reactor controls which was included in the Confirmatory Order.

The AEOD review of the preliminary notifications issued on events which occurred during the SALP period found that the licensee submitted LERs which adequately addressed the reportable events.

The LERs adequately described the major aspects of each event, including component or system failures that contributed to the event and the significant corrective actions taken or planned to prevent recurrence. The reports were complete, well written and easy to understand. The root causes were identified as appropriate. Previous similar occurrences were properly referenced in the LERs as applicable.

Violation a described an event involving operation of the intake cooling water (ICW) system outside the plant design basis, and was an example where lack of communications of required information to supervisory personnel was a contributing factor to poor performance. This item was discussed in the last SALP report.

Violations c, e, f, i, j, and m, document a number of occasions where plant personnel manipulated valves without procedural justification or approval from supervisory personnel. The major areas of concern included personnel departing from approved procedures, failing to notify supervisors of changes in system lineups, the loss of configuration control over the safety-related systems, and system engineers directing plant operators to perform valve operations without first obtaining the proper authorization from the control room staff and without using approved procedures.

Violation h, identifies a similar, though less extensive, misalignment which occurred in January 1988. On that occasion a single nitrogen bottle was inadvertently isolated for the Unit 4

AFW nitrogen system. Minor AFW nitrogen valve misalignments also occurred once in February and twice in March 1988. Violation j, which occurred in June 1988, resulted when a technician locked closed a normally open valve in the diesel fuel system, contrary to procedural requirements.

These failures by plant personnel indicate a lack of appreciation for procedural compliance, system configuration control, and receipt of appropriate authorization for realignments from the control room. Comprehensive corrective actions are being implemented.

Thirteen violations were identified:

a. Severity Level III violation for failure to take corrective action to prevent component cooling water heat exchanger degraded performance. (Unit 3 only 87-27)

b. Severity Level III violation for failure to establish or implement adequate procedures to assure configuration control over the emergency boration system. (87-28)

c. Severity Level III violation for failure to follow procedures which resulted in isolation of the AFW nitrogen system. (87-33)

d. Severity Level IV violation for failure to determine hot channel factors when quadrant to average power tilt ratio was exceeded. (Unit 4 only 87-33)

e. Severity Level IV violation for failure to follow procedures. Three examples: manipulating heat tracing thermostat, failure to transfer the comparator channel defeat switch on a power range nuclear instrument, and a boric acid storage tank valve was not properly locked open. (87-43)

f. Severity Level IV violation for failure to follow procedure in that a manual isolation valve was not in its required position. (Unit 4 only 87-46)

g. Severity Level IV violation for failure to translate design inputs into correct operating procedures and system descriptions. (87-54)

h. Severity Level IV violation for failure to follow procedures. Four examples: fire watch was found asleep, failure to independently verify AFW nitrogen valve position, maintenance performed on Unit 3 rod control system without documented instructions and failure to enter an on the spot change to a procedure. (Example one is a fire protection violation and example three is a maintenance violation, 87-54).

i. Severity Level IV violation for failure to follow procedures. Three examples: failure to maintain a valve in an open position as per a clearance procedure, no temporary system alteration for removed flow indicators, and inadequate surveillance procedure. (Example two is a maintenance violation, 88-02).

j. Severity Level IV violation for failure to follow procedure which resulted in isolation of the diesel fuel oil system. (88-11)

k. Severity Level V violation for failure to follow procedure. Two examples: a locked valve not locked and a fire watch was found asleep, (Example two is a fire protection violation, 87-35).

l. Severity Level V violation for failure to follow procedure, Two examples: shift relief turnovers were not documented and actions were not documented in the Plant Supervisor's logbook. (87-51)

m. Severity Level V violation for failure to follow procedures. Three examples: AFW nitrogen vent valve was mispositioned, on three occasions a boric acid transfer pump discharge pressure indication isolation valve was mispositioned and an intake cooling water heat exchanger inlet isolation valve was not fully opened. (88-07)

2. Conclusion

Category: 3

Trend: Improving

3. Board Recommendation

During the first half of the SALP period, licensee performance was marginal as demonstrated by a number of Severity Level III violations. Recent management changes have had positive results. This has been demonstrated by a number of conservative actions to shut down the plants or keep them shut down so that equipment repairs could be completed to help improve plant reliability. This action has resulted in an improved operating record at the end of the SALP period. The licensee should continue to address the problems with procedural adherence.

B. Radiological Controls

1. Analysis

During the assessment period, inspections were performed by the resident and regional inspection staffs. There were four

regional inspections: two radiation protection inspections, a radiological effluent inspection and a chemistry inspection.

The licensee's health physics (HP) and radwaste staffing levels were appropriate and compared well to other utilities having a facility of similar size. During the assessment period, the staff consisted of both permanent licensee and contract HP technicians. The permanent staff was supplemented with corporate staff and contract technicians during nonroutine or outage activities. In general, HP foremen and first line supervisors were knowledgeable of their authority and assigned duties within the radiation protection organization. Vacancies existed for an onsite radwaste supervisor and HP engineer. The licensee was actively recruiting experienced personnel to fill these positions. As noted during the previous SALP assessment period, a strength of the radiation protection program was the low turnover rate among the HP staff positions.

The knowledge and experience level of the site health physics staff was good. The licensee's training program for radiation protection activities was well defined and applied to all staff. The licensee's health physics technician training program has been accredited by INPO. Improvements in the general employee training (GET) were reflected in improved knowledge of HP principles and practices among a wide cross-section of workers interviewed at the site during inspections.

Management support and involvement in matters related to radiation protection and radioactive waste were adequate. The health physics supervisor received the support of other managers at the plant in implementing the radiation protection program. During the assessment period, licensee management initiated several programs concerned with identifying and resolving radiation protection issues at the facility. However, licensee programs designed to identify, review, track and resolve radiation protection issues reported in audits, incident reports and employee concern were not fully effective. These programs were poorly organized, did not have clear lines of authority, and the responsibility of several quality assurance groups was not clearly defined. Details regarding the programs were poorly documented. The effectiveness of these programs for identification of radiation protection issues at the facility was minimal.

The licensee's Performance Monitoring Section (PMONS) has initiated a monitoring program, which augments the audit program. Typically, activities monitored under PMONS were of a discrete or one-time nature, such as resolution of unresolved items or correction of identified problems.

The licensee continued the upgrade of the plant's radiation protection procedures. The involvement of site and corporate

staff in the procedural upgrade and the comprehensiveness of their technical reviews of procedures by the site and corporate HP staff were less than adequate. For example, a violation concerning inadequate procedure guidance for radiation controls during removal and transfer of reactor coolant system (RCS) spent filters was identified during the assessment period despite the fact that radiation controls for this activity had been previously reviewed earlier in the assessment period following an event which exposed workers to high radiation levels. In addition, procedures did not require documentation of personnel contaminations, even in an instance when extensive decontamination of an individual was required.

Licensee action in replacing several primary components of the post accident sampling system was timely and demonstrated licensee initiative in problem solving.

The licensee did not effectively address technical issues in the radiation protection area such as electronic drifting of the invivo counter. The licensee did not develop complete and technically sound procedures. These findings, combined with the violations identified in the radiation protection area during the assesment period, indicate a decline in what had been in previous assessment periods identified as a strong, aggressive and technically sound radiation protection program, with effective leadership from management.

During the assessment period, the licensee's radiation work permit and respiratory protection programs were found to be satisfactory.

Control of contamination and radioactive materials within the facility was generally adequate. At the beginning of January 1987, approximately 27,000 square feet (ft^2) or 38% of the radiation controlled area (RCA), excluding containment, were controlled as contaminated. Although the licensee had a goal of reducing the area contaminated by 20% in 1987, the actual reduction was less than 12%. At the end of December 1987, the licensee maintained 34% of the RCA as contaminated. This is the largest percentage of any Region II facility. Toward the end of this assessment period, the licensee began an extensive upgrade of the contaminated control program including decontamination of plant areas, use of contamination containments and preventive maintenance of leaking valves. As of July 15, 1988, the total area maintained as contaminated was reduced to 12,600 ft^2 or 18% of the RCA, which is still greater than most Region II facilities.

The licensee reported 437 instances of personnel contamination in 1987, of which 186 events were identified as skin contamination. These numbers represented an increase relative to 1986, when a total of 257 contamination events were reported. The higher number of personnel contaminations was related to the

unscheduled outage work conducted in 1987. The total number of personnel contaminations for 1987 was above average for Region II PWRs.

The 1987 collective radiation dose was 645 person-rem per unit which was approximately 75% above the national average of 368 person-rem per PWR. The increased collective dose for 1987 was attributed to increase outage activities. A comparison of Turkey Point radiation protection attributes to Region II plant averages is listed in section V. K.

During this SALP period, the chemistry supervisory staff had been reorganized and administrative programs were initiated to more effectively address qualification of personnel and chemistry control. A new training staff and training laboratory had been provided; however, the small size of the chemistry staff continued to be an impediment to initating the training program. Also, insufficient personnel resources created an obstacle to upgrading chemistry procedures. In 1984, the licensee initiated a chemistry improvement program for upgrading facilities, equipment and analyses for controlling chemistry in the secondary water cycle. This program was in line with the recommended guidelines of the Steam Generators Owners Group (SGOG) and the Electric Power Research Institute (EPRI). Completion of the total improvement program has been delayed because of assignment of lower priorities as part of the Turkey Point Nuclear Plant Integrated Schedule. Completion of the secondary chemistry inline monitors is scheduled for November 1991, and November 1992, for Units 3 and 4, respectively. Construction of a new secondary chemistry laboratory is scheduled for March 1992.

The licensee continued to encounter difficulties in controlling chemistry because of degradation of condenser tubes and problems associated with the equipment conditions of the makeup water treatment plant.

Liquid radwaste processing, using a contractor and a portable demineralizer system, maintained excellent control over the release of radioactive effluents. The mixed fission and activation products in liquid effluents for 1987, were 0.75 curies for both units, which was consistent with previous years and less than the 0.5 curies per unit industry average for PWRs for 1983, the last year for which industry data was available.

There were no significant changes in the quantities of gaseous effluent during this SALP period from previous periods. The effluent releases for the past three years are summarized in the Supporting Data and Summaries Section V.K.

The licensee's quality assurance program for the counting room was adequate. The licensee participated in a quarterly

cross-check program with a vendor whose quality assurance program was traceable to the National Bureau of Standards. As part of the NRC's confirmatory measurements program, the licensee analyzed samples for selected beta-emitting radionuclides. The results were in agreement for tritium, strontium-90 and iron-55.

The maximum environmental radiation doses attributed to plant release were a small fraction of 10 CFR 20 and 10 CFR 50, Appendix I limits and criteria. Maximum total body dose to a hypothetical individual from liquid effluents was calculated to be 0.0156 mrem per unit, which was 0.524 percent of the annual limit. Maximum gamma air dose and beta air dose to a hypothetical individual from gaseous releases were less than 0.2 percent of the annual limit.

During 1987, the volume of solid radioactive waste shipped by the licensee totalled 4,300 cubic feet (ft^3) containing 903 curies of activity. This volume of waste shipped offsite is one of the lowest of any facility in Region II. During 1987, the licensee initiated the use of a vendor to super compact the waste prior to shipment for burial. Increased decontamination efforts for equipment and material leaving the RCA, as well as control of material being brought into the RCA, resulted in a significant reduction in radioactive waste volume relative to 1986, when approximately 11,420 ft^3 were shipped containing approximately 89 curies.

Three violations were identified:

a. Severity Level IV violation for failure to follow radiation work permit (RWP) requirements (87-36).

b. Severity Level IV violation for failure to properly complete a manifest for a radioactive waste shipment (87-36).

c. Severity Level IV violation (four examples) for failure to follow and have adequate procedures (87-48).

2. Conclusion

Category: 2

3. Board Recommendations

Licensee management should give continued attention to: (1) addressing the continuing higher than average annual collective occupational doses and (2) efforts to reduce plant and personnel contaminations. In addition, licensee management should assure that there is an adequate level of resources and support provided to effectively deal with these issues.

C. Maintenance

1. Analysis

During this assessment period inspections were performed by resident and regional inspectors.

Several deficiencies were noted in the plant work order (PWO) process during this SALP period. These deficiencies included:

- Numerous items identified with deficiency tags in the field were not entered in the work control system. This is caused by the time lag between identification and actual entry intc the computer.

- The indicated number of PWOs is artificially lower due to the method of tracking them. The unplanned work orders are not entered into the system until the planner has completed his portion of the PWO.

- Deficiency tags for items repaired were left on the component in the field even after the work was completed.

- The PWO job packages were weak in the areas of planning, the use of machinery history, up to date drawings and procedures, and root cause determination.

- Assignment of priorities was weak in several instances where the item was not worked when required. This caused inadequate job planning which resulted in an increased workload on the maintenance staff. Also, priorities continued to be changed as the PWO was processed. The licensee has made several attempts to correct this deficiency however, the problem continues to exist. Late in the SALP period, the licensee instituted a new program to address this issue. The program involves more operations control over the assignment of PWO priority during a daily meeting between the Plant Supervisor Nuclear (PSN) and the operations coordinator. The program appears to be working, however, since implementation was late in the SALP period, it is too early to accurately assess its impact.

- There were several instances where PWOs were cancelled without the originator's knowledge or approval. Normally, cancellation was due to not finding the problem as described on the PWO. This has caused additional PWOs to be generated by the originator until concerns were addressed.

The licensee continues to have a large number of corrective maintenance PWOs, approximately 1,000 at the end of this SALP period. However, this is an improvement over the same period

last year which showed an average of about 1,800 corrective maintenance PWOs. It should be noted that the reduction in PWO's was accomplished by better management of available resources and not by increasing the work force.

During previous SALP periods, a reduction in PWO's was also noted near the end of the period. This was attributed to a temporary increase in the work force with contract personnel. Upon termination of the temporary help, the backlog increased.

The licensee continues to strive for maintaining the total PWO backlog in accordance with the INPO guidelines of having no more than 50 percent of the corrective maintenance PWOs greater than three months old. They normally meet this target criterion.

In order to reduce the total PWO backlog to an acceptable and more manageable number, the licensee has developed several new programs late in this SALP period. The first involves a team developed to resolve the large number of control room deficiency tags. The team, which was established May 23, 1988, is centering on repeat control room deficiencies to determine and correct the root cause. The initial effort indicates an improvement, a reduction of about 60 deficiency tags between May 23, 1988 and June 30, 1988 (from about 255 to 195). The second program was initiated by the Electrical Department and has shown a dramatic reduction in the backlog of ready to work PWOs since starting the program on June 14, 1988. Backlog was reduced from 206 to about 65 at the end of this rating period on June 30, 1988. The program included: discussions with the shop personnel as to what constituted backlog; a status board displayed in the shop area listing all ready-to-work PWOs and graphs tracking daily progress; and a separation of the department's workforce into crews being responsible for their assigned units (Unit 3, Unit 4 and common). Although this concept was implemented late in the SALP period, initial indications are positive.

Communications between Operations and Maintenance Departments have greatly improved during this SALP period and Operations is being treated more as a customer of the Maintenance Department. The improvement was due to a more in-depth Plan-of-the-Day (POD) meeting, and the POD document containing: work scheduled for the current day; priority items; LCOs presently in effect; surveillances due and past due; and other information pertinent to daily plant operation. In addition, the oncoming Plant Supervisor Nuclear (PSN) or Assistant Plant Supervisor Nuclear (APSN) conducts a briefing for their shift to update the shift for work planned or in progress. These briefings are also attended by supervisors from the other departments so that all departments are working toward the same goals.

The licensee's Analytical Based Preventive Maintenance (ABPM) Program, which was implemented during the last SALP period to augment the Preventative Maintenance (PM) Program has proven to be an effective tool for predictive maintenance. This program initially started with vibration and oil analysis for pumps and motors, and was recently expanded to include infrared thermography. The thermography has been useful in identifying numerous equipment problems throughout the plant prior to failure. Examples include: the location and repair of condenser air inleakage; hot spots in electrical equipment caused by loose electrical connections or overload; and identification of valve seat leakage. An average of 50 to 100 components per month were analyzed using thermography.

The original Performance Enhancement Program (PEP) goal of 560 maintenance and operations procedures was met on April 1, 1988. In addition, the licensee has added 103 new approved PM procedures during this SALP period and there are 329 left to complete. The additional procedures are part of the Enhanced PEP currently scheduled for completion in May of 1993.

A recent audit in the area of performing PMs indicated about 300 PMs past due. Increased management involvement rapidly reduced the number to 79 by late June 1988. However, continued management attention is required in the area of performing PMs within their required schedule.

Maintenance-related deficiencies caused two manual reactor trips and one automatic trip during this period. This is a marked improvement over the last rating period which attributed eleven reactor trips due to maintenance. The two manual trips were both associated with Unit 3. One was initiated due to an equipment malfunction, sticking electrical contacts, and the other was related to personnel error that resulted in multiple rod drops during a shutdown. There were a large number of shutdowns or forced power reductions due to maintenance/engineering related deficiencies (see the Outage section for a more detailed discussion of outages). The shutdowns (4 for Unit 3 and 6 for Unit 4) and load reductions (2 for Unit 3 and 9 for Unit 4) were, for the most part, due to equipment malfunction or failure which could be attributed to poor design or material condition. Increased management attention is needed for repetitive equipment failure, in particular in the balance of plant area. Examples include the following.

- The pressurizer spray valves have caused three forced shutdowns due to controller malfunction or spray valve failure. In addition, a pressurizer spray valve failed while Unit 3 was in Mode 3, causing a negative pressure transient which resulted in partial discharge of a cold leg accumulator into the RCS.

- The steam generator feedwater regulating valve to actuator coupling has caused two forced power reductions to facilitate repairs.

- The turbine control oil system for Unit 4 has caused one shutdown and several load reductions. Unit 3 has been relatively free of problems with the oil system since a major cleaning was accomplished during the last SALP period.

- The licensee completed replacement of all intake cooling water (ICW) pump couplings during this period after a failure required a load reduction. However, the ICW system continues to remain a large maintenance item, accounting for increased time in LCOs. Major problems include heat exchanger fouling caused by calcium carbonate buildup and strainer plugging caused by marine growth. The Amertap system was installed in Unit 4 late in this SALP period and should reduce the heat exchanger fouling problems. Increased attention should be focused on the ICW strainer problems and future heat exchanger replacement or retubing.

- As mentioned in previous assessments, the area radiation monitor system (ARMS) and the process radiation monitor system (PRMS), continue to have numerous problems. The PRMS failures of R-11 and R-12 have resulted in the initiation of seven LERs due to containment and control room ventilation system isolations. The system drawers were replaced with new upgraded drawers during this SALP period (Unit 3 on November 5, 1987, and March 24, 1988 for Unit 4) and this has resulted in improved system performance. However, the series circuit type power supply for the system, which has also caused failures, has yet to be corrected. The licensee currently plans to modify the power supply in August 1988.

- Personnel errors continue to remain a problem, as indicated by the violations identified at the end of this section. The licensee is improving in this area, as evidenced by the reduced number of LERs in the maintenance area attributed to personnel error versus equipment malfunction. However, continued licensee emphasis is required on the need for attention to detail and individual accountability as indicated in the following additional examples related to personnel error:

  - Not knowing the effects of pulling certain CRDM fuses caused multiple rod drops which required a manual reactor trip.

  - Use of carbon steel gauge fittings in a seawater system caused an ICW pump to be placed out of service and entrance into TS 3.0.1.

- An improperly installed RCP shaft shim contributed to a unit shutdown during startup and increased outage time.

A review of the safety system failures for the units indicated that they were slightly above the national average for older plants of this type during this SALP period. However, only one failure could be attributed to a maintenance related deficiency, which concerned the failure of an ICW pump coupling previously discussed in this section.

The licensee's approach of resolving technical issues by using Event Response Teams (ERTs) has continued to be a useful tool for identifying and resolving the root cause of a deficiency. A total of 23 ERTs were initiated during this assessment period, some of which were for multiple problems. One ERT concerning the multiple failures of the 125 VDC battery chargers identified an inadequate component provided by the vendor during circuit modifications. This deficiency was not initially recognized by the vendor and its identification was not only a benefit to the licensee but also to the industry.

The new maintenance building was completed during this assessment period. This should aid in improving maintenance trends by centrally locating all maintenance disciplines.

Three violations were identified. (Two additional maintenance related violation examples are identified in the Operations section):

a. Severity Level IV violation for failure to report to management a pin hole leak on an AFW steam line. (Unit 4 only, 87-33)

b. Severity Level IV violation for improper fuses installed in the reactor safeguards protection circuitry. (87-39)

c. Severity Level IV violation with two examples: failure to perform a functional test on an instrument loop and the improper installation of a check valve. (87-39)

2. Conclusion

Category: 3

Trend: Improving

3. Board Recommendations

The Board recognizes the improvements made in the maintenance area but remains concerned with the significant number of plant equipment problems that have not been repaired through the corrective maintenance program or are overdue for preventive

maintenance. Additional licensee management and NRC attention in this area is recommended.

D. Surveillance

1. Analysis

During the evaluation period, routine reviews of the operational surveillance testing program were conducted by the resident inspector staff. Regional inspectors reviewed surveillance testing in the areas of fire protection, chemistry, and core physics testing.

During the last SALP period, the majority of the missed surveillances were caused by a poor surveillance tracking program. The licensee corrected that problem with an improved manual tracking system, but during this SALP period nine LERs were generated as a result of surveillances. Personnel error caused four missed surveillances. These were in the area of failure to perform the scheduled surveillance. The other five LERs were due to inadequate procedures, and resulted in failed or missed surveillances.

The violations listed below concern missed TS surveillances. However, the root causes for each were different: violation b was due to misinterpretation of the applicable mode for the test performance; violation a concerned TS interpretations and was a result of the licensee's decision to omit, rather than meet, the TS requirement for sampling the safety injection accumulators; violation c was due to operations personnel anticipating the return to service of the EDG before the TS time limit for testing the other EDG expired; and violation d was a result of an inadequate surveillance tracking program.

The Quality Control (QC) surveillance groups' review of completed test procedures and testing activities was evident by the low frequency of missed surveillances. This is due to the group surveillance tracking program.

The licensee has developed a computerized surveillance tracking program, which is scheduled to be implemented in July 1988. The major benefit of this program will be to reduce manpower necessary to track surveillances. QC surveillance personnel should be able to witness more test activities instead of reviewing documentation. The surveillance tracking program currently in use will be run in parallel with the new computerized system until the end of 1988. This will ensure that the new system is able to track the surveillances as well as the current system.

The Procedure Upgrade Program (PUP) has continued to improve existing surveillance procedures to increase the quality, content and to aid in reducing personnel errors. In general,

the surveillance procedures were technically accurate and well written. Some difficulties resulted, as expected, with the upgrade and generation of new surveillance procedures. Personnel performing testing have encountered some minor difficulties with the new procedures, especially during the initial use. However, management's policy of verbatim compliance to procedures has helped to avert problems. When the procedures have been unclear or technically inaccurate, the test personnel have stopped the test to seek a change/clarification to the procedure.

Test personnel routinely exhibited conservative approaches to resolving safety significant issues and were knowledgeable of the surveillance they were performing. Management involvement in assuring quality was evidenced by the low occurrence of procedural noncompliance related to surveillance testing. Additionally, the surveillance records were complete, well maintained and readily available for review. However, the licensees poor management of the surveillance schedule was reflected by the routine use of TS allowed grace periods. An example of this was the Unit 3 and 4 containment tendon surveillance. This surveillance is performed every 5 years and was last performed in early 1982. The licensee had not started the tendon surveillance until May 1988, with the Unit 3 end of grace period expiring June 30, 1988, and the Unit 4 end of grace period expiring July 31, 1988. The surveillances were completed on time but the licensee utilized almost the entire alloted grace period. If an unforeseen problem would have arisen, the licensee would not have had sufficient margin to complete the surveillance within the allowed TS time limits.

The most recent post-refueling startup tests on both units were satisfactory. They were representative of good technique and attention to detail, which indicate an understanding of the test and a sound and thorough approach toward performance of these required activities. The initial criticality for both units showed a reactivity overshoot. This could have been avoided with an improved procedure and/or a more conservative approach toward restart.

One inspection on heat tracing records and procedures identified a weakness concerning a lack of review of surveillance records by management. When brought to the attention of the licensee, the data was immediately checked by performing retests and verified to be adequate.

Four violations were identified:

a. Severity Level IV violation for failure to perform the boron concentration analysis for the 4C accumulator (Unit 4 only, 87-35).

b. Severity Level V violation for failure to perform the monthly surveillance on Unit 3 spent fuel pit exhaust monitors (Unit 3 only, 87-27).

c. Severity Level V violation for failure to verify operability of the B emergency diesel generator when the A diesel was out of service (87-35).

d. Severity Level V violation for failure to perform surveillance test on electric fire pump (87-42).

2. Conclusion

Category: 2

3. Board Recommendations

None

E. Fire Protection

1. Analysis

During this assessment period, inspections were conducted by the regional and resident inspection staff to review the licensee's implementation of the fire protection program and follow up on previously identified enforcement matters.

The licensee has issued revisions to procedures for the administrative control of fire hazards within the plant, surveillance and maintenance of the fire protection systems and equipment, and organization and training of the plant fire brigade. These procedures were reviewed during the staff inspections and found to meet NRC requirements and guidelines.

The inspectors also reviewed the licensee's implementation of the fire prevention administrative controls. General housekeeping and control of combustible and flammable materials in safety-related plant areas were found to be satisfactory. The fire extinguishing systems, fire detection systems, and fire barrier assemblies protecting plant systems required for safe shutdown were found to be functional. In addition, the surveillance inspections, tests and maintenance instructions for the plant fire protection systems were found to be satisfactory and met the criteria of the plant Technical Specifications.

The fire protection/prevention annual audit, triennial audit and audits conducted to verify implementation of 10 CFR 50, Appendix R, requirements were reviewed. These audits were conducted within the specified frequency and covered all the essential elements of the fire protection program. These audits covered procedures, fire brigade organization and training, and fire protection systems and housekeeping. The audits identified

minor discrepancies. None of the audit findings were of major safety significance. The licensee has implemented the corrective actions for discrepancies identified by these audits.

During a design basis review, it was determined that insufficient emergency power exists (assuming worst case accident design basis) to operate air conditioning units in the battery charger rooms. Consequently, fire doors have been required to be propped open for the past year along with the use of portable fans, to assure adequate ventilation during accident conditions. One fire door requires that a continuous fire watch be present to shut the door under certain circumstances. Twice in the past year, individuals fulfilling this compensatory action have fallen asleep. This has resulted in examples of violation h and k of the Operations section.

The management involvement and control in assuring quality in the fire protection program was evident due to the well developed, issued and implemented fire protection administrative procedures. The licensee's approach to resolution of technical fire protection issues indicated an understanding of issues, and was sound and timely. The responsiveness to NRC initiatives were generally timely and thorough. When violations did occur, effective corrective action was promptly taken. Fire protection related events and discrepancies identified by the licensee were properly analyzed, promptly reported, and effective corrective actions were taken.

Staffing for the fire protection program is adequate to accomplish the goals within normal work hours. The fire protection staff is identified, and authorities and responsibilities are clearly defined. Personnel appear well qualified for their assigned duties. The organization and staffing of the plant fire brigade met NRC guidelines. The training and drills for the brigade members met the frequency specified by the procedures and NRC guidelines.

One violation was identified.

Severity Level IV violation for inadequate procedure for the control of deluge isolation valve positions (87-33).

2. Conclusion

Category: 2

3. Board Recommendations

None

F. Emergency Preparedness

1. Analysis

During the assessment period, inspections were performed by resident and regional inspection staffs. These included an annual emergency preparedness inspection, and an emergency response facilities (ERF) appraisal. One revision to the Turkey Point Radiological Emergency Plan (REP) was submitted for NRC review.

The emergency program inspection and ERF appraisal disclosed that the licensee has the capability to promptly identify and correctly classify emergency events, and implement the key elements of the REP and respective procedures in response to emergency events. The annual radiological emergency preparedness exercise was not evaluated during this assessment period; however, the effectiveness of the ERFs were evaluated during the exercise. No significant findings, other than those discussed below, were identified during either the appraisal or related interviews of emergency response personnel regarding adequacy of the licensee's emergency response program and facilities.

Walkthroughs with shift supervisors, performed during the inspection, disclosed that the licensee continued to demonstrate the capability to promptly identify and correctly classify emergency events consistent with the current REP and implementing procedures. The shift supervisors were cognizant of their authorities and responsibilities regarding accident assessment and protective action decision-making, including onsite protective measures and recommendations appropriate to offsite protection.

Additionally, the inspection identified that the following emergency programmatic elements were adequate: notification and communications; shift staffing and augmentation; emergency plan and implementing procedures; emergency facilities including equipment, instrumentation, and supplies; emergency response organization and management control; training; and independent reviews and audits.

The ERF appraisal performed during this period included detailed review and evaluation of the onsite meteorological facility, Control Room, Technical Support Center (TSC), Emergency Operations Facility (EOF), and all emergency equipment and supplies, provided therein. The appraisal disclosed that ERF equipment and supplies were adequate to support response to emergency events. The emergency program evaluation and the ERF appraisal also confirmed management's continued attention to maintenance of an effective emergency preparedness program and provision of emergency facilities required to implement the program. The following findings, were disclosed which could result in nonconservative dose estimates following an offsite radioactive release: (1) failure to use required time-averaged meteorological data (15 minutes) defined in the emergency procedure addressing offsite dose calculation and failure to

inform Control Room personnel of changes made at the meteorological tower regarding delta temperature; and (2) failure to establish and implement a computer software control procedure to ensure maintenance and control of the Class A Model Dose Assessment computer.

Two violations were identified.

a. Severity Level IV violation (two examples) for failure to use required time-averaged (15 minutes) meteorological data as defined in the Offsite Dose Calculation Emergency Procedure, and for failure to inform Control Room personnel and reflect respective change to Control Room analog chart records of hardware changes made to meteorological tower equipment addressing delta temperature (88-01).

b. Severity Level IV violation for failure to establish and implement a computer software control procedure to ensure maintenance and control of Class A Dose Assessment Computer Model (88-01).

2. Conclusion

Category: 2

3. Board Recommendations

The SALP rating should not be construed as representing a dramatic reduction in performance but is indicative of needed improvement to reach the level of excellence achieved in the past. During the period, problems were identified in this area which indicated that more aggressive action is needed in striving for an excellent program.

G. Security and Safeguards

1. Analysis

Inspections were performed by the resident and regional staff. Additionally, security was discussed with the NRC during monthly management meetings held onsite.

The licensee had established a program to upgrade the security systems, barriers, and computer. This effort is part of the integrated schedule and is currently estimated to be complete in 1992. The licensee had dedicated four employees to the maintenance of the system until the upgrade can be completed. There has been some progress in maintenance late in the SALP period. Recently, a guard force captain was detailed to track maintenance and related compliance issues. Two projects related to the upgrade program are near completion, the new Contractor Entrance Building and the vehicle entrapment and search area. With regard to both of these projects, a weakness has been shown

on the part of the security organization to recognize regulatory requirements and to manage the program upgrade effectively. The Contractor Entrance Building work required a reconfiguration of the protected area barrier, alarm and surveillance systems. The licensee failed to implement compensatory measures and to timely submit the required security plan change. This failure to implement regulatory requirements was not recognized by the licensee, but was identified by the Senior Resident Inspector. Several layers of security management had an opportunity to recognize this problem and failed to do so. Subsequently, a failure in communications within the Security Department precluded the prompt implementation of compensatory measures.

Work on the vehicle entrapment area was initiated without consideration of the necessary regulatory requirements; compensatory measures are currently in place while an engineering redesign is accomplished to ensure conformance with the Physical Security Plan. Late in the SALP period, the Site Security Superintendent was assigned to oversee the upgrade program.

Weaknesses in the security program have continued to prevail in this SALP period as indicated by the number of violations. The violations continue to be repetitive in nature, involving a failure of the guard force to implement the security program, an inability of security personnel and supervisors to recognize violations and a lack of management oversight. These violations included escalated enforcement in the areas of access control, compensatory measures, and the control of Safeguards Information. The licensee continues to show a lack of initiative in self-identification of problems but remains responsive to NRC initiatives.

The licensee's Security Department has failed to take responsibility for the complete security program and associated program problems and solutions. This was highlighted by the licensee's inaccurate responses to escalated enforcement violations. Statements were made to the inspectors while onsite and later in an enforcement conference that were not accurate. More inaccurate statements were sent to the NRC in the licensee's response to the violations. This necessitated the licensee to submit revised responses to Reports 87-38 and 87-47.

The inaccurate information can be attributed to the security management failing to verify data, dates, and causes, prior to providing the information to other organizations within FP&L, which formulate the formal responses to the NRC. In one case, Security Management stated that a preventive maintenance program had been implemented when in fact no program was implemented and the hardware which had initially failed was found to be in a failure mode again.

The mindset appeared to be one of writing a response, handing responsibility to another licensee entity to implement and then failing to follow up to see if the other entity had performed the work necessary to ensure reliable operation of security equipment. Ownership of the security program was poorly managed.

Although the licensee has made extensive plans to upgrade security facilities program and systems and has provided additional training and manpower resources, these measures have not yet been implemented or have failed to be effective. As discussed previously, the security force failures and lack of regulatory sensitivity at all levels of the security force, demonstrate that although all members of the force have been trained, the training management of the force has been ineffective in ensuring compliance with regulatory requirements during most of the SALP period.

Recently, licensee corporate and plant management have begun to provide support to the security program. Monthly management meetings between high level licensee and NRC management include security program issues on the agenda. The licensee has directed substantial resources to improvement of the security program shown by the upgrade program and hiring of new managers. However, these efforts have had limited improvement during the current SALP period.

The licensee has made personnel changes in the positions of Site Security Superintendent, Site Security Manager and Assistant Site Security Manager and had added one onshift FP&L security supervisor, with four more scheduled to be hired. These changes came too late in the SALP rating period to have an impact on the current analysis.

Seven violations were identified during this rating period.

a. Severity Level III violation for failure to maintain positive access control, six examples: failure to adequately control access to the protected area; failure to adequately control access to the Unit 4 containment personnel hatch; failure to adequately control access to the Unit 3 containment equipment hatch; officer sleeping in defensive tower; failure to adequately control access to the protected area; and an officer leaving a vital area compensatory post without proper relief. (87-38)

b. Severity Level III violation for failure to recognize, properly mark and protect Safeguards Information. (87-38)

c. Severity Level IV violation for inadequate protected area lighting. (87-47)

d. Severity Level IV violation for inadequate search of vital area prior to revitalization. (87-47)

e. Severity Level IV violation for inadequate compensatory measure. (88-03)

f. Severity Level IV violation for inadequate protected area barriers. (88-03)

g. Severity Level IV violation for inadequate vital area alarm testing. (88-03)

2. Conclusion

Category: 3

3. Board Recommendations

The licensee has finally given attention and resources to the security area, but continued to perform at a category 3 level during this SALP period. It will take continued effort by the licensee to improve performance.

H. Outages

1. Analysis

During this evaluation period, inspections were conducted by the resident and regional inspection staff. At the beginning of the period, both Units 3 and 4 were in the shutdown mode. Unit 3 entered a scheduled refueling outage on March 11, 1987. Unit 4 entered an extended outage on March 13, 1987, to repair corrosion caused by boric acid buildup from a conoseal leak on the vessel head. Both outages were extended to allow extensive replacement of environmentally qualified (Raychem) electrical splices inside the containments. Additionally, the Unit 4 outage was extended in June 1987 to allow for replacement of defective piping in the post accident hydrogen monitoring system.

There were four region based inspections performed of activities defined as Outage related. The first and third inspections were primarily to review the licensee's response to NRC open items including Bulletin 83-06; the second inspection was a review of primary coolant system pressure isolation (Event V) valves and the pump and valve inservice test (IST) program and procedures; and the fourth inspection involved the status of the licensee's corrective action in response to Bulletins 79-02 and 79-14. The inspectors found that the level of management awareness and initiative varied from adequate to excellent depending on the particular issue. Resolution of technical issues also varied in the same areas depending on which part of the company had the lead in developing the resolution (e.g., the resolution of the

problems associated with materials supplied by GULFALLOY [Bulletin 83-06] was handled in an excellent manner, while resolution of issues involving Event V valves and the IST program were only average).

Throughout this assessment period, there were numerous forced outages due to equipment failure caused by design or maintenance deficiencies. There were a total of eight non-refueling outages for Unit 3 and six for Unit 4 during this period. When required to enter a forced outage of significant duration, the licensee utilized their Short Notice Outage Work (SNOW) list, which identifies all maintenance items requiring a shutdown. New maintenance items identified during power operation that require a plant shutdown to repair are continuously added to this list.

During this evaluation period, a positive change in management philosophy was noted in that the emphasis is no longer being placed on meeting startup schedules at the expense of needed maintenance. This philosophy change has been observed since the fall of 1987. During subsequent outages, a good number of the maintenance activities were being performed to enhance the physical condition of the plant and not because they were required to return the unit to service.

This change in philosophy has produced a more reliable plant during the latter part of the period, as noted by the improvements in availability of the units. Several examples of extending outage times are discussed below.

The forced outages demonstrated adequate planning and scheduling through use of the SNOW list and daily meetings to discuss work progress and critical path issues. One weakness in the area of personnel accountability and responsibility was noted. This has resulted in extending equipment down times due to no single individual assuming responsibility and following up on delays. An example was the recent installation of the Amertap system on Unit 4 ICW/CCW heat exchangers. Some changes in accountability and responsibility were noted late in the SALP period, due mainly to the new Plant Manager's increased emphasis in this area.

Unit 3 encountered numerous material problems during the first part of the period, which required forced shutdowns to repair defective equipment. In August of 1987, while coming out of the refueling outage, a leak was identified in the inner reactor vessel o-ring seal. A conservative management decision was made to correct the deficiency, although plant operation was not disallowed by Technical Specifications. The repairs added about two weeks to the schedule and required reactor vessel head removal.

In September 1987, the unit experienced one trip and one shutdown due to equipment malfunction. During the outages, the

faulty equipment was repaired, which included the reinstallation of RCP 3B shim that was installed incorrectly during the previous outage due to personnel error. Additional events that occurred during the outage that resulted in an extension included: repair of RHR leaks, motor, and pump; seal table leakage repair; containment purge valve repair; RPI repair; and replacement of RHR recirculation lines, which was a generic concern identified by the licensee.

There were two short forced outages in December 1987; the first to repair a stuck open pressurizer spray valve due to control circuit malfunction, and the second to repair a defective relay in the turbine generator overspeed protection circuitry. Again in January 1988 there were two forced outages, one to balance the main turbine due to excessive vibration and the other to correct pin engagement on CRDM connectors. The latter caused a dropped rod and an eventual manual trip due to personnel error in removing the CRDM fuses for testing (see violation h in the Operation Section). While preparing to return the unit to service the licensee was performing a leak inspection of all accessible areas inside the containment and found a small leak in a CRDM canopy seal weld. The leak inspection was instituted by management as a result of the conoseal leak discussed in the last SALP report. Repair of the canopy seal extended the outage 39 days and showed effective preplanning in that welders practiced on a non-radiated reactor vessel head at Westinghouse headquarters prior to performing the repair to conserve man-rem and provide experience in this type of repair. The repair work was documented by the licensee on video tape and distributed to other plants in the industry that may experience this same failure, thus providing a free flow of information throughout the industry for newly identified problems. In addition, the licensee installed a radiation monitoring system in the upper head region during this outage to detect future leaks in this area. Two short outages were required in March 1988 and were caused by balance-of-plant (BOP) failures. One was due to failed welds in a moisture separator reheater (MSR) baffle plate and the other was due to a condenser tube rupture. In the MSR repair, the licensee again showed conservatism by inspecting all other MSRs and repairing questionable welds even though only one MSR had failed.

Unit 4 also required several forced outages throughout this period due mainly to BOP failures. Two short outages occurred in July and September of 1987 to repair a condenser tube leak and a condenser vacuum leak. In October 1987 the unit was placed in cold shutdown as a precautionary measure due to a hurricane warning. Several maintenance items were accomplished during this shutdown which extended the outage, including the replacement of the RHR recirculation line, several major valve and actuator repairs, and recovery from high chlorides in the CCW system. In February 1988, the unit was in a forced outage due to a common mode failure of the battery chargers. An ERT

was initiated to determine the root cause of the failures. The ERT identified that the vendor was supplying replacement circuit cards with capacitors that were not suited for this application. This resulted in the selection of replacement capacitors that benefited others in the industry using this type of charger as well as the licensee.

The unit required two forced outages in April 1988 to repair a turbine generator control oil leak, due to a failed weld caused by a vendor manufacturing deficiency, and to repair a pressurizer spray valve leak. During the outage to repair the turbine generator failed welds, the licensee rewelded all the control oil lines that were susceptible to this failure, and not just the failed weld. During repair of the pressurizer spray valve leak, the licensee opted to extend the outage to facilitate partial installation of the Amertap system on the ICW/CCW heat exchangers. This installation could have been accomplished with the unit on line, however the licensee accomplished it during the outage to prevent entering an LCO if performed while at power. In addition, a design deficiency in the containment purge valve air supply/discharge lines was identified and corrected.

2. Conclusion

Category: 2

3. Board Recommendations

None

I. Quality Programs and Administrative Controls Affecting Quality

1. Analysis

During the assessment period, inspections were conducted by the regional and resident inspection staffs on a routine basis. For the purposes of this assessment, this area is defined as the ability of the licensee to identify and correct their own problems. It encompasses all plant activities, all plant personnel, as well as those corporate functions and personnel that provide services to the plant. The plant and corporate Quality Assurance (QA) staffs have responsibility for verifying quality. The rating in this area specifically denotes results for various groups in achieving quality as well as the QA staff in verifying that quality.

The plant QA organization is divided into two sections. The Regulatory Compliance Section and the Performance Monitoring (PMON) Section. The Regulatory Compliance Section consists of ten auditors with experience in various disciplines such as chemistry, health physics, training, design, metallurgy, and instrumentation and controls. This Section is responsible for

performing the traditional QA audits. This includes, but is not limited to, audits of TS, QA program, Emergency Plan, plant procedures and verification of accuracy of licensee correspondence to the NRC. An improvement in this Section included conducting audits on "real-time" plant issues. This has helped to identify problems as they occur, which results in more timely resolutions. Another improvement is the involvement of QA personnel with the Event Response Teams (ERT). QA personnel have been involved in providing technical and regulatory/quality inputs for various ERTs including: failure of containment purge valves; high chloride concentrations in the CCW; formation of voids in the Unit 4 reactor vessel head during a cold shutdown condition; 4B and 4C ICW pump failures; and MSIV nitrogen backup regulator discrepancies. The licensee is also implementing Vertical Slice Audits (VSA). VSAs are intended to evaluate the operational readiness and design basis functionality of selected plant systems. The QA Guidance Document was issued in March 1988, and a VSA on the ICW system was commenced in early July 1988. The VSA will be an ongoing program and the licensee plans to conduct VSAs for at least two systems per year.

Audits by the Regulatory Compliance group have resulted in several LERs being issued by the plant concerning fire protection, diesel fuel oil sampling and rotation of battery pilot cells. Another audit identified problems with the control of non-fuel special nuclear material (SNM) prior to issuance of Information Notice 88-34, which expressed similar concerns.

The PMON section currently consists of nine auditors that provide more of a Quality Control (QC) role by monitoring plant operation, maintenance, and root cause analysis on technical issues. Improvements in this area include dedicating an auditor to monitor balance of plant (BOP) activities. Events investigated thus far include: Unit 3 condenser tube failure; Unit 3 moisture separator reheater (MSR) internals failure; and the Unit 4 guarded oil system leak. Instituting a dedicated auditor will help provide a quality perspective in determining root causes for BOP system problems. PMON has also provided support to operational enhancements such as the computerized clearance system, computerized surveillance tracking program and also the centralized scheduling organization. The PMON group activities have generated numerous findings including: operation of the waste gas system in an alignment not addressed in the Final Safety Analysis Report (FSAR); and LERs 250/87-25 and 87-28 which involved missed surveillance of control rod positions verification and undocumented surveillance of coolant loop operability.

Based on the review of the QA Department audit findings, schedules, corrective action requests and other site activities, it appears that the QA Department is conducting timely, thorough and technically sound reviews of site activities.

The Regulation and Compliance Group (Licensing) has provided effective support to plant departments for interpretations of regulations and Technical Specifications. In addition, this group has actively participated in the review of the revised TS project with NRR and has supported Region II personnel in resolving and closing approximately 900 open items. The Regulation and Compliance Group continues to demonstrate an open and effective interface with NRC inspectors, which facilitates the resolution of issues that arise.

The licensee was able to identify and correct problems relating to safety as evidenced by the following actions:

- The establishment of a Management-on-Shift (MOS) program which is instrumental in identifying areas needing improvement.

- The issuance of a "Standards of Professionalism" document to clearly define the responsibilities of licensed personnel.

- The management involvement in the reduction of the PWO backlog.

- Management's initiative in reducing control room PWOs, to facilitate efficient operations.

- Management's policy on verbatim compliance with plant procedures to reduce personnel errors.

- Event Response Teams identification of root causes of significant plant problems and determination of appropriate corrective actions.

- The expansion of the Analytical Based Preventive Maintenance Program to include new testing methods, resulting in the identification of numerous equipment problems prior to failure.

- Design Bases Reconstitution which identified several plant design deficiencies.

The licensee exhibited an inability to either identify or correct (once identified) problems relating to safety in the following areas:

- Management's failure to develop effective corrective actions to resolve numerous AFW backup nitrogen system misalignments.

- Failure to adequately control activities in the operations area which resulted in nine examples of procedural noncompliances.

- Numerous repetitive violations in the security area.

- Repetitive maintenance problems, such as: deficiency tags not entered into the tracking system; priorities not worked on time or are changed during PWO process; high preventive maintenance backlog; high amount of rework items on various safety-related systems.

- Management's failure to assure adequate staffing in the Operation's Department to prevent excessive overtime.

One violation was identified:

Severity Level IV violation for failure to take prompt corrective action to have operators and non-licensed operators review and acknowledge training reports. (87-32)

2. Conclusion

Category: 2

3. Board Recommendations

The Board acknowledges significant action taken by the licensee to identify and correct problems. Specifically, efforts in the areas of design basis reconstitution, independent management appraisal, and management changes have been effective. However, the Board noted that these efforts were, in part, in response to concerns expressed by the NRC. The Board encourages the licensee to be more proactive in the future.

J. Licensing Activities

1. Analysis

The licensee management's role in attempting to assure quality in licensing-related activities showed certain weaknesses during the SALP period, with signs of possible improvement near the end of the period. An apparent weakness in the licensing organization has been the interface and coordination between corporate licensing, site licensing, and operations/modifications planning and scheduling. The lack of unification under strong leadership in the licensing area was also noted by Enercon in their Independent Management Appraisal. There needs to be sufficient communication between these groups to permit advance planning of licensing proposals such as relief requests and Technical Specifications changes so that they can be processed in an orderly manner. One example where sufficient communciation did not exist concerned containment tendon surveillance. Although there are several years between tendon surveillances, a last-minute proposal surfaced and both licensee and NRC resources were

spent discussing a change in tendon surveillance Technical Specifications. This effort was ultimately abandoned because there was not enough time to process a change before the next surveillance. Another example was relaxation of Technical Specifications for CCW heat exchangers. In order to install the Amertap system on Unit 4, a proposal was made to relax the permissible outage time for one heat exchanger to 72 hours. The proposal was made for an emergency amendment. However, this could not be supported on the basis of 10 CFR 50.91 and instead the proposal was processed by the staff as an exigent amendment. Better coordination and planning would have foreseen the need for the TS relaxation and avoided the need for an exigent amendment.

Throughout most of the SALP period there was no apparent mechanism by which the licensee identified, prioritized, scheduled and tracked ongoing and future open licensing actions. Instead it was the practice to use the NRC-generated list of open licensing actions as a vehicle to monitor status of licensing actions. This approach was not effective because the licensee's priorities were not apparent, and future licensing actions were not identified. Near the end of the SALP period, at the NRC Project Manager's recommendation, the licensee created a new licensing action status report. This report lists priorities and attempts to identify future actions far enough in advance to permit planning for resources and orderly processing of proposals. The new status report has the potential to improve the licensing interface between the licensee and NRC. Significant improvements can still be made in formatting and layout of the report, which will give a better visual perspective of issues, focus on future actions and schedules, and document the history of key communications on open actions.

The commitment to an Integrated Schedule (I/S) process indicates a desire to control licensing activities as well as prioritize plant modifications and allocation of resources. The licensee made a significant effort to develop a computer-assisted program for integrated scheduling of planned plant modifications. The licensee's particular I/S proposal was considered to be especially comprehensive and well thought-out. A license amendment was issued incorporating the I/S during this evaluation period, and it is clear the process is being used extensively to control schedules and priorities. The Integrated Schedule represents a clear improvement to management's control of plant modifications.

The licensee's approach to resolution of technical issues has been adequate. A special inspection was held during the week of December 7, 1987 to examine activities in the

areas of safety review pursuant to 10 CFR 50.59, and the on-site and off-site review committees. Steady improvement in the quality and completeness of 10 CFR 50.59 safety evaluation documentation was observed. Recent safety evaluations audited during the inspection were sufficiently detailed to demonstrate the logic and bases for determinations regarding potential unreviewed safety questions. A weakness was identified in that the large volume of material requiring PNSC review resulted in long and frequent meetings, diverting management from other duties. Some method of screening the material for PNSC review seemed to be needed.

A broad technical issue that has existed for some time has been the early vintage Technical Specifications which were part of the initial operating license of the plant. Many technical improvements in Technical Specifications have been developed in the industry and at NRC over the years, and the licensee volunteered several years ago to upgrade their TS to modified Standard TS. During this SALP period a significant effort was made by the licensee to resolve technical issues related to the upgrade and to make many refinements in their original proposal. The vast majority of the TS changes are in a more conservative safety direction than the original TS, and the licensee is commended for this effort.

Another broad issue that has existed for some time is the reliability of A. C. electrical power (station blackout). The licensee's approach to this issue has been to make a very significant commitment in financial and personnel resources to enhance emergency power supplies by committing to add two new safety-grade diesel generators with associated equipment. The licensee has increased planning and design work during this SALP period as this effort begins to grow in magnitude.

In a meeting held on March 29, 1988, the licensee proposed relaxing the allowable outage time for CCW heat exchangers and ICW pumps. The technical basis for the CCW heat exchangers was thoroughly evaluated and well presented. This permitted rapid technical review and issuance of a license amendment at a later date. Such was not the case for the ICW pumps. Even though the ICW is an important heat removal system and Turkey Point operating experience with the ICW system has shown a number of failures, the licensee proposed removal of the TS on the third ICW pump. Operating experience in the industry and, in particular, at Turkey Point could not support such a relaxation and the request was denied. At the end of the SALP period the licensee still has not proposed an alternate TS for the third ICW pump.

In another matter regarding the allowable outage time for diesel generators, the licensee made it clear that the issue was important to plant operation. However, conference calls to resolve the issue were twice postponed by the licensee and, when finally held, evidenced inadequate technical preparation to fully address the issue. The issue remains to be resolved.

The licensee's responsiveness to NRC licensing initiatives has been very good. An example was the cooperation with the NRC effort to document historically the completion/implementation status of requirements in the NRC Safety Issue Management System. Other examples were the provision of information related to surveys of reactor vessel support structures, and the use of Bunker Ramo containment penetration assemblies. The response to requirements of bulletins and generic letters has been timely. The licensee has volunteered to be the lead plant in the NRC staff's effort to modify generic requirements related to the need for an Operations Superintendent to hold an SRO license.

The spent fuel pool rerack hearings were completed during this SALP period. The licensee was especially responsive and expended significant resources to reassure the licensing boards and intervenors that they had taken appropriate design and monitoring measures to provide for safe storage of spent fuel.

The licensee has generally provided appropriate members of their organization at meetings with the staff. The corporate licensing supervisor has shown good judgement in controlling meeting attendance and has been very responsive to NRC inquiries. The corporate licensing staff includes a former Turkey Point reactor operator, providing a valuable perspective for the group. The staffing level of the corporate (4 positions) group appears to be the minimum able to keep up with the extra improvement programs underway during the past year in addition to the normal workload.

The site licensing group has been heavily burdened with its role in interpreting Technical Specifications, evaluating root causes, preparing reports to NRC, and translating operational needs into licensing actions. The Independent Management Appraisal by Enercon recommended increasing the size of that group. In response, the licensee has increased the number of authorized positions from 5 to 9.

As part of the effort to improve performance in the area of 10 CFR 50.59 reviews, the licensee issued Quality Instruction 3.9 on April 20, 1988, entitled "Evaluations Performed by Power Plant Engineering." This QI is intended

to provide guidance to the licensee's staff for conducting 50.59 reviews and preparing reports. Training on the procedure was provided at the corporate offices and at the Turkey Point site.

2. Conclusion

Category: 2

3. Board Recommendations

None

K. Training and Qualification Effectiveness

1. Analysis

Early in the SALP period, close out inspections conducted in the area of training indicated that the licensee has continued to make improvements.

The licensee has addressed inadequacies and concerns identified during the previous SALP period in the Licensed Operator Requalification Program by providing more qualified instructors, hiring qualified contractor instructors, enhancing instructor classroom training, and implementing an effective tickler system to ensure the incorporation of emergent training and briefing material into permanent lesson plans. The licensee has also prohibited Senior Reactor Operator (SRO) licensed instructors who have failed NRC requalification examinations from teaching licensed operators, eliminated contract instructors who were not commercially SRO licensed from the license training programs, contracted 15 formerly licensed SRO instructors, and implemented a five week site specific systems training course for contract instructors.

Another improvement was the development of the Training Information Management System (TRIMS) which ensures that only qualified personnel are assigned to perform maintenance tasks. The TRIMS program is also designed to provide: configuration control of training materials; management of personnel and program training records; maintenance of examination questions and relative statistical data; maintenance of class data and training program schedules; and maintenances of the tracking, documenting, and updating of training commitments.

The licensee has made improvements in the required reading program, which provides operational experience feedback information to Operations personnel on a regular basis. Improvements include upgrades in the procedural controls over documentation and timeliness of operational experience feedback reviews, and the screening of revised procedures to ensure that only relevant information is forwarded to the operators.

However, as noted in the QA section, a violation was issued due to management's failure to take prompt corrective action for identified deficiencies pertaining to licensed and non-licensed operators who had assumed unit responsibilities without completing the required reading. This violation indicates that improved management control over the required reading program is needed.

On January 26-28, 1988, replacement examinations were administered to seven SRO candidates and one individual was administered an SRO retake written examination. All candidates passed. Two areas of below normal performance were noted in the written examination. These areas were knowledge of bypasses associated with the manipulator crane interlocks, and knowledge of whole body dose emergency exposure limits for various reentry situations. No areas of generic weakness were noted during the oral examinations.

With respect to the licensed operator requalification program, the last requalification exams were administered in February 1986. The results of these exams were considered in the previous SALP report, which stated that the licensee's performance on the exams was poor and the requalification program was unsatisfactory. In this current SALP period, requalification examinations were not administered at Turkey Point because the NRC has suspended its requalification activities in the industry. The licensee's program will receive reevaluation at a future date, pending resumption of the NRC administered requalification examinations.

Other non-licensed employee training was assessed during this SALP period. As noted in the Radiological Controls, Fire Protection, Emergency Preparedness and Engineering Support sections of this report, training in these areas was determined to be adequate, with improvement noted in the health physics area of the general employee training program.

In the area of Surveillances, the training of technical personnel was satisfactory, yet the training of personnel who specify and write repair and retest procedures needs attention.

In the Security and Safeguards area, it was noted that training measures were either not implemented, or have failed to be effective in ensuring compliance with regulatory requirements. It was noted that in the Operations area, some performance issues stemmed from root causes related to training.

Six training programs received accreditation by INPO in December 1987, resulting in all ten original training programs being accredited.

2. Conclusion

Category: 2

3. Board Recommendations

None

L. Engineering Support

1. Analysis

The licensee has successfully implemented a number of corrective actions to improve technical support. These have included detailed reviews of selected safety systems, reconstitution of system design bases, standardization of design packages for controlling changes, increased staffing and training on the plant change process.

The design basis reconstitution effort, in conjunction with system reviews and walkdowns, has been particularly beneficial in that numerous design related deficiencies have been identified and corrected. The Engineering Departments have, in all instances, responded promptly and adequately to identified problems. Several of the problems were corrected on a real time basis, although administrative justification for continued operation until scheduled outages could have been pursued. The efforts to minimize operating the plant around problems has shown improvement. The licensee has been conducting repairs when required. Examples of safety-related deficiencies which were identified and addressed on a real time basis include; waste gas system operation in an unevaluated configuration (October 1987), inappropriate design of the residual heat removal recirculation flow path (October 1987), and post-injection recirculation valve alignment resulting in insufficient net positive suction pressure to safety-related pumps (May 1988).

Corrective actions to preclude recurrence of boric acid leaks similar to the conoseal leak during the last SALP period have been implemented, resulting in a vigorous program to identify and correct even minor primary leakage. This effort resulted in the identification and correction of small conoseal leaks on the Unit 3 reactor in July 1987. Additional sensitivity to primary leakage was demonstrated in August 1987, when a decision was made to remove the Unit 3 reactor head to correct a leaking inner O-ring. Continued plant operations with this deficiency could have been justified had it occurred during power operation. However, the licensee's position was that quality precepts dictated that a post-refueling power cycle not begin with an avoidable deficiency.

During this assessment period, reviews were performed to assess the adequacy of engineering evaluations. The NRC found evidence of significant improvement in the quality of safety evaluations

over those performed during the previous SALP period. Additionally, trends were identified which indicated that continued improvement would result as procedures and training continued to be implemented.

In general, safety evaluations reviewed were sufficiently detailed to demonstrate, as stand-alone documents, the logic and basis for determinations regarding potential unreviewed safety questions. Safety evaluations were performed for all plant modifications, even those classified as non-safety related, to preclude the possibility of unexpected adverse impact on the plant. Detailed Quality Instructions have been developed and implemented after completing training to control the methodology used in completing 10 CFR 50.59 reviews and design equivalent engineering packages. The design equivalence program has been particularly effective in verifying that appropriate component substitutions are selected when current equipment is no longer available.

The procedures for controlling Temporary System Alterations are detailed and effective. Evaluations to support the alterations meet the requirements of 10 CFR 50.59 and receive numerous reviews including the Shift Technical Advisor, Technical Department Supervisor, Plant Supervisor-Nuclear and Plant Nuclear Safety Committee. The temporary alterations are audited quarterly to ensure continued validity. The level of detail included in the safety evaluations has increased over that existing during the previous assessment.

Violation i, in the Operations functional area, documents a single isolated example of the failure to perform a required Temporary System Alteration evaluation.

Violation a, in the Operations functional area, occurred, in part, due to an unacceptable safety evaluation performed on the intake cooling water. Although the problem was identified in June 1987, it should be noted that the deficient evaluation was issued in August 1986. The safety evaluation allowed brief system operation in a mode which was susceptible to single failure. Consequently, it constituted an unreviewed safety question which was not recognized by the Engineering Department. Additional reviews of safety evaluations indicate that this problem is not programmatic.

Some engineering resolutions to identified deficiencies have been resolved by administratively controlled compensatory action in the short term. Some significant plant modifications must be implemented to allow completion of long term fixes. Plans exist to install two additional emergency diesel generators on site by late 1991. This is necessary to provide additional margin for emergency loads assuming the loss of offsite power, failure of a single diesel and the initiation of a loss of coolant accident. Until this upgrade is completed, the plant must rely on portable

instrument air compressors to operate the instrument air system. The temporary compressors have been in use since 1986.

Long term compensatory action has been required to ensure that a valve with single failure deficiencies in the Intake Cooling Water system will shut under certain accident conditions. Periodic valve watches have been required since 1985. Unit 3 corrective action in mid 1987, included the installation of an automatic cleaning system for the system heat exchangers. A similar system will be functional on Unit 4 by October 1988. However, the corrective action has reduced, but not alleviated the need for the Unit 3 valve watch. On one occasion in the spring of 1988, the compensatory valve watch was found asleep at his post.

The use of non-seismic pressure gauges in engineering designs has contributed to problems described in the Operations functional area. For example, several non-seismic gauges were installed in the auxiliary feedwater (AFW) backup nitrogen system. Since the AFW nitrogen system must meet seismic requirements, the gauges were normally isolated. Several nitrogen system violations occurred when the gauges were valved in contrary to procedure. Violation m, in the Operations functional area, documents three examples of the plant personnel opening a non-seismic boric acid transfer pump discharge pressure gauge required to be shut. Non-seismic pressure gauges also exist in other safety related systems, which have had minor valve misalignments.

Violation g, listed in the Operations functional area, represents an isolated example of the failure to translate design input into operating procedures for the AFW backup nitrogen system. Modifications to the nitrogen system were performed for Unit 4 in mid 1986, and Unit 3 in the spring of 1987. The engineering packages were essentially identical. Calculations were performed to assure that the expanded nitrogen capacity allowed the requisite duration of system operation. The bases for the calculations were not fully explained in the engineering package. Consequently, design basis nitrogen usage rates were taken out of context and incorporated in AFW system surveillance procedures. This resulted in surveillance procedures with non-conservative acceptance criteria, which failed to verify full system operational capabilities.

This problem occurred because site engineering personnel were not supplied with the original calculations used by a contract organization in developing design consumption rates. A description of the consumption rates contained in the engineering package summary was too vague to supply the proper context for their inclusion in surveillance procedures as acceptance criteria.

The existence of this type of deficiency was the result of ineffective use of the licensee's system engineers. The program, which is designed to centralize knowledge of system characteristics and requirements in a single engineer, has not resulted in the identification of the kinds of concerns discussed above. An additional example includes violation a listed in the Operations functional area. The system engineer for the intake cooling water system failed to ensure that the heat exchangers were cleaned on an appropriate schedule and in the correct sequence. Additionally, although a system existed requiring detailed analysis of heat exchanger efficiencies, the engineer failed to realize that design basis assumptions were not met.

In part, this problem area existed because the system engineers did not monitor closely enough the status of their assigned systems through work order reviews, design change analyses, frequent system walkdowns and status evaluations. Consequently, identifiable problems may not be identified in a timely manner. For example, violation 1, in the Operations functional area, documents that certain intake cooling water flow meters were removed from the system without administrative justification. Although the meters were absent for many months, the system engineer did not independently pursue the discrepancy and therefore remained unaware of the problem. Also, the engineer was not aware that plant log sheets allowed an intake cooling water pump discharge pressure band which was so large that conformance with design flow rate requirements might not be possible. A new administrative procedure was implemented during this assessment period which requires the system engineer to perform regular reviews of system logs and instrumentation, and to perform periodic system walkdowns. These requirements should prevent some of the problems discussed above from occurring.

The recently completed Independent Management Appraisal concluded that problems associated with the system engineering program included; lack of management follow-up to assure effective system engineer utilization, lack of clear definition of system engineer responsibilities, lack of authority to obtain the support needed to resolve problems, and inadequate fulfillment of assigned responsibilities. The system engineers spend a large percentage of time processing paperwork instead of solving system problems.

These deficiencies have resulted in an environment in which system engineers primarily react to problems. They do not have sufficient time, nor are they directed to prevent future problems. There is little trending of performance data. Reliability engineering has not been achieved because potential system problems are not resolved before they occur.

In the spring of 1988, a new Technical Department Supervisor was appointed. A number of initiatives are being developed to

address the above concerns. These include less reliance on contractor personnel to perform system engineering functions, increased staffing to reduce the number of systems assigned to each engineer, increased training and increased supervisory involvement. While it is expected that these initiatives will have a favorable impact, it is too soon to determine whether they will ultimately be successful.

Two violations were identified:

a. Severity Level IV violation for failure to conduct modification testing as a result of an inadequate procedure. (87-41)

b. Severity Level IV violation for failure to use the proper material in intake cooling water system. (88-14)

2. Conclusion

Category: 2

3. Board Recommendations

Although improvement has been noted in the Engineering Support area, continued management attention is warranted.

V. SUPPORTING DATA AND SUMMARIES

A. Licensee Activities

At the start of the assessment period, Unit 3 was in a refueling and maintenance outage that started March 11, 1987. On September 12, 1987, the unit returned to power operations; the extended outage was caused by repair work on Raychem splices, diesel generator sequencer wiring checks and testing, and a reactor vessel O-Ring leak. Other outages included those discussed under Item J Reactor Trips, and the following non-scheduled maintenance outages: On September 25, 1988, a maintenance outage occurred to investigate and repair high vibrations on a reactor coolant pump and to repair a pressurizer spray valve. The unit remained down to repair additional items including a design deficiency with the residual heat removal recirculating piping. The unit returned to service on December 22, 1987. Additional maintenance outages occurred from March 16 to March 23, 1988, due to weld repairs to cracked moisture separator reheater baffle plates and on March 24, 1988, to repair a condenser tube leak. On March 30, 1988, the unit returned to commercial operations and remained at power through the remainder of the SALP period.

Unit 4 was in an extended maintenance outage at the start of the SALP period and did not return to service until July 8, 1987. On July 15, 1987, the unit was shut down to repair a condenser tube leak and returned to power operations on July 21, 1987. On September 6, 1987,

the unit was shut down for 576 hours to repair a damaged drain line which was causing a condenser vacuum problem. The unit operated at power until October 12, 1987, when it was shut down as a precautionary measure for a hurricane warning. The unit remained down until December 4, 1987, to repair a safety injection pump, a leaking PORV, and correct a design deficiency with the residual heat removal recirculation piping. On February 7, 1988, the unit shut down on declaring two battery charges out-of-service. While the unit was down, work was performed on a reactor coolant pump motor and control rod drive mechanism cables. The unit returned to service on February 24, 1988. On April 6, 1988, the unit was shut down for a 33 hour period to repair a turbine control oil system leak. On April 28, 1988, the unit was shut down to repair a leaking pressurizer control spray valve and remained down to repair a containment purge isolation valve. The unit returned to power operations on May 28, 1988, and remained at power through the remainder of the SALP period.

B. Inspection Activities

The routine inspection program was performed during this period, with special inspections conducted to augment the program as follows:

1. June 15-19, 1987, concerning of a series of loss of boric acid flowpath events, the status of licensed operator training, and instructor qualifications.

2. September 22 - October 25, 1987, in the areas of unauthorized dilution event and resolution of issues raised by a licensee personnel.

3. November 4-6, 1987, in the area of void formations in the Unit 4 reactor vessel upper head region during cold shutdown conditions.

4. December 7-11, 1987, in the area of safety review activities, including 10 CFR 50.59 determinations and safety review committee functions.

5. December 14-16, 1987, in the area of IE Bulletin 83-06.

6. February 22-25, 1988, in the area of Emergency Response Facility Appraisal.

C. Licensing Activities

1. NRR/Licensing Meetings

The licensee's presentations were generally well structured. The licensee was generally well prepared for meetings with the NRC staff and handled the staff's questions adequately.

A list of NRR/Licensee meetings is shown below:

Date	Purpose
June 4, 1987	Discussion of Emergency A. C. Power Enhancement
June 17-18, 1987	Discussion of TS Improvement Project
June 23, 1987	Discussion of Boraflex in Spent Fuel Pool Racks
June 22-23, 1987	Discussion of TS Improvement Project
August 26-27, 1987	Discussion of TS Improvement Project
September 2, 1987	Discussion of FP&L Electrical Transmission System
October 20-22, 1987	Discussion of TS Improvement Project
December 15-17, 1987	Discussion of TS Improvement Project
January 6, 1988	Discussion of Schedule for Technical Specification Conversion Project
January 28, 1988	Clarification of Use of Technical Specification in Control Room
February 23-26, 1988	Discussion of Technical Specification Improvement Project
March 15, 1988	Discussion of ICW/CCW TS and Operability of CCW Heat Exchangers
March 28-31, 1988	Discussion of Technical Specification Improvement Project (Electrical)
May 18, 1988	Discussion of Improvements to Integrated Schedule
June 2, 1988	Discussion of Seismic Adequacy of Components (Generic Letter 87-02)

2. Commission Meetings - None

3. Schedular Extension Granted - None

4. Reliefs Granted

June 15, 1987	Relief Request No. 16 - Relief From Visual (UT-2) Examination (Unit 3)
March 28, 1988	Relief Request No. 17 - Relief From Visual (UT-2) Examination (Unit 3)

5. Exemptions Granted

August 12, 1987	Technical Exemption from 10 CFR 50, Appendix R Requirements

6. Emergency or Exigent Technical Specifications Issued

April 29, 1988	Exigent Technical Specification to the Component Cooling Water System.

7. Discretionary Enforcement

December 31, 1987	Discretionary enforcement granted for a 24 hour extension of TS 3.4.5.a concerning ICW pump operation.
January 15, 1988	Discretionary enforcement granted for TS Chapter 6, figure 6.2-2 concerning the requirement for the Operation Superintendent to hold an SRO license.
February 24, 1988	Discretionary enforcement granted for a 24 hour extension of TS 3.0.1 concerning the recalibration of the steam generator instrument channels.

8. License Amendments Issued

Amendment Numbers

Unit 3	Unit 4	Description	Date
124	118	Revise the TS for the auxiliary feedwater system and the condensate storage tanks	06/08/87
125	119	Incorporate TS for reactor vessel level monitoring system	07/28/87
126	120	Integrated Scheduling	11/23/87
127	121	Revise the TS for the D.C. power source	04/18/88
128	122	Delete remaining Sections 1.0 and 5.0 of the environmental TS and replace it with an Environmental Protection Plan	04/25/88

129	123	Organization changes per Generic Letter 88-06	04/28/88
130	124	Revise the TS for the component cooling water system	04/29/88

D. Investigation Review

An investigation was conducted on the events surrounding the manipulation of reactor controls by a non-licensed person.

E. Escalated Enforcement Actions

1. Civil Penalties

a. A Notice of Violation (Severity Level III, Supplement I), and a Proposed Imposition of Civil Penalty (EA 87-97) for $100,000 were issued on July 21, 1987, for failure to adequately evaluate and correct a reactor coolant leak and failure to assure the required prerequisites were met prior to commencing core alterations. This violation, although issued during the current SALP period, was addressed in the previous SALP.

b. Three Notices of Violation (Severity Level III, Supplement I) and a Proposed Imposition of Civil Penalty (EA 87-85) for a total of $225,000 were issued on October 18, 1987, for the following: 1) failure to adequately establish or implement procedures to assure configuration control over the safety-related emergency boration system; 2) failure to meet the Technical Specification requirement for maintaining auxiliary feedwater system for Unit 4 operable; and 3) operation of the intake cooling water system outside the plant design basis. These violations, although issued during the current SALP period, were addressed in the previous SALP.

c. Two Notices of Violation (Severity Level III, Supplement III) and a Proposed Imposition of Civil Penalty (EA 87-98) for a total of $100,000 were issued on July 28, 1987, for failure to maintain access control and to conduct adequate vehicle search. The licensee's request for mitigation of the Severity Level and Civil Penalty resulted in the Civil Penalty being mitigated on November 5, 1987, to $75,000. These violations, although issued during the current SALP period, were addressed in the previous SALP analysis.

d. Two Notices of Violation (Severity Level III, Supplement III) and a Proposed Imposition of Civil Penalty (EA 87-179) for $150,000 were issued on February 11, 1988, for failure to maintain positive access control (six examples) and failure to protect safeguards information.

2. Orders

An order imposing the licensee's commitments to have an independent review of management and operational activities, and an assessment of required changes was issued on October 19, 1987.

F. Licensee Conferences Held During Appraisal Period

1. June 5, 1987, Enforcement Conference to discuss the following issues: inadequate protected and vital area access control; emergency diesel generator sequencer wiring errors; failure to establish containment integrity during core alterations; and inadequate safety evaluation of the conoseal leakage.

2. June 24, 1987, Working level discussions on Turkey Point's Performance Enhancement Program (PEP).

3. July 29, 1987, Enforcement Conference to discuss the loss of boric acid flowpath and auxiliary feedwater system inoperability due to isolation of the safety-related nitrogen supply.

4. July 30, 1987, Quarterly Performance Enhancement Program management meeting.

5. July 30, 1987, Management meeting to discuss SALP assessment.

6. October 28, 1987, Enforcement Conference to discuss security issues.

7. November 18, 1987, Management meeting to discuss the initial independent audit plan.

8. November 24, 1987, Management meeting to discuss the Independent Management Appraisal Plan and the Management-on-Shift Program (MOS).

9. December 21, 1987, Management meeting to discuss the Independent Management Appraisal, Management-on-Shift Program, SALP category 3 areas, and an Enforcement Conference on security issues.

10. January 25, 1988, Management meeting to discuss the Independent Management Appraisal Plan, MOS, and the Performance Enhancement Program status.

11. March 2, 1988, Management meeting to discuss the Independent Management Appraisal Plan and the MOS Program.

12. April 21, 1988, Enforcement Conference to discuss emergency preparedness issues.

13. April 22, 1988, Management meeting to discuss the MOS Program and SALP category 3 areas.

14. June 10, 1988, Management meeting to discuss the Independent Management Appraisal, MOS Program and Performance Enhancement Program status.

G. Confirmation of Action Letters (CALs)

CAL 50-250,251/87-01 issued on October 6, 1987, requiring that a specific reactor operator not assume his normal duties without NRC approval.

H. Licensee Event Report Analysis

During the assessment period, 51 LERs for Units 3 and 4 were analyzed by the NRC staff. The distribution of these events by cause, as determined by the NRC staff, was as follows:

Cause	Unit 3	Unit 4	Total
Component Failure	5	9	14
Design	1	2	3
Construction, Fabrication, or Installation	-	1	1
Personnel			
- Operating Activity	6	4	10
- Maintenance Activity	4	4	8
- Test/Calibration Activity	5	5	10
- Other	1	1	2
Out of Calibration	-	-	-
Other	2	1	3
TOTAL	24	27	51

I. Enforcement Activity

UNIT SUMMARY

FUNCTIONAL AREA	NO. OF DEVIATIONS AND VIOLATIONS IN EACH SEVERITY LEVEL					
	D	V	IV	III	II	I
UNIT NO. -	3/4	3/4	3/4	3/4	3/4	3/4
Plant Operations		3/3	5/7	3/2		
Radiological Controls			3/3			
Maintenance			2/3			
Surveillance		3/2	0/1			
Fire Protection			1/1			
Emergency Preparedness			2/2			
Security and Safegurads			5/5	2/2		
Outages						
Quality Programs and Administrative Controls Affecting Quality			1/1			
Licensing Activities						
Training						
Engineering Support			2/2			
TOTAL		6/5	21/25	5/4		

FACILITY SUMMARY

FUNCTIONAL AREA	No. OF DEVIATIONS AND VIOLATIONS IN EACH SEVERITY LEVEL					
	D	V	IV	III	II	I
Plant Operations		3	7	3		
Radiological Controls			3			
Maintenance			3			
Surveillance		3	1			
Fire Protection			1			
Emergency Preparedness			2			
Security and Safeguards			5	2		
Outages						
Quality Programs and Administrative Controls Affecting Quality			1			
Training and Qualifications						
Licensing						
Engineering Support			2			
Total		6	25	5		

J. Reactor Trip

Four unplanned reactor trips and three manual shutdowns occurred during this evaluation period for Unit 3. Unit 4 sustained six manual shutdowns. The unplanned trips and shutdowns are listed below.

1. Unit 3

   a. September 13, 1987, Safety injection actuated and the reactor tripped from five percent power due to failed high steam flow channels and personnel errors while performing a turbine generator overspeed trip test.

   b. September 25, 1987, the unit was manually shut down from power operations due to high vibration on a reactor coolant pump.

   c. December 25, 1987, while attempting a controlled shutdown, the reactor tripped from subcritical conditions when a source range detector, which had been taken out of service without bypassing its trip signal, spuriously energized above its setpoint. Insufficient procedural guidance was cited as a primary cause, with circuitry problems as a contributing cause.

   d. December 29, 1987, the reactor was manually tripped from approximately 70% power due to contact failures in the turbine overspeed protection relay and the resultant loss of turbine load.

   f. January 13, 1988, the unit experienced a turbine runback from 100% power and a subsequent manual reactor trip due to dropped control rod assemblies.

   g. March 16, 1988, the unit was shut down to repair a weld crack on moisture separator reheater baffle plates.

   h. March 24, 1988, the unit was shut down from approximately 30% power due to a condenser tube leak.

2. Unit 4

   a. July 17, 1987, the unit was shut down to hot standby to comply with Technical Specification requirements due to a steam supply leak in the auxiliary feedwater system.

   b. September 6, 1987, the unit was shut down due to losing vacuum as a result of a bearing drain failures on the main feedwater pump.

c. October 12, 1987, the unit was shut down as a precautionary measure for a hurricane warning.

d. February 7, 1988, the unit was shut down from 100% power due to exceeding the Technical Specification action statement for inoperable battery chargers.

e. April 6, 1988, the unit was shut down to investigate and repair a leak in the turbine control oil system.

f. April 28, 1988 the unit was shut down due to increased RCS leakage (3.2 gpm) caused by a pressurizer spray valve bellows rupture.

K. Radioactive Effluent Releases (Ci/YR)

Activity Released (Curies)	1985	1986	1987
1. Gaseous Effluents			
Fission and Activation Gases	3.12	4.65	1.70
Sodiums and Particulates	0.015	0.023	0.025
Tritium	310	593	820
2. Liquid Effluents			
Fission and Activation Products	0.9	0.506	0.75
Tritium	869	727	540
3. Personnel Contaminations			
a. Turkey Point	---	---	437
b. Region II PWR Average	---	---	306
4. Contaminated Area (ft^2)			
a. Turkey Point	---	---	23,821
b. Region II	---	---	16,023
5. Collective Dose (Man-rem)			
a. Turkey Point	---	---	645
b. Region II PWR Average	---	---	390
6. Solid Rad Waste (ft^3)			
a. Turkey Point	---	---	4,300
b. Region II PWR Average	---	---	14,497