CLINTON SALP 12

REPORT NO. 50-461/93001

I. INTRODUCTION

The SALP process is used to develop the NRC's conclusions regarding a licensee's safety performance. The SALP report documents the NRC's observations and insights on a licensee's performance and communicates the results to the licensee and the public. It provides a vehicle for clear communication with licensee management that focuses on plant performance relative to safety risk perspectives. The NRC utilizes SALP results when allocating NRC inspection resources at licensee facilities.

This report is the NRC's assessment of the safety performance at Clinton Power Station for the period May 1, 1992, through November 27, 1993.

An NRC SALP Board, composed of the individuals listed below, met on December 7, 1993 to review the observations and data on performance and to assess performance in accordance with the guidance in NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance."

Board Chairperson
E. G. Greenman, Director, Division of Reactor Projects, RIII

Board Members
J. E. Dyer, Director, Project Directorate III-2, NRR
W. L. Forney, Deputy Director, Division of Reactor Safety, RIII
P. Ting, Acting Deputy Director, Division of Radiation Safety and Safeguards, RIII

II. PERFORMANCE RATINGS

The current SALP process assesses performance in four functional areas instead of the previous seven. The four areas are Operations, Maintenance, Engineering, and Plant Support. Safety Assessment/Quality Verification is considered for each of the four functional areas rather than as a separate functional area. The Plant Support functional area assesses radiological controls, emergency preparedness, security, chemistry, and fire protection. Three category ratings (1, 2, and 3) continue to be used in the assessment of performance in each functional area. Performance trends, improving or declining, have been eliminated as a part of the ratings.

Current Functional Areas and Ratings:

Functional Area	Rating This Period
Plant Operations	1
Maintenance	1
Engineering	2
Plant Support	2

Previous Functional Areas and Ratings:

Functional Area	Rating Last Period
Plant Operations	1
Maintenance/Surveillance	2 Improving
Engineering/Technical Support	2
Radiological Controls	2
Emergency Preparedness	1
Security	2 Improving
Safety Assessment/Quality Verification	2

III. PERFORMANCE ANALYSIS

A. Plant Operations

The overall performance of plant operations has continued to show steady improvement over the last two SALP periods and remained at an excellent level. Operating history improved with reductions in scrams, safety system actuations, safety system failures and forced outage rates. An excellent focus on safety was demonstrated in the conduct of plant operations. Station management's conservative operating philosophy was clearly evident in all groups at Clinton and was a significant contributor to this excellent performance. An example of this was the operators' decision to immediately scram the unit before any indications of core oscillations developed, when an equipment failure caused a reactor recirculation runback that potentially led to entry into the power-to-flow instability region. Evaluations of equipment operability for motor operated valves and diesel generators and implementation of technical specification limiting conditions for operation were very conservative. Management aggressively addressed shutdown safety issues.

Management involvement in plant operations was excellent. The Senior Vice President was personally involved in operator training on reactor safety and industry events. A significant commitment was undertaken to upgrade the entire technical specifications to enhance operations performance. Personnel in the radwaste group were integrated into the operations department to improve control over equipment status and manipulations.

Operator control and coordination of plant activities during normal operations and the three startups and shutdowns was very good due to strong shift management and effective pre-briefings for major evolutions. Operators' prompt response to several plant transients and effective actions taken to stabilize the plant were excellent. Control room demeanor and professionalism remained excellent. The number of personnel errors was reduced. However, some examples of poor communications included; overflowing of the ultrasonic resin cleaner, not closing the vent and drain valves on a reactor water cleanup pump before pressurizing the system, and overflowing the spent fuel pool. These examples indicated a continued need for improvement to maintain the present high level of performance.

Identification and resolution of issues was very good. The threshold for initiating Human Performance Evaluation System (HPES) reviews was lowered. A low threshold for initiation of Condition Reports (corrective actions) was clearly demonstrated by plant personnel. Corrective actions taken to improve the emergency operating procedures (EOP) were very effective and the quality of the EOPs improved significantly.

Programs and procedures were considered very good. The quality of operating procedures and specifically the EOPs was excellent. Significant progress was made in reducing the number of temporary modifications installed in the plant; whereas, progress in the plant re-labeling program was not as rapid. Operations, maintenance, and engineering were very effective in working together to improve the availability of critical safety systems such as diesel generators and emergency core cooling systems. Improvements were also made in systems important to safety, such as the reactor water cleanup system. This has led to improved reactor water chemistry and reduced maintenance radiation exposures. The effectiveness of the initial and requalification training programs for licensed operators was superior.

The performance rating is Category 1 in this area.

B. Maintenance

Performance in the maintenance area improved and was overall excellent. Active management involvement and innovative approaches resulted in improved reliability monitoring and maintenance practices, and in overall excellent equipment reliability. However, some work control problems evidenced in the recent outage pose a continuing management challenge.

Management involvement and safety focus in the area of maintenance were effective at achieving excellent equipment reliability. Overall, the recent refueling outage was planned and executed very well but some work control problems existed. Daily planning meetings during operating and outage periods

ensured that maintenance and testing activities were scheduled to increase equipment reliability and minimize challenges to operations. Senior management was frequently present during the daily meetings and often observed key maintenance in the plant. Management initiatives included: an aggressive material condition monitoring program; personnel exchanges with Fermi Nuclear Station during outages; development of an onsite testing capability for safety relief valves (SRVs); improved quality of work packages; and improved planning, scheduling, and coordinating with other station organizations. However, there were several instances where the safety focus of contractor personnel during outages was poor. Two examples were the multiple problems with complying with equipment danger tags and control of foreign material exclusion near the open reactor vessel. Management actions to correct these problems, once understood, were effective.

The overall material condition of the plant was generally excellent and equipment failures caused few challenges throughout the 306 day operating run. Equipment problems were usually identified and resolved quickly, resulting in a reduced backlog of corrective and preventive maintenance items that remained below industry norms and licensee's 1993 goals. Post-maintenance testing failures and rework rates remained low. Initiatives taken to improve material condition included: overhaul of critical equipment based on predictive maintenance assessments, chemical cleaning of portions of the reactor water cleanup and reactor recirculation systems, reduction of contaminated areas within the plant, and continuation of the ten-year painting and restoration program. Significant steps were taken to implement reliability centered maintenance concepts with systematic reviews completed on eight systems. These efforts, which are continuing, are aimed at assuring maintenance and other resources are most effectively utilized.

Programs and procedures for the conduct of maintenance activities were considered to be very good and resulted in high quality maintenance. However, several examples of improper procedure implementation and lack of attention to detail occurred, principally during outages. Aggressive steps were taken to resolve equipment problems which were highlighted by trending activities. Examples include resolution of difficult recirculation system and reactor water cleanup system pump seal problems. The onsite SRV testing and refurbishment facilities were the first developed at a domestic BWR and resulted in reduced radiation exposure and expedited testing and repair. The Material Condition Monitoring Program employed state-of-the-art diagnostic and predictive maintenance techniques to assess and trend equipment performance and to facilitate identification of problems before equipment failure occurred. Additionally, the use of mockups and training was very effective at improving testing of motor-operated valves (MOVs) and refurbishment of reactor water cleanup and reactor recirculation pumps' seals. This has led to significant improvements in the reliability of these seals. Self assessment activities were strong. There is a low threshold for reporting problems. Management reports are candid and self-critical providing management with a sound basis for addressing issues at an early stage when they can be most effectively dealt with.

The performance rating is Category 1 in this area.

C. Engineering

A strong safety focus and good support to other organizations was exhibited towards emergent issues and resolution of existing equipment problems. While overall performance in the engineering area has improved, there were some fundamental weaknesses identified in the areas of understanding of design basis and root cause analysis. A lack of understanding of design resulted in weak 50.59 reviews. Inconsistent root cause analyses contributed to corrective actions that were not thorough.

Management involvement and oversight of engineering activities was generally good. Aggressive management oversight of emergent issues resulted in the quick resolution of problems identified with a nuclear system protection system inverter, the "B" recirculating water pump motor, and pressure transients in the shutdown service water system. Management also continued efforts to reduce reliance on contractors by increasing "in house" expertise for review of design calculations and modification analyses. Additionally, management has taken a leading role in several industry initiatives, including the BWR/6 owners group lead for improved technical specifications and hydrogen control for Mark III containments. However, the lack of a formal fuse control program, and the initially slow response to schedular problems in the MOV program indicated a need for additional management attention in these areas.

Performance in the area of understanding of design was considered mixed. System engineers were knowledgeable and worked closely with design engineers and maintenance personnel in the removal of a number of unnecessary snubbers in safety and non-safety related systems. Additionally, they were involved in replacement of an AC driven air compressor to improve reliability of the DIV III emergency diesel generator air start system. Notwithstanding, a poor understanding of plant systems design bases was exhibited in a number of modifications to the plant. Examples included; the non-challenging design review of the modification to the "A" fire pump, the failure to identify the hydraulic instability in the component cooling water system, the use of non-conservative values in the design calculations for the battery voltage used to determine the potential for short circuits, and the selection of a stroke time for a residual heat removal (RHR) valve that was different than specified in plant Technical Specifications.

Performance in the area of identification and resolution of technical issues was also mixed. In general, response to identified problems involving pressure transients and the failure of the "A" pump in the shutdown service water system were excellent. However, corrective actions and root cause analyses of failures in RHR system supports and a shutdown service water minimum flow valve were poor.

Self assessment activities in the engineering area were considered to be good overall. Evaluations resulted in the identification of the need for additional engineering expertise for efforts related to modifications and the evaluation of emergent technical issues and problems with plant systems and components. However, engineering self assessments did not identify the weaknesses in root cause analysis and ineffective corrective actions.

The performance rating is Category 2 in this area.

D. Plant Support

The overall performance in the plant support area was very good. The strengths were evidenced by a strong radiation protection management team, excellent implementation of the new 10 CFR Part 20 requirements, significant improvements in planning and scheduling throughout the cycle related to the radiation protection and the ALARA program, an improved security program, and an effective emergency preparedness program. However, there were noticeable weaknesses which impacted the overall performance. These included; outage dose significantly exceeded goals, poor outage dose projection for emergent work, poor documentation of identified deficiencies in some audits and surveillances, corrective actions not routinely reviewed for root cause analysis, poorly implemented deficiency reporting program, as well as poor housekeeping resulting from ineffective interfaces with other departments.

The focus on safety issues was very good. It was evidenced by significant improvements in job planning and scheduling, excellent performance in the emergency exercise, proper classification of unusual events and timely offsite notifications. The security program remained strong with a significant upgrade to the perimeter detection system resulting in improved detection capability. Implementation of tactical firearms capability was good. Personnel contamination events were close to expectations and were low. Source term reduction efforts were good. Non-outage personnel exposures were very good and below projections; however, exposure for the outage was poor and considerably above goals.

Management involvement was very good. The early implementation of the new 10 CFR Part 20 regulations was excellent. Improvements were made in the chemistry and radiation protection management teams. Emergency response facilities were excellent, and the emergency preparedness (EP) drill program was very good. The EP staff was strong, and dose assessment models were upgraded. Security management was active in assuring implementation of program requirements as evidenced by equipment upgrades and training improvements. However, the followup of housekeeping problems was weak and reflected poor cooperation between departments.

Identification and resolution of technical issues was good. Effective corrective actions were taken to resolve weaknesses noted during EP exercises. Compensatory measures implemented in response to the Thermo-Lag issue were good. Aggressive utilization of security tracking and trending programs resulted in improved equipment performance and reduction in personnel errors. Problem identification was good; however, documentation, root cause analysis, and resolution of problems were weak as evidenced by the fact that some issues raised by auditors during the 1993 QA audit of the radiation protection program were not included in the text of the audit report. Radiation protection failed to adequately update dose projections against actual dose expended during the outage, which contributed to management's failure to implement corrective actions to help minimize dose.

Self-assessments performed were very good. Radiation protection personnel identified deficiencies and took steps to correct them as evidenced by improvements in the job planning and scheduling process. Emergency preparedness exercise evaluations were excellent and audits met all requirements. Security was aggressive in development of self-audits which resulted in major security system upgrades.

Training in the plant support area was excellent. Implementation of the new 10 CFR Part 20 regulations, vendor training, and continuing training were excellent. Requalification training was very good and the emergency preparedness group was involved with industry groups. Security tactical training was extensive, the staff was experienced, drills were good, and weapons capability was upgraded. Fire brigade drill performance was good.

Support for other organizations was excellent. Improvements in the job planning and scheduling process provided the radiation protection department with increased capability to support work throughout the plant. Interfaces with the State and the local law enforcement agencies were excellent in the emergency preparedness and security areas, respectively. There was good support for security from maintenance and operations. Fire drills had good plant support and backup fire departments were brought in for training.

The performance rating is Category 2 in this area.