ENCLOSURE

SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBER

50-280, 281/89-16

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY UNITS 1 AND 2

MAY 1, 1988 THROUGH JUNE 30, 1989

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated NRC staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance on the basis of this information. The SALP program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocation of NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC assessment of their facility's performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on August 30, 1989, to review the observations and data on performance and to assess licensee performance in accordance with Chapter NRC-0516, "Systematic Assessment of Licensee Performance." The guidance and evaluation criteria are summarized in Section III of this report. The Board's findings and recommendations were forwarded to the NRC Regional Administrator for approval and issuance.

This report is the NRC's assessment of the licensee's safety performance at Surry for the period May 1, 1988, through June 30, 1989.

The SALP Board for Surry Units 1 and 2 was composed of:

L. Reyes, Director, Division of Reactor Projects (DRP), Region II (RII) (Chairman)
E. Merschoff, Deputy Director, Division of Reactor Safety (DRS), RII
J. Stohr, Director, Division of Radiation Safety and Safeguards (DRSS), RII
M. Sinkule, Chief, Reactor Projects Branch 2, DRP, RII
H. Berkow, Director, Project Directorate II-2, Office of Nuclear Reactor Regulation (NRR)
W. Holland, Senior Resident Inspector, Surry, DRP, RII

Attendees at SALP Board Meeting:

B. Grimes, Acting Deputy Regional Administrator, RII
P. Fredrickson, Chief, Project Section 2A, DRP, RII
S. Shaeffer, Project Engineer, Project Section 2A, DRP, RII
G. Wiseman, Reactor Engineer, Technical Support Staff, DRP, RII
W. Scott, Senior Operations Engineer, Performance and Quality Evaluation Branch, NRR
D. Roberts, Intern, NRR

A. Licensee Activities

Unit 1 began the assessment period in day 22 of a scheduled refueling/ maintenance outage. The outage extended much longer than scheduled, and

the unit did not return to power operation until the middle of July 1988. With the exception of one automatic reactor trip in August 1988, the unit operated at power until the middle of September 1988, when it was shut down due to concerns about the operability of the emergency diesel generators. The outage lasted from September 14, 1988, through the end of the assessment period. However, Unit 1 was preparing to return to power operation when the assessment period ended and was operating at power on July 7, 1989.

Unit 2 began the assessment period at power. The unit experienced an automatic reactor trip in May 1988, and remained shut down for repairs for the next five weeks, returning to power operation in the latter part of June 1988. The unit operated at power until September 10, 1988 when, during shutdown operations for a scheduled refueling/maintenance outage, it tripped from approximately four percent power. The refueling outage lasted longer than originally scheduled due to the parallel outage on Unit 1 and identification of significant safety issues which had to be resolved for both units prior to restart. Unit 2 remained in cold shutdown at the end of the assessment period while corrective actions that were required prior to unit restart were being completed.

As indicated by the duration of the unit outages, significant safety problems were identified which required extensive corrective actions. Some of the problems related to a lack of procedural guidance in the performance of operations, radiological controls, maintenance, and testing; lack of cleanliness affecting safety-related systems; inadequate identification and root cause resolution of significant conditions adverse to quality; and a lack of proper planning and requiring accountability for lower level supervision and craft in the performance of daily work. After significant safety issues associated with the original design of plant systems became known, the licensee augmented the station staff with additional management and engineering resources during the fall of 1988. Additional management changes and reorganizations continued to be made at both the station and in the corporate offices well into the assessment period.

Management and/or organization changes instituted by the licensee during the assessment period included:

September 1988	New Vice President-Nuclear Operations
November 1988	New Station Manager - Surry Plant
December 1988	New Health Physics Superintendent - Surry Plant
January 1989	Reorganization of the engineering organization. New Superintendent of Engineering position created and assigned to both Surry and North Anna
February 1989	New Assistant Station Manager-Operations and Maintenance - Surry Plant

February 1989	New Operations Superintendent - Surry Plant
March 1989	Reorganization of the corporate organization to specifically focus appropriate resources on the nuclear program. Changes included creation of a Senior Vice President-Nuclear position, a Vice President-Nuclear Services position, a Vice President-Nuclear Engineering position, and an Assistant Vice President-Nuclear Operations. These changes also affected several management positions in the corporate offices including selection of a new Quality Assurance Manager.
April 1989	New President and Chief Executive Officer
June 1989	New Vice President-Nuclear Services (position created in March 1989 restructure.)

B. Direct Inspection and Review Activities

During the assessment period, routine inspections were performed at the Surry facility by the resident and regional staffs. From May through December 1988, 36 inspections were conducted including an Augmented Inspection Team (AIT) inspection of the reactor cavity seal leakage event on Unit 1, a Safety System Functional Inspection (SSFI) of the service water system in September 1988, and special inspections associated with the increased radiological protection area monitoring, which was instituted due to problems identified during the last assessment period. From January through June 1989, 19 inspections were conducted. Several of these inspections were special inspections associated with technical problem areas identified during the licensee's Operational Readiness Assurance Program (ORAP), which was implemented in January 1989. Seven management meetings, four technical meetings and three Enforcement Conferences were also conducted.

The following is a listing of specific special inspections:

June 20-24, 1988; inspection to review environmental qualification and Generic Letter 83-28 implementation.

September 1-3, 1988, AIT inspection to review the reactor cavity seal leakage event.

September 12-16, 26-30, and November 14-18, 1988; SSFI inspection of the service water and recirculation spray systems.

October 3-7 and 9-14, 1988; inspection to review reactor cavity seal modifications and corrective actions.

January 23-27 and February 1-2, 1989; inspections to followup on motor operated valve (MOV) and electrical termination issues.

March 27 - April 4, 1989; inspection on motor operated valve (MOV) issues.

April 10-14 and May 10-12, 1989; inspection for followup on electrical issues.

May 1-5, 1989; inspection for followup on SSFI issues.

June 5-9, 1989; inspection for followup on MOV program implementation.

II. SUMMARY OF RESULTS

Surry operated with mixed performance during the assessment period. Performance during the first half of the assessment period was poor overall, but improved significantly toward the end of the period. Major weaknesses were identified in the areas of Plant Operations, Radiological Controls, Maintenance/Surveillance, Emergency Preparedness and Safety Assessment/Quality Verification. A major strength was identified in the Security area.

There was considerable activity in the Plant Operations area, though the units operated for only a few months. Operator inattention to detail, combined with inadequate management overview, contributed to several events early in the assessment period. Although management reaction was evident for many of these events, root cause corrective action did not occur until late in the assessment period. A comprehensive ORAP was developed for the restart of the units, but was initiated only after several significant events necessitated some form of management action. An additional problem, early in the period, was the tendency of operators to tolerate equipment problems and work around them, rather than insisting on repair or replacement. Toward the end of the period, many of the operations problems were in the process of being corrected. Use of the ORAP provided effective means to identify, evaluate and correct deficiencies. Several plant management changes also contributed to improvement late in the assessment period; and, both management and the operations staff displayed an increased awareness toward attention to detail, performance expectations and plant safety responsibilities.

The Radiological Controls functional area had not improved significantly from the previous assessment period. Early in the period, an exposure-related event occurred resulting in escalated enforcement action. This event and several other violations were directly attributed to inadequate performance by the radiation protection staff. During the last half of the assessment period, the licensee began to more closely monitor work activities for person-rem exposure and personnel contaminations. The

amount of contaminated area was reduced, but was still considered high. Although the number of personnel contaminations and the collective dose were also high, a decreasing trend was noted in the number of personnel contaminations toward the end of the assessment period. Health physics (HP) management changes and the development of a radiological engineering capability resulted in improvement in this area.

Performance in the Maintenance/Surveillance functional area decreased since the last assessment period. A large maintenance backlog existed during the period and the preventive maintenance (PM) program needed improvement, as evidenced by several large-scale equipment problems. In addition, the lack of a formal check valve maintenance program and an ineffective maintenance root cause and trending program revealed a deficiency in the ability to correct long-standing problems. Procedures were also a weakness in this functional area as was post-maintenance testing. The deficient MOV maintenance program was an example where all of the specific types of problems identified in this functional area occurred, clearly indicating a significant programmatic deficiency. Toward the end of the assessment period, though, an aggressive MOV rework program was well underway. Surveillances were generally performed in the required time frame, but major problems involving emergency service water pump and control room chiller surveillance testing revealed some significant deficiencies. A surveillance strength, though, was the maintenance predictive analysis feedback into the surveillance program.

Weaknesses were observed in the Emergency Preparedness (EP) area during the 1988 annual emergency exercise and during NRC inspections. Event classification and the augmentation timeliness of personnel at emergency response facilities were significant problem areas. A remedial drill corrected the classification problem, but an overall improvement in augmentation timeliness was not demonstrated. Some EP program strengths were noted during the last EP inspection conducted during the period. As a result of the problems observed in the EP area, the licensee has categorized specific areas for followup analysis and corrective action as appropriate to improve the overall EP program.

With respect to the Security functional area, the licensee provided excellent support within the requirements of its approved plan. One weakness was the timeliness of security equipment repair; a problem which revealed that better coordination of activities between security and maintenance was needed. The security force had minimal turnover and was well trained and supervised. Procedures were clearly written and training was thorough.

Early in the assessment period, within the Engineering/Technical Support functional area, poor performance was demonstrated by the engineering department, through its failure to correctly determine the design basis adequacy of the service water system. Also early in the period, engineering MOV reviews were inadequate, contributing to the significant

MOV problem. An engineering self-assessment capability was lacking during the assessment period, as evidenced by a large backlog of engineering problems and the inadequate safety assessment of several issues. Engineering Work Request (EWR) problems revealed a deficiency with training of the engineering staff and also deficiencies in EWR procedure quality. Engineering support to the equipment qualification (EQ) and non-destructive examination (NDE) program was good. Engineering involvement in the ORAP, in an MOV task team, and in the initiation of a Design Basis Documentation program represented a significant engineering effort later in the assessment period. In addition, the formation of a systems engineering group and a design engineering group on site provides the potential for improvement. Training, overall, continued to be a strong area, with licensed operator training being very effective. Training facilities and high quality instructors were also positive assets, especially during the latter part of the period.

Within the Safety Assessment/Quality Verification functional area, the licensee failed to take appropriate corrective actions in numerous instances such as the reactor cavity seal leak event, foreign material/cleanliness problems, potential gas binding of safety-related pumps, a degraded ventilation system, and a leaking safety-related pump enclosure. Early in the assessment period, the licensee did not demonstrate an adequate safety assessment capability, which contributed to several events. Root cause analysis was also identified as being ineffective. Other problems identified in this functional area involved not tracking regulatory commitments and the independent review group not meeting its regulatory review responsibilities. The above noted deficiencies occurred primarily during the first part of the assessment period. Toward the end of the period, management sensitivity increased and corrective action became more thorough, safety assessment improved and the licensee also began to improve the root cause analysis effort. With respect to licensing activities, submittals were of good quality and timely. Although the major problem areas were not identified through the quality assurance (QA) program, the QA organization began to improve its problem identification capability late in the assessment period.

Overview

Functional Area	Rating Last Period	Rating This Period
Plant Operations (Operations/Fire Protection)	2/2	3 Improving
Radiological Controls	2 Declining	3 Improving
Maintenance/Surveillance	2/2	3
Emergency Preparedness	2	3
Security	2	1
Engineering/Technical Support (Engineering/Training/Outages)	NR/1/2	2
Safety Assessment/ Quality Verification (Quality Programs /Licensing)	2/1	3 Improving

NR - Not Rated

III. CRITERIA

Licensee performance is assessed in selected functional areas depending on whether the facility is in the construction or operational phase. Functional areas normally represent areas significant to nuclear safety and the environment. Some functional areas may not be assessed because of little or no licensee activity, or lack of meaningful observations. Special areas may be added to highlight significant observations.

The following evaluation criteria were used, as applicable, to assess each functional area:

1. Assurance of quality, including management involvement and control;

2. Approach to the resolution of technical issues from a safety standpoint;

3. Responsiveness to NRC initiatives;

4. Enforcement history;

5. Operational and construction events (including response to, analysis of, reporting of, and corrective actions for);

6. Staffing (including management); and

7. Effectiveness of training and qualification program.

However, the NRC is not limited to these criteria and others may have been used as appropriate.

On the basis of the NRC assessment, each functional area evaluated is rated according to one of three performance categories. The definitions of these performance categories is as follows:

1. Category 1: Licensee management attention and involvement are readily evident and place emphasis on superior performance of nuclear safety or safeguards activities, with the resulting performance substantially exceeding regulatory requirements. Licensee resourses are ample and effectively used so that a high level of plant and personnel performance is being achieved. Reduced NRC attention may be appropriate.

2. Category 2: Licensee management attention to and involvement in the performance of nuclear safety or safeguards activities are good. The licensee has attained a level of performance above that needed to meet regulatory requirements. Licensee resources are adequate and reasonably allocated so that good plant and personnel performance is being achieved. NRC attention may be maintained at normal levels.

3. Category 3: Licensee management attention to and involvement in the performance of nuclear safety or safeguards activities are not sufficient. The licensee's performance does not significantly exceed that needed to meet minimal regulatory requirements. Licensee resources appear to be strained or not effectively used. NRC attention should be increased above normal levels.

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 and the licensee had not taken meaningful steps to address this pattern.

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

During the assessment period, inspections of plant operations were performed by the resident and regional staffs. Also, an AIT inspection was conducted in September 1988, to review the event associated with a loss of reactor cavity water level during the refueling of Unit 1 in May 1988.

Performance in this functional area was mixed over the assessment period. Early in the assessment period, proper management involvement and control at both the site and corporate levels were not evident. Approach to resolution of technical issues from a safety standpoint was inconsistent, enforcement history was indicative of programmatic problems, and operational events occurred which were poorly identified and marginally analyzed. After identification of several problem areas by both the NRC and the licensee, a number of management changes were made at the station.

During the assessment period, Unit 1 operated at power for two months and Unit 2 operated at power for three and one-half months with Unit 1 experiencing one automatic reactor trip, and Unit 2 experiencing two automatic reactor trips. The three automatic trips in a six month period of operation was considered high. All trips were caused by equipment failures. Both units were shut down in early September 1988; Unit 1 for a forced maintenance outage, and Unit 2

for a scheduled refueling outage. Neither unit had returned to power operations by the end of the assessment period. The long outages were not attributable to the operations department's performance; however, the long downtime appeared to have a detrimental effect on operator alertness and attention to detail. Examples of operator inattention to detail during the outage included improper operation of containment isolation valves, problems with valve alignments, tagging problems, and improper pump(s) operation.

Early in the assessment period, the lack of proper management overview resulted in an inadequate evaluation of the May 1988, Unit 1 reactor cavity seal event. Operator actions to recover cavity level during this event were improper. These deficiencies resulted in a Severity Level III violation with a Civil Penalty. Inadequate management overview was also noted during the return to power of Unit 1 in July 1988, following an extended refueling outage. That occurrence involved initial direction by station senior management to continue with a plant heatup while the unit was in a Limiting Condition for Operation (LCO) which required that the unit return to cold shutdown.

Management changes made during the assessment period included the Station Manager (November 1988), the Assistant Station Manager for Operations and Maintenance (February 1989), and the Operations Superintendent (February 1989). These changes resulted in improved sensitivity to safety and a positive attitude towards the proper conduct of nuclear power plant operations. This new sensitivity and attitude were observed during safety committee meetings, Unit 1 readiness restart assessment meetings and restart action item closeout meetings during the latter part of the assessment period. In addition to the management changes discussed previously, another factor affecting the operation of the station after both units were shut down was the lack of clear direction and appropriate scheduling of corrective actions. These actions were necessary to resolve significant issues that had been identified which affected several safety systems. After identification of incorrectly wired (wrong train) safety-related valves in December 1988, the licensee proposed a comprehensive ORAP which provided for an appropriate direction of the activities needed to be accomplished prior to either units' restart.

One of the positive actions taken was the implementation of a plant status log for each unit. At the end of the assessment period, the initial indications were that this configuration control program had a positive impact on the safe operation of each unit. Some examples were that the control boards were not cluttered with different tags and information notes and the plant status logs provided a single location for information relating to work requests, operator aid notes and component tagout status.

Staffing levels were adequate. The operations department continued to run with five operating shifts. The operations department averaged between 20 and 30 percent overtime, and early in the period some backshifts were staffed with only two Senior Reactor Operators (SRO) (minimum Technical Specifications (TS) requirement). It should be noted that, at the end of the assessment period, the operating shifts had a minimum of three SROs assigned to each shift which was considered as an enhancement in technical and supervisory shift capability.

At the end of the previous assessment period and continuing into this assessment period, operating procedures were identified as requiring improvement. During the early part of this assessment period, almost every procedure in use by the operations department had one or more temporary changes implemented. This condition placed additional burdens on the operators in the performance of their duties. The licensee acknowledged the poor condition of procedures and initiated a program that involves the implementation of a uniform method for procedure writing (Procedures Writers Guide). The licensee also outlined a three-year schedule commencing in 1989 which will generally upgrade station technical procedures in the operations and maintenance areas to the new enhanced format. At the end of the assessment period, the licensee had upgraded approximately 50 procedures. However, the procedures, which were used for the Unit 1 restart were not upgraded. These procedures had been reviewed and considered adequate for unit startup. Based on a population of approximately 2500 procedures to be reviewed for upgrade program completion, the three-year schedule appeared to be optimistic.

During the early part of 1989, several operational errors occurred, including improper operation of containment isolation valves, improper valve alignment resulting in flooding of the Unit 2 cavity area, operation of a charging pump without a suction flowpath, and operation of a containment vacuum pump with the suction flowpath blocked. These errors resulted in a violation for failure to follow procedures and for inadequate procedures. Another operational occurrence that resulted in a violation was a loss of shutdown cooling to Unit 1 in March 1989. This problem again indicated inadequate operator control of a required system. Although each of the occurrences resulted from either an inadequate procedure or a failure of operations personnel to maintain cognizance of system configuration, the more underlying cause was a lack of personal responsibility for attention to detail. Management was involved after each event, providing direction to correct the problems. However, management sensitivity towards proper operation of the station and expectations regarding attention to detail and plant ownership were not evident until the latter half of the assessment period.

Early in the assessment period, the operations department tolerated malfunctioning equipment and often took compensatory measures to work around problems rather than have them corrected. This was evidenced by the continuing problems associated with inadequate service water to operating control room chillers and the acceptance and lack of repair of inoperable radiation monitoring equipment for long periods of time. However, near the end of the assessment period, the operations staff was requiring more accountability and performance of the operations support departments with operators being held accountable for identification of problems affecting operational readiness.

The licensee continued to upgrade the drawings which were needed by operations personnel in the performance of their daily duties and in emergency conditions. Both units' flow diagrams were being converted to the computer assisted drawing system (CADS) in order to ease updating. Several NRC reviews of the control room drawings identified few discrepancies which would affect the capability of the operators to handle events. Also, during conduct of the ORAP for Unit 1, the flow drawings were used by the system engineers to walk down the systems addressed in the emergency procedures for Unit 1. During these walkdowns, no significant problems were identified. At the end of the period, the review process was still ongoing and the licensee was continuing to update and correct minor discrepancies.

The operations department identified several discrepancies in the program associated with establishing and maintaining isolation tagouts over the long outages. Although additional management attention was given to this area, a comprehensive solution to correction of identified problems was not evident. At the end of the assessment period, the licensee was in the process of converting to a computerized tagout program to help improve this area. Based on a limited review, implementation of this program should improve tagout control.

The review of the fire protection program implementing procedures, surveillance procedures, test results, fire fighting equipment and fire detection systems demonstrated that plant fire protection features were in service and functional. The control of combustibles and general housekeeping in safety-related areas were found to be training and drills for the fire brigade members met frequency requirements specified by the fire protection program implementing procedures. The effectiveness of fire brigade training was demonstrated during an unannounced drill observed by the NRC staff. In addition, NRC inspectors observed satisfactory fire brigade performance during a response to two minor fire events. The fires were extinguished immediately and resulted in no damage to plant equipment or injury to plant personnel.

One Severity Level III violation and two additional violations were identified during the assessment period.

2. Performance Rating

Category: 3

Trend: Improving

3. Board Recommendations

The procedures upgrade program should be considered a high priority issue and it's progress should be monitored to assure timely completion. Management needs to assure that the operations staff does not accept conduct of plant operations with poorly performing equipment. The Board recognizes that later in the assessment period, past problems were being addressed. The high level of inspection effort should continue in this area.

B. Radiological Controls

1. Analysis

During the assessment period, inspections were performed by the resident and regional staffs. The inspections included six radiation protection inspections and one radiological effluents and chemistry inspection. Radiation protection inspections were increased as a result of the previous assessment which concluded that Surry's radiation protection program was degrading.

The licensee's radiation protection, radwaste and chemistry staffing levels were adequate. In the middle of the assessment period, a new Radiation Protection Superintendent was named. Also, the licensee recruited a radiological assessor to provide internal assessment of the radiation protection program. In response to below average resolution of technical issues reported in the previous assessment report, and to remedy the weaknesses identified, the licensee developed a radiological engineering capability within the radiation protection group by adding a staff of seven radiological engineers.

The performance of the HP staff, in the early part of the assessment period, in support of routine and outage operations was poor. Eleven of the fourteen violations of NRC regulations that occurred during this assessment period could be attributed directly to inadequate performance by radiation protection department personnel. Five violations of NRC regulations involved requirements for controlling personnel radiation exposure. Four violations of NRC regulations involved either the failure to follow approved procedures or inadequate procedures. In addition, the inability to adequately control personnel exposure continued from the previous assessment

period. Early in this assessment period, a person performing cleaning and inspection of the reactor vessel flange received 3.279 rem in one calendar quarter. This overexposure resulted in multiple violations characterized as a Severity Level III problem, and the issuance of a Civil Penalty.

As a result of the unsatisfactory performance during the early part of the assessment period, the licensee performed an evaluation of their radiation protection program and identified the following corrective actions to address the programmatic weaknesses: 1) increased management involvement and control of pre-job preparations and assessments; 2) management emphasis on accelerating the implementation of the Corporate Radiation Protection Plan, including issuing revised radiological control procedures; 3) provision for additional experience in and proper management of the radiation protection group, as well as adequate radiological engineering expertise onsite; 4) training and department meetings to review and emphasize procedural compliance; and 5) a program to enhance overall procedure quality.

The licensee presented a formal improvement program to the NRC in July 1988. New initiatives for accountability of performance implemented by the Plant Manager and the Radiation Protection Superintendent have resulted in improved performance by both HP supervisors and technicians. However, throughout and subsequent to the end of the assessment period, problems were observed in station workers' compliance with HP requirements. Since identification of the programmatic improvements, both units have been in extended maintenance/refueling outages. During these outage periods, significant work requiring HP support was accomplished. Although the licensee did not achieve the reduction in person-rem exposure that could be expected if both units were operating, the licensee did closely monitor each job for person-rem exposure and also closely monitored the personnel contaminations. Reviews of the licensee's As Low As Reasonably Achievable (ALARA) program revealed that all items identified as problems during a team inspection conducted in the previous assessment period had been closed. As a result of the corrective actions taken by the licensee in response to the ALARA team inspection, the most significant ALARA program improvement was the management of collective dose at the station. During the previous assessment period, the licensee managed dose by utilizing a daily collective dose average which was based on previous routine and outage days. The licensee improved the daily management of collective dose by basing the goals on specific ALARA reviews and dose projections.

At the beginning of the assessment period, the licensee had 24,075 square feet (ft^2) of contaminated area, which represented 27 percent of the radiologically controlled area of the plant. By the end of

the assessment period, this area was reduced to 17,524 ft^2, (19 percent), which was under the licensee's goal of 17,792 ft^2 for 1989. Although the reduction in contaminated area is significant and can be attributed to increased management support for decontamination of controlled areas, and the recoating of large portions of the controlled areas with epoxy, Surry's contaminated area was still high.

During the assessment period, the licensee recorded 394 personnel contamination events. This was a downward trend and is attributed to the decontamination effort and increased management attention in this area.

The station's 1989 collective dose goal was established at 502 person-rem. By the end of the assessment period, the licensee had accumulated 435 person-rem towards this goal. During this assessment period, Unit 1 experienced 259 outage days while Unit 2 experienced 263 outage days. The collective dose during this period was 1938 person-rem. The cumulative exposure for the amount of outage time was not considered to be excessive.

During the assessment period, the licensee began construction of a new radwaste processing facility, which was designed using the latest ALARA concepts and waste reduction technology.

In the past several assessment period, there continued to be a significant decreasing trend in total curies released via the liquid release pathway. This was partially attributable to improvement in radioactive waste processing and extended plant shutdowns during the period. Liquid and gaseous effluents for the period were within the dose limits specified in 40 CFR 190, 10 CFR 50, Appendix I ALARA Criteria, and the radioactive concentrations specified in 10 CFR 20. No unplanned releases were reported during the assessment period.

In the liquid and gaseous effluent monitoring program, there has been an apparent lack of management attention, in that the licensee has been in several continuous Technical Specification ACTION statements. Examples of this are the inoperability of the component cooling water effluent line monitor and the waste gas holdup system oxygen monitor. Compliance has relied totally on compensatory measures. At the end of the assessment period, the licensee was actively pursuing redesign of these monitors.

A radiological confirmatory measurements comparison continued to show good agreement between NRC and licensee measurements.

One Severity Level III problem, composed of eight violations, and six additional violations were identified during the assessment period.

2. Performance Rating

Category: 3

Trend: Improving

3. Board Recommendations

Positive management initiatives are necessary to assure continued reduction of cumulative exposure, to ensure that working level personnel understand the importance of adherence to HP procedures and to expeditiously repair radiation monitors needed for plant operations. The Board recognizes that the construction of a new modern radwaste facility, a decrease in the number of personnel contamination events and a downward dose trend are positive indicators of your radiological control effort. Based on the overall assessment, the Board recommends a continued high level of inspection activity.

C. Maintenance/Surveillance

1. Analysis

During this assessment period, routine and special inspections were performed by the NRC staff. Significant inspection findings in this area were identified in an SSFI inspection of the service water system, an AIT inspection of the reactor cavity seal event and several MOV inspections.

The maintenance staffing levels appeared adequate, with minimal turnover rate. The overtime rate was relatively high due to the extended outages, even though a significant number of contractors were used to augment the normal station staff. The maintenance department was expanded to include an engineering supervisor, who is responsible for the predictive analysis group, the PM program, the MOV coordinator, and the maintenance engineers.

The overall material condition of the plant improved during this period, primarily due to identified problems driving a more thorough maintenance approach. For example, the main control room envelope chillers and instrument air compressors were overhauled after being allowed to degrade to a point where they would not have performed as required.

The licensee did not routinely use maintenance-specific performance indicators to evaluate the effectiveness of the maintenance department. For example, the licensee did not identify and trend rework and/or mean time to return equipment to service for management review and evaluation. The average age of corrective maintenance work requests was approximately 200 days. Although this figure was

elevated by a significant number of minor work requests, it did indicate that a substantial amount of backlog work remained. Examples of these minor work requests were leakage reduction work orders, valve packing upgrades, and replacement of Grinnel valve diaphragms due to the age of the material. Management involvement was evident regarding temporary modifications (i.e. jumpers, lifted leads), with adequate emphasis placed on removal of those jumpers necessary to return safety equipment to service. PM comprised approximately 25 percent of the total maintenance effort. The deferral rate of scheduled PM work averaged approximately 20 percent. Although this was an improvement over previous assessment periods, continued improvement was needed, as evidenced by the extensive MOV problems and the failure to implement PM requirements specified for the diesel driven emergency service water pumps.

The licensee was ineffective in implementing adequate programs to correct long-standing problems. For example, the PM program was scattered throughout several disciplines, with no method to monitor effectiveness. Also, the licensee did not have a formal check valve maintenance program in place, even though a need for this type program was identified as a major weakness following the 1986 feedwater pipe rupture event. In addition, at the end of the assessment period, the licensee was developing a formal maintenance root cause and trending program in response to numerous audit and NRC concerns identified during the last assessment period. This programmatic problem was discussed in the last assessment period. Management was aware of this shortcoming and initiated efforts to improve. A change in philosophy regarding program development and implementation occurred over the assessment period, turning away from tasking the station with developing programs and more toward turnkey program development at the corporate level.

Training for the maintenance craft was found to be adequate. The training program maintained full accreditation with the National Academy for Nuclear Training. Construction was completed on a large addition to the training center complex that contains additional classrooms, laboratories and offices.

Inadequacies were identified regarding the identification, procurement, and staging of parts. A previous failure to adequately evaluate the suitability of non-qualified replacement parts, coupled with an inadequate purge of these suspect parts from storage, resulted in potentially unqualified replica parts being installed in safety related components. In addition, a problem was identified regarding the failure to adequately identify and control materials in several safety-related work activities. At the end of the assessment period, the licensee was implementing a program to increase engineering involvement in the procurement process.

Similar to the Plant Operations functional area, procedures also continued to be a significant weakness in the maintenance area. Changes to procedures were frequently required to enable work to proceed. The failure to implement adequate procedural control resulted in a programmatic weakness regarding foreign material exclusion. This weakness was highlighted by the discovery of debris that had accumulated for several years inside the poorly maintained screens of both containment sumps. Further examples of poor procedures were identified involving the failure to incorporate reactor cavity seal design requirements into maintenance procedures, improper orientation of flow orifices, the poor reinstallation of Appendix R cable tray covers, and the improper torquing of system closure fasteners. The licensee acknowledged the poor condition of the procedures and initiated a three-year procedure upgrade program as discussed in the Plant Operations area.

Significant and numerous problems were identified regarding the maintenance of MOVs. The MOV deficiencies indicated weaknesses in the technical content of implementing procedures, little involvement from management and first-line supervisors and a lack of a well structured, comprehensive MOV program. Resolutions to correct MOV deficiencies were often not thorough and in some cases not adhered to.

During the latter half of the assessment period, the licensee instituted a major rework program involving virtually all the safety system MOVs, after it became apparent that the MOV failure rate was unacceptable. A task group consisting of corporate engineering staff, plant system engineers and operations personnel had been assigned to develop and implement a comprehensive MOV program. The implementation of the new MOV program was well underway toward the end of the assessment period.

The local leak rate test program implementing procedures and controls were well executed and had improved since the previous assessment period. System features necessary to ensure containment integrity were found to be adequately maintained.

Post-maintenance testing was identified as a weakness, as evidenced by the fact that the licensee did not have in place a comprehensive program that addressed post-maintenance testing. The program that was established to implement the testing requirements of American Society of Mechanical Engineers (ASME) Section XI was informally adapted to specify post-maintenance testing of components not covered by the ASME Code. Several examples were identified where the maintenance scope increased, yet the post-maintenance test requirements were not reviewed for adequacy. In addition, an example was identified involving the failure to perform adequate post-maintenance

testing following a major repair to a safety-related pressure control valve.

The ASME Section XI inservice inspection (ISI) test program was found to be generally sound, although two examples were identified regarding failure to adequately perform required testing. Midway through the assessment period the licensee issued a revised ISI manual that included both new and revised administrative and non-destructive examination (NDE) procedures. The administrative procedures established a more comprehensive control of ISI activities and the NDE procedures, and in most cases, were an improvement over previously used procedures. NRC initiatives were well received by the licensee as evidenced by the establishment of guidelines pertaining to second independent interpretations of radiograph film and additional radiography being conducted when earlier results were questionable. Also, an extensive NDE program to identify erosion- and corrosion-affected components within suspect piping systems was implemented.

Post-refueling startup test activities were reviewed for Unit 1, cycle 10, which occurred early in the assessment period. The assessment of core physics data collected during the startup agreed well with the predicted performance criteria. The licensee continued to maintain a sound approach to post-refueling startup activities.

The licensee responded positively to an NRC request for additional engineering evaluations and testing to confirm power supplies to plant equipment and train independence, and to conduct additional load sequencing tests for the emergency diesel generators (EDG). These requests were in response to SSFI inspections, reactor cavity seal inspections and licensee's identified items in areas of system design control, system configuration control and system maintenance practices. The licensee's staff demonstrated adequate technical and operational skills in the preparation and performance of complex and integrated plant system testing. However, deficiencies were identified in testing of electrical emergency buses. An example of poor coordination and communication was noted during performance of special testing on the Unit 1 H bus. In addition, an example of failure to establish adequate initial plant conditions for electrical testing of the Unit 1 J bus was identified. Management was actively involved in correcting these problems.

Surveillance tests were generally performed within the allowable time interval. The licensee continued to integrate the data collected from the predictive analysis group into the official surveillance program. A significant problem was identified, however, regarding the failure to adequately test the capacity of the emergency service water pumps and their associated diesel start batteries. The pumps were in fact found to be incapable of supplying an adequate makeup to the ultimate heat sink following a design basis accident. Inadequate

surveillance testing was also identified regarding the verification that the main control room envelope chillers were operating within an acceptable performance envelope. The above items contributed to several Severity Level III violations with Civil Penalties.

Although not issued within the assessment period, a deviation was identified during the SSFI for not including vendor's equipment maintenance recommendations into site procedures. These vendor recommendations pertained to operation of various MOVs, emergency service water diesels and the recirculation spray heat exchangers. The possibility existed that these problems could have been avoided if full implementation of NRC Generic Letter 83-28, Required Actions Based on Generic Implications of Salem ATWS Events, had been instituted by the licensee.

The implementation of the secondary chemistry control program was successful in maintaining water purity generally within the accepted guidelines. However, minimal success in slowing the rate of corrosion of the secondary system was achieved. Corrosion products continued to be transported to the steam generators (SGs) of both units. As a result, large amounts of solid corrosion products were removed from the SGs during the spring and fall of 1988 for Units 1 and 2, respectively. This provided evidence of pipewall thinning and the formation of conditions within the SGs known to be conducive to the corrosion and cracking of SG tubes. The licensee had installed an on-line monitoring system for principal secondary chemistry parameters. This system would allow continuous monitoring and trending of steam cycle chemistry along with computerized data logging. The low turnover rates and the resultant continuity of the chemistry staff, backed up by a commendable training program and adequate management support, were licensee strengths.

Two Severity Level III violations, ten additional violations and one deviation were identified during the assessment period.

2. Performance Rating

Category: 3

3. Board Recommendations

The Board recognizes good performance in the areas of maintenance training, leak rate testing, the ASME Section XI ISI program, post-refueling startup test activities and secondary plant chemistry control. However, management attention is needed to assure improvement of the PM program, the procurement of spare and replacement parts and the implementation of post-maintenance testing. The Board recommends a continued high level of inspection activity in this area.

D. Emergency Preparedness

1. Analysis

During the assessment period, inspections were performed by regional and resident staffs. Two routine inspections and two evaluations of EP exercises were conducted.

The first routine inspection focused on the Emergency Plan and implementing procedures; emergency facilities, equipment, instrumentation, and supplies; organization and management control; training; and the independent reviews of the EP program. No violations were identified during the inspection; however, an off-hours callout drill, which was requested by the NRC inspector, identified a problem with augmenting the emergency organization. The callout drill consisted of the licensee calling individuals listed in the Emergency Personnel Notification List and obtaining an estimate of the time required to respond to the site. The callout drill did not clearly demonstrate that the emergency organization could be fully staffed within the required times. Also, the Emergency Personnel Notification List that security personnel were going to use was several revisions out of date; this was corrected prior to the callout drill. Although the licensee committed to take corrective actions in this area, the timeliness of the augmentation staffing continued to be a problem. For example, during the off-hour annual emergency exercise, conducted on November 1, 1988, the excessive time to activate the Technical Support Center (TSC), (90 minutes), and Local Emergency Operations Facility (LEOF), (150 minutes), with the standard being 60 and 90 minutes, respectively, was a problem noted by the licensee and the NRC. Later, during the second routine inspection of the assessment period, the failure to meet the Emergency Plan's augmentation staffing requirements within the times set forth was identified as a violation.

The annual emergency exercise also identified the failure to recognize and classify a Site Area Emergency as a significant exercise weakness. The classification was not made in a timely manner and had to be prompted by the controllers. As a result of the inability to classify the event, the licensee committed to conduct retraining in needed areas and redo the exercise within approximately 90 days. An additional problem area identified in the exercise was the failure to provide accurate and updated messages to the State and local response organizations.

Although licensee management appeared responsive in their concern over the less than satisfactory exercise by committing to redo the exercise, the remedial exercise that followed did not reflect the increased management attention and involvement that the situation

required. Observations supporting this statement included the minimally challenging scenario, the identification of a new exercise weakness addressing the failure to maintain contamination access control to the emergency response facilities, and a repeat of the excessive activation times for the TSC and LEOF. In particular, the TSC activation time was approximately 25 minutes greater than in the previous exercise where the licensee had identified the excessive times to activate as a deficiency requiring corrective action. The remedial exercise was successful for demonstrating the required corrective action of properly classifying a radiological release and adequately providing messages to state and local response organizations; however, a significantly improved overall level of emergency response effectiveness was not demonstrated.

During April 1989, an inspection conducted noted that the licensee had effectively utilized a computerized system to track emergency response training; that the early warning siren system had been upgraded; and that the knowledge of classification procedures was noted as a program strength. The licensee, through a root cause analysis approach, has categorized the outstanding EP deficiencies. Corrective actions for these deficiencies commenced subsequent to the end of the assessment period.

One violation was identified during the assessment period.

2. Performance Rating

Category: 3

3. Board Recommendations

Observations during the assessment period indicated that although management expressed their awareness of a need for increased attention to the EP program, only limited program improvements were actually observed by the end of the assessment period. Management attention is needed to complete the actions the licensee identified necessary to improve the EP program. An increased NRC inspection effort is warranted to monitor and assess program improvement.

E. Security

1. Analysis

During the assessment period, inspections were performed by the resident and regional inspection staffs. The evaluation was based on three routine inspections conducted by the NRC regional staff, in which no violations were cited; however, one licensee identified violation was identified relative to the reliability of the vital area door locks.

The licensee provided excellent security in accordance with the requirements of its NRC-approved Physical Security Plan. The licensee retained a somewhat unique security organization in that the site security force, a proprietary force, reports directly to the off-site Corporate Director of Nuclear Security, and indirectly interfaces with the on-site Plant Manager. These two management chains provided very good daily operational support.

The daily performance of the security force and its on-site supervisor and management was the single greatest strength of the licensee's program for site security. Day-to-day operations of the security shifts continually met and exceeded NRC criteria and the licensee committed TS requirements. In spite of hardware and equipment deficiencies, the security force performed at superior levels.

The licensee's corporate security department performed numerous audits of the contractor's personnel screening programs, including the administration of psychological tests. At the corporate QA level, the licensee continued to experience aggressive annual audits of its security program. During the licensee's annual 1988 security audit, a negative finding was reported relative to the time needed to complete repairs of degraded security equipment. A repair time of 11 days versus the licensee's goal of 48 hours was considered to be excessive. There were multi-examples of this deficiency. While station outages could have explained some of this delay, the NRC concurred with the auditor's findings and considered this to be an area where plant support could be improved. A review of the negative findings found in security inspections (vital area door lock maintenance, upkeep of the isolation zone, and upkeep of safeguards cabinets) supported the conclusion that a more effective working relationship between the security and maintenance organization was needed.

The proprietary security force had a minimal turnover rate, overtime did not appear excessive, and the shifts appeared extremely well supervised and staffed. Procedures were very clearly written, and other documentation was readily available for regulatory tracking purposes. Training and requalification continued to be a strong point. Contingency tactical drills appeared realistic and were run frequently such that each shift was exercised. Close liaison with off-site response authorities was also noted.

The licensee's security staff implemented a personalized briefing of persons who were badged for unescorted access to the station. This special briefing addressed required duties and responsibilities associated with being granted unescorted access. The NRC considered that this new briefing concept at the time of badging was a positive

training attribute with regard to implementation of personnel awareness of security requirements at the station.

The licensee's use of continuously manned stationary defensive positions (bullet resistant towers) has assured rapid and accurate assessment and resolution of protected area perimeter alarms. Compensatory measures were adequately implemented at the perimeter barrier through the use of officers in defensive positions.

Five changes to security plans were submitted pursuant to 10 CFR 50.54(p). Licensee changes to the security plan met the reporting requirements of 10 CFR 50.54(p) with respect to timely notification; however, the changes were not always consistent with the provisions of the regulation regarding decreases in plan effectiveness. There was one request for which the licensee's processing of changes could have been enhanced by more communication with the NRC staff prior to the submittal. The explanations which were included with the submittal did not always provide an adequate synopsis of the actual revisions. For example, changes were evaluated by the licensee and considered editorial or minor, while, in fact they were more substantive and related to access authorization, materials search and equipment

No violations were identified during the assessment period.

2. Performance Rating

Category: 1

3. Board Recommendations

The excellent quality of personnel, procedures and training are recognized by the Board. The special security briefing is also a strength. Timeliness of equipment repairs needs management attention. Reduced inspection effort should be considered.

F. Engineering/Technical Support

1. Analysis

Evaluation of the Engineering/Technical Support functional area was based on routine and special inspections conducted by the NRC in this and other functional areas. Special inspections conducted were an SSFI on service water and an AIT inspection of the reactor cavity seal event. This area addresses the adequacy of technical and engineering support for all plant activities. The area includes licensee activities associated with plant modifications, technical support provided for operations, maintenance, testing and surveillance, training, and configuration management.

Poor performance of the engineering department was demonstrated by the calculations produced to support operability of the service water system and recirculation spray heat exchanger. This issue resulted in a Severity Level III violation with a Civil Penalty. The evaluations used to determine if the service water system met design requirements lacked detail and did not include an in-depth review of critical data. The calculations also utilized invalid assumptions. The evaluation focused on verifying a conclusion that the design basis requirements were met rather than providing a review of all pertinent aspects of system performance. The errors in the service water system calculations, which were accomplished early in the assessment period, demonstrated that the engineering department did not fully utilize existing regulatory guidance relative to the design and review process. Consequently, the licensee failed to reach adequate conclusions on the operability of the service water systems. Recirculation heat exchanger calculations utilized inaccurate and nonconservative design assumptions and inputs. Environmental effects on safety related components and control of mechanical specifications were also elements of weakness in the recirculation heat exchanger calculations.

Calculations for reactor coolant leakage surveillance employed incorrect values for constants which provided the potential for underestimating RCS leakage. The error in RCS leakage calculations could have resulted in acceptance of unidentified leakage in excess of TS limits. A violation was issued concerning the use of the incorrect constants.

During the first portion of the assessment period, engineering involvement was minimal in evaluation and resolution of significant problems with MOVs. Engineering did not review MOV actuator test results in order to evaluate deficiencies and determine corrective actions. Deficiencies written on MOVs were not evaluated for root causes, and MOV engineering sketches were inadequate. The lack of engineering review of MOV problems resulted in a violation for failure to properly identify and correct MOV deficiencies. As a result of the above discrepancies, a task team was established in the latter portion of the assessment period and provided a positive impact on the resolution of MOV deficiencies.

Early in the assessment period, the engineering organization had not demonstrated an adequate self-assessment capability. A specific example was the lack of administrative control for the backlog of potential problem reports which were generated in the corporate offices. Incorrect assessment of safety significance of outstanding issues was identified as a problem area. This condition became obvious when significant safety issues (i.e., emergency diesel generator sequencing problems and control room envelope air conditioning/ventilation problems) were first addressed in the licensee's corrective action program approximately two years after

they were identified. Also, during review of outstanding station EWRs for appropriate disposition as a part of the restart effort, several of the older EWRs were discovered to be incomplete and not properly closed out. These conditions indicated that the programs for proper disposition and closeout of engineering documentation appeared to be ineffective.

Technical support weaknesses were also evident in plant EWR procedure quality. Examples of these weaknesses were identified as violations for failure to ensure that proper technical reviews were being completed prior to returning safety-related components to service, and failure to provide adequate instructions in EWRs relating to safety-related activities. In addition, the technical staff was using the EWR process to perform plant modifications, which resulted in inadequate technical reviews for addition of heat loads to plant air conditioning/ventilation systems and improper modification of the reactor cavity seal backup air supply system without implementating required drawing revisions. The above problems were also indicative of a lack of adequate training of engineering personnel.

The issues identified by the SSFI and AIT resulted in management's recognition of existing deficiencies in engineering and technical support. Improvements initiated included increased resources, engineering improvement programs, and reorganization of the engineering department. A Design Basis Documentation (DBD) Project which encompasses 80 plant systems was initiated. The program consists of six phases, from document collection to approval and final issuance of the final DBD. For the first seven systems, phases one and two have been completed. The third phase, involving component design basis, was on schedule.

Identification by the licensee of an actual configuration problem in the middle of the assessment period resulted in a program to verify the integrity of the Unit 1 plant configuration in accordance with emergency procedures. The ORAP represented a considerable engineering commitment of resources to ensure that actual plant configuration was in accordance with approved plant drawings and procedures and also ensured that divisional power supplies to safety-related components were correct.

During the assessment period, the licensee realized that the engineering staff was not focusing appropriate resources to the needs of the station. In order to correct this condition, the licensee reorganized the engineering department and established a larger engineering staff at each nuclear station. The formation of a system engineering group and a design engineering group provided a major improvement potential. A reorganization of technical resources provided consolidation of nuclear support resources on the corporate level and a stronger on-site engineering presence. This reorganization appeared to be a strength, in that during the latter part of

the assessment period, increased systems and design engineering capabilities on-site allowed for more timely resolution of Unit 1 restart technical issues.

Technical support related to EQ was good. The engineering staff was knowledgeable of EQ issues and NRC-identified deficiencies were resolved.

Operator training, as evidenced by the performance on the replacement examination, was effective. All 12 candidates passed both the operating and written portions of the examination. Reference material sent to the NRC for exam preparation was well organized and detailed. The quality of the reference material and a review effort by the licensee prior to the exam contributed to it's high quality.

Training facilities and instructor quality continued to be one of the strengths. This was particularly evident during the latter part of the assessment period. During this timeframe, additional training was conducted with regard to new system modifications and operating requirements. In addition, special refresher training was provided to operators for Unit 1 restart and was conducted in an excellent manner. Training for the maintenance craft was found to be adequate. The training program maintained full accreditation with the National Academy for Nuclear Training. Also, all programs at the station have received accreditation from the Institute of Nuclear Power Operations.

Construction was completed on a large addition to the training center complex. The new structure includes nine additional classrooms, new instructor offices, five laboratories (mechanical, electrical, chemistry, HP, and instrumentation and control), a technical library, and a practical factors area for general employee training. This modern training addition provides facilities for the station to properly train personnel in all requisite areas and is expected to increase plant proficiency in the future.

One Severity Level III problem, composed of four violations, one additional violation and one deviation were identified during the assessment period.

2. Performance Rating

Category: 2

3. Board Recommendations

Management needs to continue the improvement of engineering support to the station and to closely monitor the engineering organization for effectiveness. The reorganization of the engineering organization, the initiation of the Design Basis Documentation effort and

the conduct of the ORAP provided indication that this area was improving. Based on the mixed performance in this area, the Board had difficulty in determining the final performance rating. A high level of inspection effort should be maintained.

G. Safety Assessment/Quality Verification

1. Analysis

During the assessment period, inspections were performed by the resident and regional inspection staffs and licensing reviews were conducted by the NRR staff. Inspections evaluated the licensee's corrective action program, performance of appropriate safety evaluations, root cause analysis of plant events, the corporate offsite independent review group's functions, the licensee's on-site safety committee functions, and the quality function as used in the monitoring of the overall performance of the plant.

During the early part of the assessment period, significant weaknesses in plant and corporate management leadership and skills resulted in lower than desired expectations and accountability. These weaknesses were illustrated by multiple examples dealing with the failure to take adequate corrective actions, and the failure to conduct appropriate safety and root cause evaluations. These problem areas resulted in several Severity Level III violations with Civil Penalties.

Numerous examples of management's failure to take adequate corrective actions, as exemplified in the last assessment period by the failure to verify boric acid heat tracing operability, continued to be identified in this assessment period. These examples were as follows: the Unit 1 reactor cavity seal failure event, where management failed to take necessary corrective action due to not understanding the event, as discussed in the Plant Operations section; the failure to identify and correct a longstanding adverse condition involving inadequate housekeeping and improper maintenance of the containment sumps, as discussed in the Maintenance/Surveillance section; the failure of the licensee's corrective action program to identify a potential for gas binding of safety-related pumps; the failure to promptly identify a degraded condition of the control room and emergency switchgear ventilation system; the failure to promptly correct leakage of water around safety-related pump room roof plugs until prompted by the NRC; and failure to completely resolve a non-original equipment manufactured parts problem when first discovered several years ago.

The preceding examples of failure to take adequate corrective actions were mostly identified in the first half of the assessment period. After identification of the programmatic deficiencies, licensee management took action to change the threshold for identification of

conditions adverse to quality. During the latter part of the assessment period, licensee-identified station deviation reports increased by a factor of 10 over previous numbers and problem identification sensitivity of the station staff was improving.

Weaknesses with regards to proper safety reviews were identified in the last assessment period, as exemplified by a failure to properly evaluate the consequences of an event which involved a worker's unnecessary exposure to an extremely high radiation field. This type of problem continued to be identified during this assessment period. Four previously discussed examples highlighted this continuing weakness.

In addition, the lack of management sensitivity to safety evaluations of degraded conditions at the beginning of the assessment period was evident. An example was during the restart of Unit 1 in July 1988, when senior station management indicated to licensed operators that Unit 1 heatup should continue even though the operators had indication of containment boundary leakage which required the unit to return to cold shutdown.

The preceding examples of failure to conduct proper safety evaluations were mostly identified in the first half of the assessment period. After identification of the programmatic problem, licensee management's attitude and sensitivity to the conduct of proper safety evaluations and reviews improved. During the latter part of the assessment period, frequent monitoring of the station safety committee meetings and other event reviews indicated an improvement in this area.

Another problem area that was identified during the previous assessment period and continued into this assessment period was inadequate root cause analysis of events, failures, and/or conditions adverse to quality.

The licensee recognized in the latter part of the assessment period, that root cause evaluations were not being accomplished. After identification of the problem, the licensee implemented a root cause analysis procedure at the station focusing on system engineer evaluations. However, a formal corporate root cause evaluation program was not initiated until near the end of the assessment period.

A weakness was also identified with the licensee's capability to properly track regulatory commitments and ensure that measures were in place to prevent their deletion from a procedure without proper review. An example of this problem occurred when abnormal procedures were revised in response to an NRC Bulletin commitment. Due to a lack of proper tracking, this commitment was deleted in a later procedure revision, contributing to inadequate operator response during the cavity seal leak event. This problem was indicative of a

significant weakness with regards to ensuring compliance with commitments.

During the latter part of the assessment period, an evaluation of the licensee's self assessment capability was conducted. The assessment concluded that the on-site review committee was performing an adequate review as required by TS. However, a major weakness was observed during the review of the corporate independent review group. The review, which resulted in a violation, concluded that this group was not complying with TS because they were not conducting the required reviews of all safety evaluations, violations, reportable events, and on-site safety review committee actions. The review also concluded that this TS function had not been complied with for an extended period of time. Based on these observations of the off-site review function it appeared that corporate management did not effectively use self-assessment to assure quality in activities.

The licensee's initial approach to the resolution of technical issues from a safety standpoint contained in NRC Bulletin 85-03, MOV Common Mode Failures During Plant Transients Due to Improper Switch Settings, was neither conservative nor thorough. The MOV Task Team's subsequent design review identified deficiencies that should have been identified during the bulletin review. Also, numerous station deviations were written on valves covered by the bulletin after the licensee reported completion of the program. The same type of inadequate review was conducted of NRC Bulletin 84-03, Refueling Cavity Water Seal, and was noted as part of the cause of the cavity seal event discussed earlier in this functional area.

Licensee submittals such as amendment requests and relief requests were of good quality and submitted in a timely manner. The licensing staff was professional and thorough and in most instances scrutinized their submittals for both technical content and conformance with regulatory requirements.

Increased use of technical personnel on audit activities resulted in audit findings of greater technical substance than in the previous assessment period. The method for closing audit findings, including the recurrent ones, was changed in August 1988. This new method involved evaluating the corrective action for an audit finding, on more than one occasion and then presenting the decision to close a finding for approval by the manager of the audit group. Specific QA/QC problems were identified, though, during conduct of the SSFI in the middle of the assessment period. A violation was noted in which QC identified work orders containing design change deviations and nonconformances that were not addressed in the corrective action program. In addition, effective maintenance activity corrective actions had not been taken as evidenced by recurrent QA audit findings. After identification of these QA/QC problems, the QA

department took appropriate actions. All of the significant deficiencies discussed in this functional area were not aggressively identified and pursued through the use of the licensee's QA program. Late in the assessment period, though, the QA organization demonstrated an improved capability to identify problems in safety-related plant activities. This conclusion was based on monthly discussions between the resident inspector and QA management.

During the latter part of the assessment period, some of the aforementioned changes did provide an indication that problems attributable in part to an inappropriate management attitude and significant weaknesses in plant and corporate management leadership and skills were changing. Past management practices which had resulted in lower than desired expectations and accountability were also improving. A positive change with regards to sensitivity and a lack of attention to detail was also noted. The licensee's ORAP, which was instituted in January 1989, and the management restart readiness confirmation which was conducted prior to Unit 1 restart were indicative that past programmatic problems were being addressed.

Three Severity Level III problems, composed of eight violations, one Severity Level III violation and one additional violation were identified during the assessment period.

2. Performance Rating

Category: 3

Trend: Improving

3. Board Recommendations

Management needs to continue the implementation of the corrective action, safety assessment and root cause analysis programs that successfully improved the performance in the latter part of the assessment period. The Board recognizes that later in the assessment period management was demonstrating an improved sensitivity toward safety issues. Inspection effort in this area should remain high.

V. SUPPORTING DATA AND SUMMARIES

A. Investigation Review

None.

B. Escalated Enforcement Action

1. Violations

Severity Level III violation issued on June 13, 1988 for failure to

verify operability of required boric acid heat trace circuitry as required by TS (CP - $50,000). This violation occurred in the previous assessment period, but was issued during this period.

Severity Level III violation issued on June 13, 1988 for failure to adequately evaluate radiation hazards, have adequate procedures, and follow procedures while working on a stuck incore detector. (CP - $100,000). This violation occurred in the previous assessment period, but was issued during this period.

Severity Level III problem, composed of eight violations, issued on August 25, 1988 for failure to control an individual's occupational radiation dose to less that 3 rems per calendar quarter and to meet other 10 CFR 20 occupational dose requirements. (CP - $100,000).

Severity Level III violation issued on November 10, 1988 for failure to have adequate procedures to ensure that system cleanliness and/or foreign material exclusion was being maintained on safety-related systems. (CP - $50,000).

Severity Level III violation issued on May 18, 1989 for failure to provide adequate procedures for operation and testing of the inflatable seal portion of the reactor cavity seal. (CP - $100,000).

Severity Level III problem, composed of two violations, issued on May 18, 1989 for failure to conduct an adequate 10 CFR 50.59 evaluation of the reactor cavity seal design and failure to conduct an adequate evaluation of the cavity seal failure event. (CP - $100,000).

Severity Level III violation issued on May 18, 1989 for failure to promptly identify and correct a significant condition adverse to quality involving potential gas binding of the high pressure safety injection pumps. (CP - $75,000).

Severity Level III problem, composed of two violations, issued on May 18, 1989 for failure to promptly identify and correct significant conditions adverse to quality involving inadequate capacity of control room chillers and degraded condition of control room/emergency switchgear room ventilation system. (CP - $50,000).

Severity Level III problem, composed of four violations, issued on May 18, 1989 for failure to promptly identify and correct significant conditions adverse to quality with regard to the use of non-qualified replacement parts for safety related components, wetting of safety-related electrical components, and lack of implementation of an effective component failure trending and root-cause analysis program. (CP - $50,000).

Severity Level III problem, composed of four violations, issued on

May 18, 1989 for failure to correctly translate into specifications, drawings and procedures the design bases for operability of the recirculation spray heat exchangers and the emergency service water pump house equipment; the effects of added loads on the 125 VDC vital bus batteries; and the effects of minimum wall thickness for a component cooling water heat exchanger. (CP - $25,000).

Severity Level III violation issued on May 18, 1989 for failure to comply with TS requirements related to flowrate operability of the emergency service water pumps. (CP - $100,000).

2. Orders

None.

C. Management Conferences

1.	June 8, 1988	Technical meeting at Region II to discuss issues on recirculation spray heat exchangers.
2.	July 6, 1988	Enforcement Conference at Region II to discuss the Radiation Protection Program.
3.	September 16, 1988	Enforcement Conference at Region II on safety-related sump cleanliness issues.
4.	October 26, 1988	Management meeting at NRC Headquarters on the cavity seal event, service water SSFI, and restart issues.
5.	November 17, 1988	Management meeting at the station to review the status of the Radiation Protection Program.
6.	December 8, 1988	Technical meeting at NRC Headquarters to discuss EDG sequencing issues.
7.	December 22, 1988	Technical meeting at NRC Headquarters to discuss restart issues.
8.	January 5, 1989	Management meeting at Region II to discuss restart issues.
9.	January 26, 1989	Enforcement Conference at Region II on design control and corrective action problems affecting various plant systems.
10.	February 28, 1989	Management meeting at the station on current issues, configuration management, ORAP, and restart issues.

11.	March 30, 1989	Technical/Management meeting at NRC Headquarters on restart issues.
12.	April 19, 1989	Technical meeting at NRC Headquarters to discuss followup on masonry wall design.
13.	April 26, 1989	Management meeting at Region II on the overall improvement action plan.
14.	May 22, 1989	Management meeting at the station to discuss the status of restart issues.

D. Confirmation of Action Letters

1.	September 6, 1988	Refueling cavity seal leakage.
2.	November 2, 1988	Surry restart issues
3.	March 9, 1989	Surry restart issues

E. Review of Licensee Event Reports (LERs)

During the assessment period 67 LERs for Unit 1 and 2 were analyzed. The distribution of these events by cause, as determined by the NRC staff, was as follows:

Cause	Unit 1	Unit 2	Total
Component Failure	20	10	30
Design	10	0	10
Construction, Fabrication, or Installation	1	1	2
Personnel			
- Operating Activity	9	1	10
- Maintenance Activity	1	2	3
- Test/Calibration Activity	7	2	9
- Other	0	0	0
Other	2	1	3
Total	50	17	67

F. Licensing Activities

In support of licensing actions, frequent meetings were held with the licensee to address licensing and other technical issues. During this assessment period there were 50 licensing actions completed, i.e., 22 amendments, 8 reliefs, 12 Multi-Plant Actions (MPA), 2 exemptions, and 6 other licensing actions.

G. Enforcement Activity

ENFORCEMENT ACTIVITY

FUNCTIONAL AREA	NO. OF VIOLATIONS/PROBLEMS IN SEVERITY LEVEL					
	Dev.	V	IV	III	II	I
Plant Operations	0	0	2	1	0	0
Radiological Controls	0	1	5	1	0	0
Maintenance/Surveillance	1	1	9	2	0	0
Emergency Preparedness	0	0	1	0	0	0
Security	0	0	0	0	0	0
Engineering/Technical Support	1	0	1	1	0	0
Safety Assessment/ Quality Verification	0	0	1	4	0	0
TOTAL	2	2	19	9	0	0

H. Reactor Trips

a. Unit 2 on May 16, 1988, from 100% power. Event was due to an undetermined failure of the electro-hydraulic control system which caused the main turbine governor valves to close resulting in a low-low level SG automatic reactor trip.

b. Unit 1 on August 15, 1988, from 100% power. Event was caused by a spurious actuation of the "A"-train-Hi consequence limiting safeguards relay during the performance of a normal surveillance test procedure resulting in the automatic reactor trip.

c. Unit 2 on September 10, 1988, from approximately 4% power. Event was caused by erratic operation of a governor valve controller which caused the first stage impulse pressure to increase greater that 15%. When impulse pressure increased greater than 15%, with the generator output breakers open, a turbine trip signal tripped the main turbine. The impulse pressure increase also caused permissive P-7 to reinstate (P-7 indicates reactor power greater than 10%). An automatic reactor trip was then initiated due to the turbine trip with permissive P-7 reinstated.