U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

NRC Inspection Report: 50-280/96-201 and 50-281/96-201

License No.: DPR-32 and DPR-37

Docket No.: 50-280 and 50-281

Licensee: Virginia Electric and Power Company

Facility Name: Surry Power Station, Units 1 and 2

Inspection at: Surry Power Station, Surry, Virginia

Inspection Conducted: January 22 through February 2, 1996

Inspection Team: Peter S. Koltay, Team Leader, Special Inspection Branch
Jeffrey B. Jacobson, Special Inspection Branch
Paul P. Narbut, Special Inspection Branch
Edmund A. Kleeh, Special Inspection Branch
David L. Gamberoni, Inspection Program Branch
Steven P. Sanchez, Inspection Program Branch
James E. Wigginton, Emergency Preparedness and Radiation Protection Branch
Lawrence K. Cohen, Emergency Preparedness and Radiation Protection Branch
Robert B. Manili, Safeguards Branch

Prepared by: Peter S. Koltay, Team Leader
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Date: 2/12/96

Reviewed by: Donald P. Norkin, Section Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Date: 2-12-96

Approved by: Michael R. Johnson, Acting Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Date: 2-12-96

9602200230 960212
PDR ADOCK 05000280
Q PDR

Enclosure

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report represents the results of the in-office review phase of the IPAP for the Surry Power Station, Units 1 and 2. The assessment was conducted by the Special Inspection Branch of the U.S. Nuclear Regulatory Commission's Office of Nuclear Reactor Regulation during the weeks of January 22 and 29, 1996. The purpose of this assessment was to develop an integrated perspective of performance strengths and weaknesses based upon an in-office review of inspection reports, event reports, and other NRC and licensee generated performance information. The assessment covered a two year period from January 1994 to December 1995. A two week on-site assessment scheduled to start on February 26, 1996, will be conducted to validate the observations made during this in-office review.

The licensee's corrective action and performance assessment systems have been effective at capturing equipment, program, and human performance deficiencies. Assessments of program performance by the licensee's nuclear oversight division were effective. Problem analysis and evaluation for routine, low level issues was generally good, but initial root cause analyses performed for more complex equipment issues were sometimes ineffective. Often, sufficient root causes were not identified until after the problems resulted in plant events. Repeat failures were identified with the rod control system, the auxiliary feedwater turbine-driven pump, essential service water pumps, and component cooling water heat exchangers. Trending of equipment and human performance was good as evidenced by quarterly trend reports which effectively captured equipment and human performance issues, including specific recommendations for management action.

Problem resolution was not effective. Corrective actions to longstanding problems with the rod control system, hydroid growth in the essential service water system, and the turbine-driven auxiliary feedwater pumps have sometimes been delayed or have only partially been completed. A review of recent licensee corrective actions with regard to these issues will be conducted during the team's on-site assessment.

In the area of operations, management involvement and safety focus were good; however, instances were noted where management's decision making process was non-conservative. Management actions were conservative in interpreting technical specifications, establishing additional supervisory oversight in the control room, oversight of on-line maintenance, and in shutdown risk reduction. Conversely, decisions associated with the sampling of charcoal filters, pumping the containment sump, and assessing the operability of safety related equipment potentially affected by common failure mode were sometimes inadequate. Operators were knowledgeable and responded well to challenges caused by the large number of equipment failures and reactor trips that were often complicated by unexpected equipment responses.

Engineering management established a good safety perspective as demonstrated by the programmatic controls for design related matters; however, there were weaknesses in the implementation of programs. For example, engineering safety evaluations and operability assessments provided good support, to maintenance and operations. However, the licensee did not maintain control of setpoints when making changes to design basis calculations and their methodology.

In the area of maintenance, programs for problem identification, self-assessments, and quality assurance department audits were well established; however, problem resolution was sometimes slow and ineffective, resulting in longstanding or recurring problems. Plant material condition has improved steadily, but problems with material condition in the balance of plant and with maintenance and surveillance personnel errors have resulted in numerous equipment failures and plant perturbations.

In the plant support areas of Security, Emergency Preparedness and Health Physics, overall strong performance was demonstrated. However, some weaknesses were noted in the procedure compliance area for health physics.

OVERALL ASSESSMENT SCOPE AND OBJECTIVES

This Integrated Performance Assessment of both units of the Surry Power Station Units 1 and 2 is being performed in accordance with NRC Inspection Procedure 93808 "Integrated Performance Assessment Process." The assessment is divided into: an in-office review performed at NRC headquarters; an on-site assessment to validate the observations from the in-office review; and a final analysis of the results of the assessments and development of inspection recommendations. The assessment is being conducted by the Special Inspection Branch of the Office of Nuclear Reactor Regulation. The in-office review was performed during the weeks of January 22 and January 29, 1996. The on-site assessment is scheduled to be performed during a two week period starting February 26, 1996.

The assessment objectives are to develop an integrated perspective of licensee performance and arrive at recommendations for future inspection focus in the areas of Safety Assessment/Corrective Action, Operations, Engineering, Maintenance, and Plant Support. The in-office review covers NRC inspection reports, licensee event reports (LERs), enforcement history, regional assessments, and licensee internal and external assessments. The results of the in-office review are included in this preliminary assessment report. The references contained in the report are listed in Appendix A. The preliminary results are presented on the Performance Assessment/Inspection Planning Tree in Appendix B.

Following the issuance of this report, the team will validate its observations via a performance based, on-site assessment. The results of the on-site assessment and in-office review will be used during the final analysis and development of inspection recommendations, and will be documented in a final report to be issued after the conclusion of the on-site assessment. The final assessment report will include recommendations on where to focus future NRC inspection effort, and these recommendations will be depicted on a final Performance Assessment/Inspection Planning Tree.

ASSESSMENT METHODOLOGY

During the in-office review, the team evaluated the Surry Power Station inspection record and performance history for a two year period spanning January 1994 to December 1995. Available licensee quality assurance (QA) audit reports and other self-assessment documents were reviewed. The review results were utilized to assign performance ratings of either decreased, normal, or increased inspection to the individual elements in each assessment area. Where the team's review of inspection data and licensee information was inconclusive, or where sufficient information was not available to come to meaningful conclusions, individual elements were rated as being indeterminate.

Ratings for the overall performance in the areas of Safety Assessments/Corrective Action, Operations, Engineering, Maintenance, and Plant Support were not addressed during the in-office review phase.

The results obtained from the in-office review will be used by the assessment team to develop individual on-site assessment plans for each of the assessment areas. During the on-site review, the team will focus on those areas rated as indeterminate and those where the inspection or performance data record indicated potential performance weaknesses. The team will also validate the elements that were assigned decreased or normal inspection ratings. Following the on-site phase of assessment, the team will issue a final assessment report.

1.0 SAFETY ASSESSMENT AND CORRECTIVE ACTION

1.1 Problem Identification

The licensee's corrective action and performance assessment systems have been effective at capturing equipment, human performance, and program deficiencies. The threshold for initiating corrective action documents appears to be sufficiently low and the licensee has apparently been able to avoid a large backlog of open corrective action documents. A recent audit of the corrective action process by the licensee's nuclear oversight division confirmed that the corrective action system has been effective in the area of problem identification (ref. 225).

Assessments of program performance by the licensee's nuclear oversight division were noted in several inspection reports as being effective (refs. 3, 18, 26, and 29). These assessments were seen as being insightful, in-depth, and as having identified significant issues which could be used by the line organizations for making meaningful improvements. The effectiveness of line organization follow-up actions to address assessment findings will be reviewed during the team's on-site assessment.

The quarterly performance annunciator window program overseen by Station Nuclear Safety group effectively communicated personnel, equipment, and programmatic performance. Numerous performance indicators with pre-determined criteria have been established for each organization. Data for individual annunciator windows are provided by the line organizations. The Station Nuclear Safety group compiles the data and in conjunction with senior licensee management, assigns overall performance ratings for personnel, equipment, and program performance. Areas receiving a red (significant weakness) or yellow (improvement needed) rating require a line management response. The effectiveness of the annunciator window program in the area of operations appeared to be indeterminate due to a lack of internal assessment data. Of the 16 operations areas rated by the program, 7 appeared to be primarily based on NRC and the Institute of Nuclear power Operations (INPO) findings, including items such as tagging, operations status, and configuration control. A review of the actions taken by line management in response to the annunciator window program will be conducted during the team's on-site assessment.

The licensee is currently developing a more extensive self assessment program. Other than the annunciator window program described above, formal line organization self assessments have not been performed routinely. In the maintenance area, self assessment reports reviewed by the IPAP team appear to have been effective in the identification and resolution of problems, including the fact that certain relief valves and risk significant check valves were not being periodically tested. Engineering self assessments were stated in inspection reports as being good (ref. 26), but it appears the self assessments were limited to a review of the annunciator windows. Likewise, the team was not provided with any internal assessments of the Operations Division performance.

Normal inspection effort is recommended for this area.

1.2 Problem Analysis and Evaluation

Overall, performance at Surry appears to have been hindered by a large number of challenges caused by equipment failures and human performance weaknesses. Several plant trips and inoperable safety systems can be attributed to uncorrected or partially corrected problems that had been previously identified by the licensee. For example, instances of inoperable or degraded emergency service water (ESW) pumps (refs. 38, 42, and 45), control room annunciators (ref. 43 and 45), station batteries (ref. 28), component cooling water heat exchangers (CCWHXs) (ref. 45), and charging pump lube oil temperature controllers (ref. 25) have been attributed to causes that were not fully resolved by previous corrective action attempts. Repeated challenges were also caused by deficiencies in the turbine driven auxiliary feedwater (AFW) pump (ref 14, 21, and 32) and in the rod control system (ref. 37).

More extensive root causes analyses were generally performed only after plant events had occurred and the initial opportunities to prevent problem escalation had not been successful. These root cause analyses provided the necessary detail for the technical assessment, but did not fully evaluate the contributing causes related to human performance, the corrective action system itself, and management. For example, the root cause analysis (ref. 94) associated with the failure of the 2A station battery did not address why the system engineer was unable to recognize that the batteries had become inoperable or why plant procedures were not followed. The root cause analysis associated with the inoperable turbine driven auxiliary feedwater pump (ref. 117B) failed to address why previous corrective action attempts were not sufficient and why the plant was allowed to restart before ensuring that the problem was completely resolved. A recent audit (ref. 225) conducted by the licensee of the corrective action program also raised concerns regarding the effectiveness of the root cause analysis program.

The team also reviewed the third quarter 1995, quarterly trend report, issued by Station Nuclear Safety. The trend report of deviations effectively captured station issues involving both equipment and human performance. The trend report provided a detailed summary of the issues and included a synopsis of the actions planned or already implemented. The report also included six additional recommendations for management action which were gleaned from a review of recent deviation reports. The recommendations are required to be tracked by the licensee's commitment action tracking system. The team will review the license's response to the recommendations during the on-site phase of the assessment.

Overall performance in this area was rated as being indeterminate.

1.3 Problem Resolution

The licensee has done an adequate job of addressing the majority of lower level hardware concerns that resulted in challenges to the corrective action system. For example, corrective actions taken for a failed shunt trip relay (ref. 6), low head safety injection check valves failing to seat (ref. 22), unsuccessful attempts to load main control room chillers (ref. 22), and clogged suction strainers for the main control room chillers (ref. 26), were stated as being adequate to resolve the identified problems.

However, the licensee's efforts to resolve several recurring major issues have not been effective. Corrective actions were sometimes delayed or only partially completed. Examples include hydroid growth in the ESW and component cooling water (CCW) systems, problems with the performance of the rod control system, and governor problems with the turbine driven auxiliary feedwater pumps Also reviews to ensure the effectiveness of the corrective actions taken have not always been sufficient to prevent reoccurrence. Some of these issues have finally been resolved, but follow-up during the on-site phase of the assessment will be necessary to fully assess this area.

Based on the team's review of the licensee's responses to NRC violations, actions taken in response to externally identified issues appeared to be very good. Corrective actions addressed both the specific problems cited and the more general programmatic concerns as appropriate.

Tracking of corrective actions via the licensee's commitment action tracking system will be reviewed during the on-site phase of the assessment.

Overall performance in this area was rated as being indeterminate.

2.0 OPERATIONS

2.1 Safety Focus

Management generally demonstrated conservative safety focus. For example, the licensee declared the condensate storage tank inoperable even though only tank level indication was lost (ref. 9). The Station Nuclear Safety and Operating Committee (SNSOC) assessments were effective and focused on safety. For example, to assess readiness for startup following outages, each department presented a review of work status, and an action plan for remaining items to the SNSOC (ref. 29). Managers regularly interacted with the control room crews to address issues. For example, management was closely involved in establishing appropriate and timely compensatory measures when Unit 1 annunciators were lost (ref. 43). Operations managers gave effective pre-shift briefings to crews before complex evolutions (ref. 29).

However, several examples were noted where management decisions were not conservative. For example, an enforcement conference was held dealing with the failure to promptly identify and implement corrective action when the licensee did not sample both auxiliary ventilation exhaust filter trains following a chemical release, a recognized potential common failure mechanism. Upon delayed sampling, both charcoal banks failed to meet technical specification requirements (ref. 21). Likewise, a nonconservative decision was made to pump the containment sump when one of the sump valves, a containment isolation valve, had already failed to close during testing and the licensee was in an action statement to close and remove power from the second valve. When the second valve was later administratively reopened it failed to close due to debris, resulting in entry into a one hour LCO (ref. 27). Another example occurred on May 30, 1995 when ESW pump C failed its operability test due to low flow. Technical Specifications required the plant to shutdown if more than one ESW pump was inoperable. The redundant ESW pump A was not immediately tested, even though it was reasonable to assume that the A pump was also fouled. The A pump had been operating in the alert range since May 16, 1995 when it exhibited low flow during testing. On June 1, 1995 after ESW pump C was cleaned and operable, ESW pump A was cleaned and subsequently tested satisfactorily (ref. 38). Similarly, LER 95-10 (ref. 85) describes the inoperable condition of all four CCWHXs due to fouling. Technical specifications required the plant to shutdown if more than one heat exchanger was inoperable. In this case no shutdown occurred since the licensee cleaned one heat exchanger first and declared it operable, before testing the other three.

The licensee implemented a comprehensive program to reduce shutdown risk (ref. 35). However, an example of poor risk management was identified when turbine building flooding occurred due to leaking canal damming devices during outage work. Despite the fact that turbine building flooding is a high risk core melt sequence, no flood watches had been posted and the process of installing the damming devices was not described in a procedure (ref. 46).

Increased inspection in this area is recommended.

2.2 Problem Identification and Resolution

Overall, inspection reports indicated that problem identification was adequate. Operators had improved in their performance in writing problem reports. For instance, operators identified that the protection channels for pressurizer pressure were indicating lower than the control channels and wrote a deviation report. This eventually led to the identification of the fact that all three protection channels were inoperable (ref. 4). Although there were examples where operators did not initiate deviation reports when appropriate, inspection reports state that operators have a generally low threshold for reporting problems (ref. 1).

Some of the licensee problem reporting mechanism's appear to identify important trends to management. For example, the Third Quarter 1995 Station Deviation Trend Report addressed configuration control issues as a degrading trend area.

Another of the licensee's mechanisms for highlighting operations performance for management attention, the Performance Annunciator Panel program, often only uses NRC data, such as violations issued, to assess performance. Seven of the sixteen windows applicable to operations use only NRC data for success criteria. Examples include the windows for Operations Status and Configuration Control; Operations Drawings, Documents and Procedures; Tagging; and Labeling.

There were examples of a lack of aggressive management problem resolution which resulted in repeated challenges to operators. For example, there was a repeated problem with unexpected changes in reactor vessel water level during reduced inventory operations (ref. 1), repeated problems with dropped rods (refs. 36 and 37), and biofouling of CCWHXs (ref. 45).

Normal inspection is recommended in the area of problem identification. Performance in the area of problem resolution is indeterminate.

2.3 Quality of Operations

Operating crews responded promptly and effectively to operational events. For example, when challenged by a turbine run-back, operators prevented a plant trip through detailed plant knowledge and skillful equipment operation (ref. 1); they performed a unit shutdown that required difficult manual control of steam generator levels (ref. 1); and operator crew responses to plant trips was considered a strength (ref. 9). On one occasion the operators prevented an automatic trip by prompt response to a feedwater regulating valve failing closed (ref. 21). However, there is one example where an acting control room supervisor lost command and control of ongoing plant evolutions (ref. 102). The event represents a significant but isolated case.

A negative trend in operator performance is indicated by recurring personnel errors (ref. 45). For example, operators made configuration control errors such as failure to open the hot leg stop valve within two hours of filling the loop as required by technical specifications (ref. 6), and failure to lock a makeup water isolation valve as required by technical specifications (ref. 14). Five equipment lineup deficiencies occurred in one month. Also, a power loss to emergency buses was caused by an operator opening the wrong fuse drawer due to inadequate self checking (ref. 46). Likewise, operations had inappropriately released work on the seal table and pressurizer relief valves when the reactor coolant system was still pressurized (ref. 49).

Equipment failures continued to challenge the operators during startups, shutdowns and during normal operation. For example, in separate instances in July and August 1995, a partial failure of the control room annunciators occurred (refs. 43 and 45). Additional examples were losses of nuclear instrument power and the generator hydrogen seal oil pressure (ref. 37). Also, biofouling made the CCWHXs inoperable 1-4 times per week (ref. 45). Other hardware problems included battery cell problems (ref. 29), control rod dropping problems (refs. 36 and 37), and chiller unit trips (ref. 29).

Normal inspection in this area is recommended.

2.4 Programs and Procedures

Procedures were generally followed. However, three violations were identified for failure to follow procedures involving a reactor coolant system inventory reduction (ref. 49). Additionally, there were other isolated examples of lack of procedure compliance. An operator performing a quarterly pump test entered a procedure at the wrong place (ref. 24), operators exceeded the pressurizer maximum heatup rate (ref. 32), and licensee contractors, performed fuel manipulations without following the procedure (ref. 34).

Isolated instances of inadequate procedures were identified. For example, the procedure for opening the loop stop valves was not detailed and did not point out that the cold leg valve must be shut to open the hot leg valve. Consequently, the valve was not opened within the technical specification limit of two hours after loop fill (ref. 6). Similarly, plant cooldown was accomplished using main steam bypass valves which was a method not addressed by the procedure (ref. 27). The procedure for maintaining containment integrity during refueling was inadequate. Some valves needed for integrity were kept open and would only be closed by operators if an event occurred. The licensee consequently changed the procedure (ref 34).

Normal inspection in this area is recommended.

3.0 ENGINEERING

3.1 Safety Focus

Generally, a conservative safety focus was exhibited by engineering during the review period. This conservative safety focus was evident during engineering's attempts to improve emergency diesel generator (EDG) reliability (ref. 22) and eliminate power oscillations caused by degrading steam generators (ref. 13). Conversely, the lack of a formal setpoint control program led to an overpower event resulting from the licensee's failure to update the calorimetric computer program in accordance with the latest revised base calculation (ref. 8). A licensee root cause evaluation (RCE) of this event identified potential problems with other station-instrument settings and test/calibration procedures, that were also attributed to a lack of formal setpoint control program (ref. 113).

The engineering work load of open design change packages (DCPs) and drawing revisions has been maintained below management established goals (ref. 22). Operability and safety evaluations were generally comprehensive and provided a sound basis for conclusions regarding safety impact. Examples included an evaluation of power oscillations due to steam generator tube-sheet blockages (ref. 25) and the by-passing (jumpering) out of two cells of battery 2A (ref. 25). The engineering safety evaluations associated with deviation reports also were generally adequate to support continued operation (ref.22). However, there were two instances where the safety evaluation process failed to provide acceptable results. In one case, a safety evaluation to allow for the administrative control of a manual valve for the low pressure carbon dioxide fire suppression system was performed only upon NRC request (ref.4);

in the other case, improper safety analysis of a revision to a test procedure resulted in a "water hammer" in the reactor coolant system (RCS) and safety injection (SI) piping systems (ref. 6).

Normal inspection effort in this area is recommended.

3.2 Problem Identification and Problem Resolution

The licensee generally provided prompt assessments and resolution to issues emanating from events. For example, engineering provided good assessment of issues pertaining to the cleaning of steam generator tube sheets to eliminate a power oscillation (ref. 13), open circuited charging station batteries (ref. 46), the erosion of the protective lining for the ESW piping (ref. 4), and the marine-fouling of ESW pumps and CCWHXs (ref. 45). However, there were some notable examples where the licensee failed to recognize significant deterioration of equipment that caused delays in the corrective actions and allowed continued plant operation with degraded equipment. For example, engineering failed to identify that Battery 2A was not operable (ref. 28) and that rod control circuit cards and other vital relays had a limited design life (ref. 6 and 98).

Engineering self assessments consist of monthly and quarterly audits, primarily of design functions, along with specific audits in targeted areas. Overall engineering assessments are monitored by the Engineering Program Performance Annunciator Panel Report. QA audits, engineering self assessments, and performance monitoring by management were positive indications of management's efforts to improve overall engineering performance (ref. 26). The engineering assessments and audits were effective at discovering and resolving problems (ref. 26).

The engineering department uses station deviation reports to document, track, and resolve long standing problems. The reports reviewed indicate that the engineering staff adequately responded to these deviation reports with evaluations and recommendations that appeared to resolve the problem (ref. 22). The ability of the licensee to promptly resolve problems was demonstrated during the replacement of aluminum bronze ESW valves (ref. 4), the elimination of power oscillations by steam generator tube sheet cleaning (ref. 25), the modification to reduce pressurizer safety valve seat leakage (ref. 29), during the actions taken to improve the reliability of station batteries (ref. 94), and during plant modifications to improve EDG reliability and availability (ref. 22).

To the contrary, it is not clear whether engineering has been able to resolve some lingering long term problems. Examples of these problems include the loss of reactor water level indication (ref. 1), AFW pump-turbine governor valve problems that resulted in numerous trips for both units (ref. 14, 21, and 117), problems with the charging pump lube oil temperature control systems (ref. 25), several problems in the rod control system which have caused rod drops and manual trips (ref. 6, 37, and 98), and the repeated problems with the macro fouling of the CCWHXs and SW pumps (ref. 22, 85, and 79). Also root cause evaluations were not always effective in preventing recurring equipment problems like control rod system failures, Kaman radiation monitors spurious alarms, and individual rod position indication erroneous readings (ref. 21). In some of these examples engineering failed to determine whether the problems were attributed to a materials issue, a degraded environment, or a combination of both. In some cases, corrective actions were initiated to alleviate a condition, but only the symptoms were addressed allowing the problem to reoccur.

Normal inspection effort in the areas problem identification and problem resolution is recommended.

3.3 Quality of Engineering

The quality of modification and design change packages was generally good. The licensee had a strong program for the review, prioritization, and scheduling of plant modifications which appropriately emphasized nuclear and personnel safety in lieu of operational improvements (ref. 22). Based on the design change packages reviewed by previous inspectors, there were no significant safety related deficiencies identified with reviews, walkdowns, or installation instructions. The only weaknesses identified concerned pre-installation modification package development (ref. 26).

The number of outstanding drawing revisions was not excessive and the controls for updating and maintaining critical drawings were effective (ref. 22). The support of operation and maintenance by engineering was considered good.

Normal inspection is recommended for this area.

3.4 Programs and Procedures

The inspection reports reviewed indicated that surveillance activities were appropriately performed and that implementing procedures were being followed (ref. 18). Controls were adequate to ensure that effective updates of procedures were performed for design changes (ref. 26); however, as previously stated, concern was raised over the control of set-points. Reviews of licensee procedures and the witness of surveillance tests indicated that the surveillance procedures were adequate to support safe operation of the plant. Weaknesses were identified with the maintenance procedure for testing of individual battery cells (ref. 28), with the design change control process for updating the computer calorimetric program (ref. 8) and with a revision of a test procedure that deleted important 'caution' statements (ref. 6).

A high percentage of the engineering staff, including system engineers, had either full senior reactor operator (SRO) training or certifications. System engineers had a strong knowledge of assigned systems (ref. 22) and were actively involved in supporting plant operation and maintenance (ref. 26).

The licensee instituted programs and conducted several assessments that were effective in evaluating and maintaining plant systems and components. Examples of these programs include: the (ISI) program which had well written procedures as demonstrated by the high quality reactor vessel examinations and the evaluation of ultrasonic data (ref. 2 and 33); the flow accelerated corrosion program to maintain high energy carbon steel pipe within acceptable wall limits (ref. 33); and the motor operated valve (MOV) compliance program in which a high number of valves were tested (ref. 15).

Reduced inspection in this area is recommended.

4.0 MAINTENANCE

4.1 Safety Focus

Maintenance management's focus on safety resulted in effective planning and scheduling, supervisory oversight of complex jobs (ref. 32), and basic use of risk-informed decision making (refs. 35). One example of effectively managing risk during a shutdown was the rescheduling of an EDG surveillance during the 1995 Unit 2 refueling outage (ref. 35).

Procedures for on-line maintenance practices requiring voluntary entries into technical specification limiting conditions for operation (LCO) action statements were determined to meet NRC guidance in this area (refs. 27 and 35). Prior to the 1995 Unit 1 shutdown for refueling an increase was noted in the licensee's practice of this type of maintenance (ref. 45). The most significant was work on an EDG that was scheduled for 72 hours, but took 128 hours. This represented a significant delay in the availability of the emergency diesel generator.

Pre-activity briefings were thorough (ref. 32). The most recent outages for both units were completed ahead of schedule, due in part to good outage planning (ref. 35). The maintenance backlog was well managed (ref. 35).

Normal inspection in this area is recommended.

4.2 Problem Identification and Problem Resolution

Maintenance self-assessments and quality assurance (QA) department audits of maintenance were generally effective in identifying problems. For example, the 1994 Check Valve Program Annual Assessment (ref. 151) noted that the failure rate of check valves reportable to the Nuclear Plant Reliability Data System (NPRDS) is currently below industry average; however, some of the check valves listed as risk significant in the individual plant examination (IPE) were either not part of the Check Valve Program or have never been tested to ensure operational reliability. The 1994 Safety and Relief Valve Program Assessment (ref. 150) noted that the licensee continues to experience failures of small safety and relief valve during testing.

Additionally, a QA audit of the measuring and test equipment (M&TE) program, (ref. 169) concluded that it does not meet regulatory requirements and is not being effectively implemented. Specific examples included programmatic weaknesses with the program's control of M&TE, the use of calibrated standards and M&TE, the recording of usage data, the evaluations for retesting, the storage and identification of M&TE, and the trending of M&TE-related deficiencies.

Category 1 root cause evaluations identified root causes for most of the significant plant issues. Several long standing and recurring equipment problems were corrected including replacement of pressurizer safety valves and component cooling water heat exchangers (ref. 51). In addition, condenser outlet expansion joints that are considered to be a major contributor to IPE internal flooding scenarios, were replaced.

The licensee was slow to take effective corrective action on a low voltage condition with station battery 2A, cell 52 (refs. 28 and 39). The licensee concluded that this event was caused by inadequate post-maintenance testing and a personnel error.

Normal inspection in the problem identification area is recommended.

The overall performance in problem resolution area was indeterminate.

4.3 Equipment Performance and Material Condition

Material conditions of selected safety systems such as the low head safety injection, safety injection, EDG air start, and AFW systems were found to be acceptable (refs. 9, 14, and 36). However, during this assessment period, approximately 16 out of 18 plant perturbations (reactor trips, turbine runbacks, and power reductions or shutdowns) were the result of either plant material condition (primarily in the balance of plant) or maintenance and surveillance errors. For example, a reactor coolant pump motor failure (refs. 82); a main transformer differential lockout (refs. 38 and 80); and a trip of a main feedwater pump due to a lubricating oil fitting failure (refs. 29, 67, and 69) caused reactor trips.

In addition, other equipment failed during the post trip recoveries. For example, following Unit 2 reactor trips the main steam reheater control system initially would not reset, a condensate polishing building bypass valve would not close, one of the main steam dump valves did not automatically open, an individual rod position indication light was delayed (ref.82), and a main steam dump valve opened unexpectedly and remained open longer than expected (refs. 38 and 80). Following a Unit 1 reactor trip the turbine-driven AFW pump tripped on overspeed. Less significant discrepancies were also noted during the post-trip response including; two reactor coolant pump annunciators alarmed, a feedwater pump recirculation valve position indicator light did not illuminate, and an individual rod position indication light was delayed (refs. 38 and 80).

Other unexpected equipment failures also challenged site personnel, such as a Unit 1 turbine runback that occurred following a failure of the K-2 control rod position indication (ref. 29), and a hole in the service water outlet piping for the recirculating spray heat exchanger represented a potential pathway for radioactivity to leak outside containment.

Increased inspection in this area is recommended.

4.4 Quality of Maintenance Work

The quality of maintenance and surveillance activities was generally good. NRC inspectors identified few maintenance personnel shortcomings during their observations of maintenance work. For example, maintenance support of the Unit 2 core uprate generally enhanced plant safety (ref. 45). However, personnel errors during maintenance and surveillance activities resulted in unnecessary challenges to equipment and personnel. For example, 50 percent of the Unit 1 control room annunciators failed due to maintenance error during troubleshooting (refs. 43 and 45); a Unit 1 manual reactor trip was initiated in response to a loss of a main feedwater pump due to accidental bumping of a relay during a routine safeguards actuation logic test (refs. 9 and 61); and welding activities on the Unit 1 primary system initiated a hydrogen burn inside the pressurizer (refs. 1 and 52).

Personnel errors also resulted in the loss of both Unit 1 source range nuclear instruments for approximately one minute (refs. 48 and 86), and caused all three pressurizer pressure protection transmitters to be out of calibration (refs. 35, 73, and 74).

Foreign material exclusion problems were identified as a long standing and recurring problem by both the NRC and the licensee (refs. 6, 14, and 24). The licensee has initiated corrective actions and plans to audit this area prior to the 1996 Unit 2 refueling outage (ref. Surry Integrated Assessment Schedule).

Normal inspection in this area is recommended.

4.5 Programs and Procedures

The quality of procedures steadily improved as a result of the licensee's technical procedure upgrade program (ref. 51). Procedural usage by maintenance personnel was usually consistent with licensee management expectations (refs. 35, 43, 45, and 48). The maintenance process for troubleshooting and repairing a turbine-driven auxiliary feedwater pump was ineffective in part because procedures were not used to perform the maintenance (refs. 29 and 32).

Licensee assessments identified problems in the maintenance and test equipment program and in the safety and relief valve program (refs. 150 and 169). All three Unit 2 pressurizer low pressure protection channels were inoperable due to the use of an uncompensated test gage and weaknesses in the M&TE program (refs. 35, 73, and 74).

The licensee's in-service inspection (ISI) program contained the necessary procedures, which were well-written. ISI examinations were performed satisfactorily (ref. 33). The licensee's snubber surveillance program was inspected and it complied with technical specification requirements (ref. 44).

The licensee's preventive maintenance program will be evaluated further during the on-site assessment to determine if it is effective in preventing material condition deficiencies in aging plant equipment.

Normal inspection in this area is recommended.

5.0 PLANT SUPPORT

5.1 Safety Focus

5.1.1 Radiological Controls

The overall radiation protection safety focus was strong and well directed. Strong corporate and station management support (along with active worker involvement) for the ALARA program was instrumental in the program's success (ref. 3). The Five-Year Rad Reduction Program includes plans for radiation source-term reduction along with direction and guidance for continued ALARA program success (ref. 40). The radiation protection organization was stable, with no significant changes in lines of authority, and the number/level of staffing adequate to support outage and normal operations (ref. 31).

The recent outages for both Units have been well planned, supported, and effectively managed; the 1995 Unit 2 outage had the lowest ever worker cumulative exposures (ref. 143). Successful outages are clear indications of good cooperation and communications between radiation protection and the operations and crafts (refs. 4, 31, 34, 35, 42, and 50).

Management consistently placed strong emphasis on improving and maintaining the material conditions by actively reducing contaminated areas. For example, the auxiliary building restoration project significantly improved and eased worker access (refs. 29 and 34).

Reduced inspection effort in this area is recommended.

5.1.2 Security

Management safety focus was evidenced by continued improvements in the program. An example was the recent implementation of the hand geometry based access control system. Management support for the physical security program at the site ensured adequate level of staffing, training, and motivation for the security force (ref. 51B)

Reduced inspection in this area is recommended.

5.1.3 Emergency Planning

The satisfactory performance of the licensee during drills and exercises demonstrated their ability to respond effectively to emergencies at the site. During the 1995 exercise, the emergency facility was promptly staffed and activated. The on-site emergency organization was effective and had sufficient staff to deal with the simulated event. The scenario was challenging and fully exercised the licensee's on-site and off-site emergency organization. The licensee's ability to classify the simulated event was an exercise strength. Minor problems with the off-site notification system were quickly resolved (ref. 39)

In support of the emergency planning program, emergency response facilities continue to be maintained. Additional communications capability has been added to provide additional communication channels for various emergency teams (ref. 19). Training programs continued to be effectively implemented (ref. 51). Interviews with off-site agencies revealed that the licensee has developed and maintained very strong relationships with the state and local support agencies. Excellent critiques, detailed audits, and tracking corrective actions, strong management support indicated an overall excellent program (refs. 19 and 24).

Normal inspection in this area is recommended.

5.2 Problem Identification and Resolution

5.2.1 Radiological Controls

Quality Assurance audits, surveillance programs, and the radiation protection self-assessment program are well organized and provide effective oversight of the radiological program. These audits consistently identified substantive issues and problems, and tracked appropriate corrective actions. The audits have a low threshold for problem identification, as evidenced by the number and type of findings. Lessons learned and items for improvement are clearly communicated (refs. 3, 11, 40, 42, and 50). For example, QA found that forms in use in the plant were not consistent with the current applicable procedure (ref. 158).

The detailed radiological self-assessments were comprehensive and well documented. One excellent example of tracking and trending program performance was in the area of radiation controls procedure compliance. The QA group had earlier made a finding in this area and decided to keep it open, based on continued similar occurrences where workers were not following RWP access requirements (ref. 3, 11, 40, and 50).

Some weakness was noted in the corrective action program in response to NRC and licensee identified events. Two instances where corrective actions to prevent recurrence of NRC-identified problems only focused on the immediate event, and did not address a broader programmatic view. Both instances involved the use of a forms that were not part of the approved governing procedures (refs. 23 and 31).

Reduced inspection effort is recommended for problem identification.

Normal inspection effort in the area of corrective actions is recommended.

5.2.2 Security

The licensee effectively used the yearly Quality Assurance Audits and the quarterly security self assessment program to identify weaknesses (refs. 154, 162 and 165). The QA Reports identified a number of deviations in the fitness-for-duty program and procedures, communication equipment testing, and the uninterruptable power supply (UPS) within the security plan. The security self assessment program provided an internal review of the security department's performance. These quarterly reports examined each segment of the security program from personnel, equipment, procedures, and other supporting programs and conclusions were made (refs. 178 and 179).

Based on the sample of problems identified by audits, inspections, and event logs, the review and analyses were appropriately assigned, analyzed and prioritized, and corrective action was adequately performed in a timely manner. Any negative trends noted resulted in the licensee developing an enhancement program to correct the situation (ref. 51B).

Reduced inspection in this area is recommended.

5.2.3 Emergency Planning

The licensee conducted thorough and extensive annual audits of the emergency preparedness program with the assistance of technical specialists from outside the company. The overall finding of the audits was that the emergency plan satisfied regulatory requirements and that these requirements were effectively implemented. No major deficiencies were identified. However, minor procedural issues were identified during the audits concerning controlled procedures and inventory of emergency kits (ref. 167).

The licensee critiques following exercise and drills were very detailed and complete. Follow-up was prompt and thorough. The identified items were corrected in a timely manner (ref. 39).

Normal inspection in this area is recommended

5.3 Quality of Plant Support

5.3.1 Radiological Controls

The radiological support program provides good job coverage and technical support to operations and crafts, during normal and outage conditions. Especially noteworthy was the well planned support for the off-normal moisture carryover testing (ref. 43). The licensee effectively uses numerous ALARA techniques, including temporary shielding, hot spot elimination, remote HRA surveillance, mockup training, and teledosimetry (ref. 3 and 45). The controls established to control access and work in the incore sump rooms (full-time designated VHRA), along with the tag-out of the moveable incores guard against inadvertent, serious worker overexposure (refs. 3 and 23). The control and elimination of contamination is a program strength. The major revision to 10 CFR Part 20 was successfully implemented, with a notable aggressive reduction in respirator use, while maintaining TEDE ALARA with proper use of engineering controls (refs. 3, 23, and 40). The 1994 health physics technical continuing training program was successfully completed (ref. 31).

Three examples of failure to follow radiation controls procedures governing access to the incore sump rooms were identified by the NRC and resulted in a severity level IV notice of violation (NOV) (refs. 23 and 31).

Normal inspection effort in the occupational radiation program area is recommended.

5.3.2 Security

The licensee effectively maintained radiological controlled area boundaries and the security perimeter (ref. 43). Security personnel were knowledgeable about fire control responsibilities in conjunction with compensatory measures during battery room maintenance (ref. 25).

Reduced inspection in this area is recommended.

5.3.3 Emergency Planning

Licensee's performance in the Emergency Planning area continues to be excellent (ref. 51). Response of the licensee during exercises and drills was very good. During the 1995 exercise, the emergency facility was promptly staffed and activated. The on-site emergency organization was effective and had sufficient staff to deal with the simulated event. The scenario was challenging and fully exercised the licensee's on-site and off-site emergency organization. The licensee's ability to classify the simulated event was an exercise strength (ref. 39).

There is strong management support for the program. Changes in organization in 1995 did not affect the effectiveness of the program (ref. 19). Audits and exercise critiques were found to be detailed and comprehensive. Corrective actions were timely and thorough (refs. 19 and 24).

Normal inspection in this area is recommended

5.4 Programs and Procedures

5.4.1 Radiological

The site has effective effluent and environmental controls programs, with well trained, knowledgeable health physics technicians (HPTs). Radwaste processing and shipping was conducted in a competent, professional manner, while the volume and number of radwaste shipments has remained relatively constant over 1991-1994. An example of the quality of the radwaste program and the commitment to occupational ALARA is the significant exposure reduction for processing a high integrity container (refs. 11, 20, and 42).

A NCV was issued as a result of multiple licensee-identified examples of workers failing to adhere to rad control procedures during outage work; examples included failure to wear extremity dosimeters for S/G work, not wearing teledose dosimetry, work in the seal table area without dosimetry (DAD). The immediate corrective action was effective. As a result, the licensee requested independent corporate assessment and kept specific work groups out of radiological controlled areas (RCA) until corrective actions were implemented. They also instituted dedicated health physics technician

(HPT) at access points to improve access compliance during the outage. Previous licensee audit findings had identified problems with worker compliance with HP procedures (ref. 50).

A notable radwaste operational problem was the over pressurization of a chemical radwaste tank, which resulted in personnel injury and the declaration of a notification of unusual event (NOUE). The event details and the licensee's corrective actions will be reviewed during the on-site IPAP team inspection (refs. 27 and 34).

Normal inspection is recommended in this area.

5.4.2 Security

The NRC verified that the security plan and procedures were in compliance with the regulations. The licensee effectively implemented the security plan and applicable procedures for training and qualification, contingency plans, security patrols, inspection and testing, defensive positions, physical security barriers, security alarm station operation, and security records (refs. 5, 30, and 51B). The Fitness-For-Duty Program was thorough (ref. 12).

The licensee's Access Authorization Program was reviewed against the requirements in 10 CFR 73.56. The program and procedures appeared to be well managed and thorough for all aspects of the program (ref. 41).

Reduced inspection in this area is recommended.

5.4.3 Emergency Planning

Minor problems with procedures involved the maintenance of controlled copies in one of the emergency response facilities and controlled documents in the emergency kits (ref. 167).

The licensee's system for making changes to the Surry Emergency Plan and EPIPs was found to be effective. Changes to EPIC and plans were approved, documented, and distributed on a timely basis (ref. 19).

Normal inspection in this area is recommended

APPENDIX A

LIST OF REFERENCES

Inspection Reports 1993 & 1994

Ref. No.		
0	93-16	SALP Report for Period, 4/5/92 to 7/3/93
1	94-02	Core Resident Inspection; Inservice Testing
2	94-04	Routine Inservice Inspection in regard to 2nd ten year interval
3	94-05	Occupational Radiation Exposure
4	94-06	Core Resident Inspection; Refueling
5	94-07	Physical Security
6	94-08	Core Resident Inspection; LER Follow-up
7	94-09	Service Water System Operational Performance Inspection
8	94-11	Core Resident Inspection; On-site Engineering Review
9	94-12	Core Resident Inspection; On-site Engineering Review; LER Follow-up
10	94-13	Low Head Safety Injection flow testing; Setpoint Validation Program
11	94-14	Radwaste Mgt.; Effluent Reports; TS Chemistry Parameters
12	94-15	Fitness for Duty
13	94-16	Review of S/G tube pulse cleaning; FW system leaks; Flow Accel. Corrosion
14	94-17	Core Resident Inspection
15	94-18	Licensee Compliance with Generic Letter 89-10 for Safety-related MOVs
16	94-19	Review of Station Blackout Commitments
17	94-20	Review of Requalification Program for ROs and SROs
18	94-21	Core Resident Inspection; Safety Assessment & Quality Verification; LER Followup; Engineering Tech Spec Review

1994 Inspection Reports Cont'd.

Ref. No.		
19	94-22	**Emergency Planning**
20	94-23	**Org. of Chem.Dept.&RW Group;PW & SW Chemistry;REMP;CR Emer. Vent.**
21	94-24	Core Resident Inspection; LER Followup
22	94-25	**Engineering & Tech. Support (Org.; Training; Mgt.; Interfaces; Controls)**
23	94-26	**Review Implementation of New 10CFR20**
24	94-27	Core Resident Inspection; On-site Engr. Review; Annual Emergency Exercise; LER Followup
25	94-28 LER	Core Resident Inspection; On-site Engr. Review; Plant Support; Followup
26	94-30	**Engineering & Tech. Support** (Procedures; Personnel Interviews; **Activities in Progress)**
27	94-31 LER	Core Resident Inspection; On-site Engr. Review; Plant Support; Followup
28	94-32	**Special Inspection To Review Inoperability of Unit 2 Station Battery**
29	94-33	Core Resident Inspection; Plant Support; Safety Assessment & Quality Verification

1995 Inspection Reports

30	95-01	**Physical Security**
31	95-02	**Occupational Radiation Exposure**
32	95-03	Core Resident Inspection; On-site Eng. Review; Plant Support
33	95-04	Inservice Inspection; Flow Accelerated Corrosion; FW Heater Replacement
34	95-05	Core Resident Inspection; On-site Eng. Review; Plant Support; LER Followup
35	95-06	Core Resident Inspection; On-site Eng. Review; Plant Support

Ref. No.		
36	95-07	Core Resident Inspection; Plant Support; LER Followup
37	95-08	Core Resident Inspection; On-site Engineering Review; Plant
38	95-09	Core Resident Inspection; Plant Support; LER Followup
39	95-10	**Emergency Planning**
40	95-11	**Occupational Radiation Exposure**
41	95-12	**Access Authorization Program per 10CFR73.56**
42	95-13	**Org. of Chem. Dept. & RW Group; PW & SW Chemistry; REMP; Transportation of Radwaste**
43	95-14	Core Resident Inspection; On-site Engineering Review; Plant Support; LER Followup
44	95-15	**Surveillance of Snubbers; New Construction; Transport of Spent Fuel Casts**
45	95-16	Core Resident Inspection; On-site Engineering Review; Plant Support
46	95-17	Core Resident Inspection; On-site Engineering Review; Plant Support, Turbine Building Flooding; Discrepancy Reports Review
47	95-18	**Review requalification program of ROs and SROs**
48	95-19	Core Resident Inspection; Refueling; On-site Engineering Review; Plant Support; Self Assessment; LER Followup
49	95-20	**Special Inspection for Loss of Rx Inventory**
50	95-21	**Occupational Radiation Exposure**
51	95-99	**SALP Report for Period 7/14/93 to 1/21/95**
51A	95-22	Core Resident Inspection; Reactor Trip
51B	95-25	Physical Security

Licensee Event Reports in 1994

Ref. No.	
52	94-001-00 (50-280)- Hydrogen in PZR ignited by welding
53	94-001-00 (50-281)- Both trains aux. vent. filtered exhaust inoperable
54	94-002-00 (50-280)- Test of MSSVs indicated setpoint drift
55	94-002-00 (50-281)- Both trains aux. vent. filtered exhaust inoperable
56	94-003-00 (50-280)- Small hole in piping of RSHX B
57	94-003-00 (50-281)- Failure to close CVCS makeup valve following dilution
58	94-004-00 (50-280)- Hot leg isol. valve not operated per T.S. time limit
59	94-004-00 (50-281)- LCO not timely for Inoperable Battery
60	94-005-00 (50-280)- Unit Output exceeds T.S. limit due to instrument error
61	94-006-00 (50-280)- Manual Rx trip due to MFW isolation causing S/G levels to rise
62	94-007-00 (50-280)- Contrary to T.S.-Vent Stack Rad Monitor INOP
63	94-008-00 (50-280)- Both aux. vent. trains INOP due to a single event
64	94-008-01 (50-280)- Revised LER 94-008-00 to show violation of T.S. because sampling of filters not performed
65	94-008-02 (50-280)- Inconsistency in verifying operability of new charcoal beds thus LER revised
66	94-010-00 (50-280)- EDG Battery Surveillance Missed Due to Personal Error

Licensee Event Reports in 1995

Ref. No.		
67	95-001-00 (50-280)-	Auto Rx Trip due to failure of MFP Coupling
68	95-001-00 (50-281)-	PZR H/U exceeds T.S. (Procedure Control)
69	95-001-01 (50-280)-	Revised LER due to clarification for turbine driven AFW pump trip following the auto Rx trip
70	95-002-00 (50-280)-	Smoke detectors not tested per T.S. Surv. Time limit
71	95-002-00 (50-281)-	MS & PZR Safety valves out-of-tolerance
72	95-003-00 (50-280)-	Auto. initiation of AFW @ Lo-Lo S/G level
73	95-003-00 (50-281)-	PZR P.T.s out of calibration due to faulty gauges
74	95-003-01 (50-281)-	PZR P.T.s out of calibration due to faulty gauges not being temperature compensated basis for LER revision
75	95-004-00 (50-280)-	Missed Battery Surveillance Due to Personal Error
76	95-004-00 (50-281)-	Installation of Damaged Circuit Card Resulted in Unit 2 Manual Trip
77	95-005-00 (50-280)-	Error in calculation to convert T.S. NAOH Volume to Level
78	95-005-00 (50-281)-	Manual Rx Trip due to control rods dropping into core
79	95-006-00 (50-280)-	ESW Pumps inoperable due to marine growth
80	95-006-00 (50-281)-	Auto Rx trip due to main xfmr protective relay actuation
81	95-007-00 (50-280)-	Operation with non-isolable leak in PZR instrumentation nozzles
82	95-007-00 (50-281)-	Rx trip due to failed Rx coolant pump motor
83	95-008-00 (50-280)-	PZR Safety valve as found setpoint out of tolerance
84	95-009-00 (50-280)-	Loss of 4KV BUS then EDG start due to personal error
85	95-010-00 (50-280)-	Four CCW heat exchangers inoperable due to macrofouling

Licensee Event Reports in 1995

Ref.
No.

86 95-011-00 (50-280)- Both source range nuclear instruments de-energized due to personal error

Other Reports and Documents Reviewed

87 Commission Briefing Paper (Visit between VEPCO and NRC)

88 Surry Event Matrix

89 Plant Status Report June 1994

90 Plant Status Report October 1994

91 Plant Status Report March 1995

92 Plant Status Report September 1995

Category 1 Root Cause Evaluations

Ref. No.		Ref. No.	
93	95-01	94	95-03
95	95-04	96	95-05
97	95-07	98	95-08
99	95-09	100	95-10
101	95-11	102	95-12
103	95-13	104	94-01
105	94-02	106	94-04
107	94-05	108	94-06
109	94-07	110	94-08
111	94-09	112	94-10
113	94-11	114	94-12
115	94-14	116	94-15
117	94-18	117B	95-02
117A	93-25		

Emergency Planning

Ref. No.	
118	Emergency Plan Audit Report C95-03
119	Emergency Plan Audit Report C94-05
120	Surry Power Sta. Drill and Exercise Critique Item Res. Report April 1994
121	Surry Power Sta. Drill and Exercise Critique Item Res. Report July 1994
122	Surry Power Sta. Drill and Exercise Critique Item Res. Report Sept.1994
123	Surry Power Sta. Drill and Exercise Critique Item Res. Report April 1995
124	Surry Power Sta. Drill and Exercise Critique Item Res. Report May 1995
125	Surry Power Sta. Drill and Exercise Critique Item Res. Report June 1995

Chemistry

126	Chemistry Data Report - August 1995
127	Chemistry Data Report - Sept. 1995
128	pH Comparison Report - August 1995
129	pH Comparison Report - Sept. 1995
130	pH Comparison Report - Oct. 1995
131	Corrosion Product Transport Report - April 1995
132	Corrosion Product Transport Report - August 1995
133	Sludge Analysis Report - Cycle 12
134	Early Boration Report Fuel Cycle 12 - Unit 1
135	Early Boration Report Fuel Cycle 12 - Unit 2
136	Hideout Return Evaluation Cycle 12 - Unit 1
137	Hideout Return Evaluation Cycle 12 - Unit 2
138	Evaluate Alternate Amine Chemistry Effects - Sept. 1995

Radiological (Health Physics)

Ref. No.	
139	Dose Rate Trending Program Status Report - July 1995
140	Hot Spot Reduction Program Status Report - Nov. 1995
141	Radwaste Facility Operating Report - December 1994
142	Radwaste Facility Operating Report - September 1995
143	Unit Two 1995 Refueling/10 Year ISI Outage Alara Report - Unit 2
144	Radiological Awareness Reports - August 1995
145	Radiological Survey Program Eval. - 4th Qtr. 1994 thru. 2nd Qtr. 1995
146	Restricted/Controlled Area Dose Eval. - 1st Qtr. thru. 2nd Qtr. 1995
147	Radioactive Material Control Program Eval. - Annual 1995
148	Exposure Control Program Eval. - Annual 1995
149	Bioassay Program Surveillance and Evaluation - 1st thru 4th Qtr. 1994

Maintenance

150	1994 Safety & Relief Valve Program Assessment
151	1994 Check Valve Assessment Comments

Quality Assurance Assessments

Ref. No.		Ref. No.		Ref. No.	
152	S94-01	153	S94-02	154	C94-03
155	C94-04	156	C94-05	157	S94-06
158	S94-07	159	C94-08	160	S94-09
161	S94-10	162	C94-11	163	S94-12
164	S94-13	165	C95-01	166	S95-02
167	C95-03	168	S95-04	169	S95-11
170	95-06	171	C95-07	172	C95-08
173	95-09	174	95-10		

Quarterly Trend Reports for Deviation Reports

Ref. No.	
175	First Quarter 1995
176	Second Quarter 1995
177	Third Quarter 1995

Nuclear Administration Services Self Assessments

178	1st thru. 4th Quarters of 1994
179	1st thru. 4th Quarters of 1995

Business Plans

1994

Ref. No.		Ref. No.	
180	August	181	Sept.
182	Oct.	183	Nov.
184	Dec.		

1995

185	Jan.	186	Feb.
187	March	188	April
189	May	190	June
191	July	192	Aug.
193	Sept.	194	Oct.

Engineering

Ref. No.	
195	Surry Power Station Response to Reg. Guide 1.97
196	Surry Power Station Eng. Accomplishments and Initiatives for April 1995
197	Inservice Testing Program Plan for Pumps and Valves
198	Self Assessment for Appendix R Program 1994
199	ISI Self Assessment for Snubbers in 3rd Quarter in 1995
200	Self Assessment for Appendix R Program 1995
201	Level 2 EQ Self Assessment 1994
202	Level 2 EQ Self Assessment 1995
203	Q-List Assessment for 1994
204	Self Assessment Vendor Technical Manual Program 1994
205	Self Assessment Vendor Technical Manual Program 1995
206	Procurement Technical Evaluations Self Assessment Report
207	Self Assessment on the Potential Problem Reporting System
208	EDS Self Assessment Update 1994
209	Self Assessment on NDCP Procedures and Standards
210	DCP Process Self Assessment Engr. Review Board Meeting Minutes Apr. 1995
211	DCP Process Self Assessment Engr. Review Board Meeting Minutes May 1995
212	DCP Process Self Assessment Engr. Review Board Meeting Minutes Aug. 1995
213	Self Assessment of DCP Process by Review of DCP 91-27
214	Self Assessment of DCP Process by Review of DCP 93-088
215	Self Assessment of DCP Process by Review of DCP 94-008
216	IPAP Nuclear Materials Self Assessment
217	Special Assess. of Westing. Non-Partnership Material/Services Requests

Engineering (cont.)

Ref. No.	
218	System Engineering Quarterly Report - 1st Quarter 1994
219	System Engineering Quarterly Report - 2nd Quarter 1994
220	System Engineering Quarterly Report - 3rd Quarter 1994
221	System Engineering Quarterly Report - 1st Quarter 1995
222	System Engineering Quarterly Report - 2nd Quarter 1995
223	System Engineering Quarterly Report - 3rd Quarter 1995
224	System Engineering Quarterly Report - 4th Quarter 1995

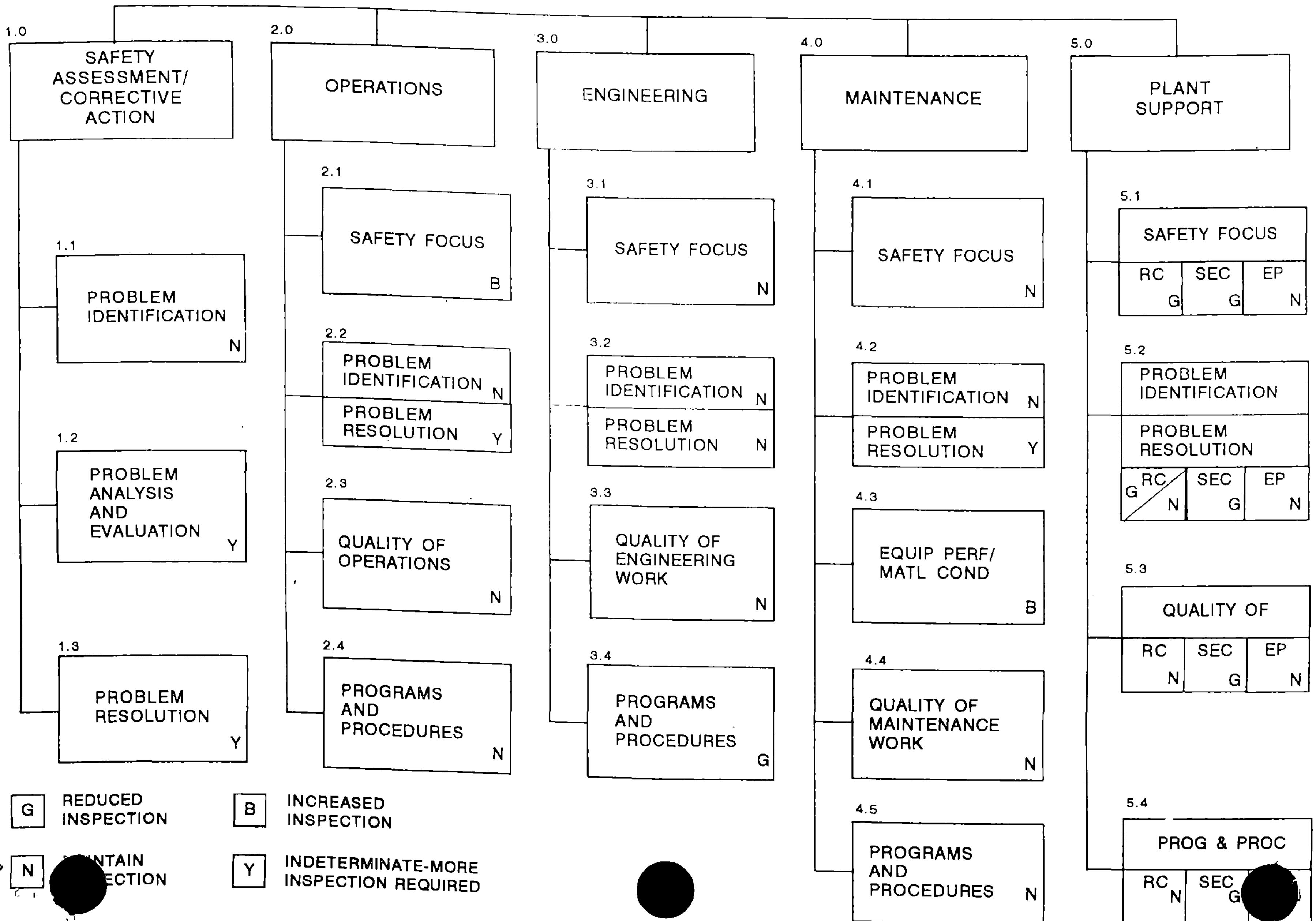
Miscellaneous References

225	Corrective Action Audit, Nuclear Oversight Audit Report/95-09
226	Hinson-Crutchfield Memorandum--12/29/95

APPENDIX B

SURRY POWER STATION UNITS 1 AND 2

PRELIMINARY PERFORMANCE ASSESSMENT/INSPECTION PLANNING TREE



G REDUCED INSPECTION

B INCREASED INSPECTION

N ...NTAIN ...ECTION

Y INDETERMINATE-MORE INSPECTION REQUIRED