LaSalle County Nuclear Generating Station - SALP 13
(Report Nos. 50-373;374/96001)

I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) process is used to develop the Nuclear Regulatory Commission's (NRC) conclusions regarding a licensee's safety performance. Four functional areas are assessed: Plant Operations, Maintenance, Engineering, and Plant Support. 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 the LaSalle County Nuclear Generating Station for the period from November 27, 1994, through August 3, 1996.

An NRC SALP Board, composed of the individuals listed below, met on August 14, 1996, to assess performance in accordance with the guidance in NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance."

Board Chairperson
J. A. Grobe, Acting Deputy Director, Division of Reactor Projects, Region III

Board Members
R. A. Capra, Director, Project Directorate III-2, NRR
H. B. Clayton, Acting Deputy Director, Division of Reactor Safety, Region III

II. PERFORMANCE ANALYSIS

A. Plant Operations

Slow improvement in control room formality, operator discipline and operator performance was evident through most the assessment period. Management emphasized higher standards and expectations with some success; however, control room and auxiliary operator errors and a series of non-conservative decisions during the June 1996 service water event showed a poor safety focus by operators, engineers and senior management. Further, operator work-arounds and plant materiel condition deficiencies continued to impact plant operations.

Operating decisions were generally conservative, with improved safety decisions implemented lower in the organization. Examples included operator responses to a loss of main transformer cooling and to high main turbine vibrations. During these events, the control room crew recognized the abnormal conditions, developed conservative plans to deal with the emerging problems, and effectively implemented those plans to maintain the plant in a safe condition.

Conversely, one significant event occurred where operators, engineers and senior management demonstrated an inappropriate safety perspective. Non-conservative operating decisions were made based on inadequate technical assessment and system operability evaluations following significant operating transients on June 19 and 24, 1996, related to foam sealant which had been inadvertently injected into the safety-related service water tunnel. The operating crews returned the units to full power without understanding the cause of the transient and without an operability evaluation for the affected safety systems. Finally, when available information no longer supported continued operability of safety systems, NRC intervention with plant management was necessary to assure proper actions were implemented.

In general, the discipline of operations performance during routine power operations, startups, shutdowns, response to alarm conditions and outages improved during this assessment period. However, corrective actions to minimize human performance errors were not fully effective. Operations management continued to set high expectations and standards for operations; however, personnel errors continued to occur, including multiple errors in clearing or establishing out-of-service tags. In one case, a manual reactor scram was narrowly avoided when an incorrect valve was closed. Other examples included removal of the mode switch key for no apparent reason, and acceptance of an alarm on the local diesel panel as normal during surveillance testing.

Plant materiel condition deficiencies continued to pose unnecessary challenges to the operators. For example, operations had long tolerated a significant work-around involving installation of jumpers around a main steam line isolation signal upon occurrence of high temperature in the steam tunnel. This work-around was the key factor in a main steam line isolation and reactor scram during this assessment period. In another example, a known design weakness in the reactor water cleanup system contributed to a reactor water resin intrusion.

Self-assessment in the operations area was good and contributed to improvements in several areas. Operations management initiated benchmarking trips to other nuclear plants to stimulate new ideas and find improved ways to conduct operations. Although this effort was positive overall, its effectiveness was somewhat limited due to the lack of participation by nuclear station operators. Other examples of self-assessment involved elevating the priority of the procedure upgrade program and increasing management involvement in the licensed and non-licensed operator training programs.

The Plant Operations area is rated Category 3.

B. Maintenance

Overall performance in the maintenance area resulted in an acceptable level of safety. However, continuing problems with plant equipment were indicative of weaknesses in initial design and in work control, personnel performance, procedures and preventive maintenance. While some improvements were observed in the areas of plant materiel condition and work control, these areas require continued management attention.

Progress was slow on improving overall materiel condition of the station. Improvements were implemented for several long-standing equipment deficiencies and operator work-arounds. Examples included repairs to the reactor recirculation system, replacement of main steam isolation valve (MSIV) solenoid pilot valves, and modifications to the main steam line leakage detection system to avoid spurious isolations. In addition, some progress was made in reducing the corrective maintenance backlog and good focus was generally demonstrated in the timely completion of safety-related corrective maintenance. Nevertheless, a large amount of emergent work, rework, and difficulties in planning and executing work, hindered progress in implementation of the station's materiel condition improvement plan.

Implementation of the performance-centered maintenance process continued, but residual weaknesses in the preventive maintenance program contributed to equipment failure. Degraded ventilation systems, due to poor design and to ineffective or nonexistent preventive maintenance, accelerated the thermal aging of some components and reduced the amount of effective work that individuals could perform due to heat stress. Efforts to improve plant ventilation systems were noted. Other materiel condition deficiencies caused inoperable safety equipment, forced shutdowns, plant transients, and engineered safety feature (ESF) actuations. For example, during the current SALP period, equipment-related problems contributed to four scrams and several forced shutdowns and restart delays.

Several work control process changes were made with some focused improvements noted in the allocation of resources, planning, scheduling and interdepartmental coordination. However, significant deficiencies continued to exist in the ability to execute the work schedule. As noted above, this contributed to slow progress on materiel condition improvement items. In addition, deficiencies in the work control process continued to result in several missed surveillances. For example, a surveillance of the 125 VDC batteries was unintentionally deleted from the master surveillance database; a diesel generator calibration procedure was signed off as complete when it had not been performed; and fire protection valve positions were not verified because it was not recognized that the surveillance interval was exceeded.

A major breakdown in work control late in the assessment period resulted in work on a safety-related structure being classified as minor maintenance and the work was performed without sufficient reviews, procedures, or oversight. As a result, foreign material was injected into the safety-related service water tunnel, rendering all service water inoperable for both units.

Procedural guidance continued to be problematic. Inadequate guidance or lack of clarity in maintenance procedures contributed to four ESF actuations. In another example, a procedure weakness contributed to a reactor scram because it did not instruct the technicians to reset the main steam high flow isolation trip channel following a surveillance. In addition, a number of required surveillances were not adequately incorporated into plant procedures early in the assessment period. For example, diesel generator fuel oil samples were not taken due to the failure to properly incorporate technical specification changes into procedures. Also, the rod blocking function for the recirculation flow trip function was not fully tested due to an inadequate test procedure. Subsequent initiatives to improve surveillance procedure

quality were positive. Work package quality was satisfactory for most jobs; however, some faulty work packages led to plant events and delays in work execution.

Weaknesses in some craft skills contributed to rework on several components including the 1D condensate booster pump and 1B control rod drive pump, and contributed to a forced shutdown to repair the 2B recirculation flow control valve. In addition, personnel performance errors, including inattention to detail and failure to follow procedures by maintenance personnel, led to several plant events. These included a fire in the Unit 1 heater bay, inadvertent ESF actuations during surveillance, and de-energizing of the security power supply. Foreign material exclusion control continued to be a problem as evidenced by several foreign material exclusion events on the refuel floor during the Unit 1 refuel outage, despite increased worker sensitivity.

Self-assessment activities were enhanced during the assessment period, including the performance of several benchmarking trips to other nuclear facilities. These activities resulted in some performance improvement in oil leak reduction, backlog reduction, work control implementation, outage improvement and formation of the "First Hit" team, a team developed to expedite minor corrective maintenance.

The Maintenance area is rated Category 3.

C. Engineering

Overall performance in the engineering area was adequate. The engineering organization was in transition during this assessment period with the assignment of several new managers. Engineering response to several industry issues was good. However, engineering support to operations, maintenance and licensing was weak. Late in the assessment period, a significant operational event occurred involving a challenge to the availability of the ultimate heat sink for both units. Poor engineering support to operations in determining system operability, assessing root cause and developing corrective actions exacerbated the event and placed the facility at significant risk.

Engineering support to generic issues was good. Implementation of the motor operated valve program was strong resulting in NRC acceptance of the program and closure of the matter. Also, response to the scram solenoid pilot valve diaphragm hardening was good and engineering played an active role in the industry evaluation and resolution of the issue.

However, examples of weak or untimely engineering support to routine operations, maintenance and licensing matters occurred throughout the assessment period. An evaluation conducted on a degraded support in the Reactor Core Isolation Cooling system did not constitute a valid operability determination. Engineering support for two technical specification change requests regarding the leakage detection system and the Main Steam Isolation

Valve leakage control system contained inadequate technical justification for the changes. This resulted in extensive requests for additional clarifying technical information. Further, NRC identified that a prior modification for the Reactor Vessel Level Indication System contained a non-conventional piping configuration which would not allow proper venting and the specified post-modification testing was inadequate.

Several new engineering managers were assigned during the assessment period. They initiated actions to improve engineering support to the station and progress on longstanding material condition deficiencies with limited success. Improved management guidance and expectations for system engineers were developed; however, implementation was slow and improvement in performance of system walkdowns and tracking and trending of system performance was inconsistent.

Progress on material condition deficiencies and operator work-arounds was also slow. Several engineering teams were assigned to address longstanding issues in the nuclear instrumentation, reactor recirculation and ventilation systems. However, engineering was not aggressive in pursuing Reactor Water Cleanup System spurious isolations until a chemistry excursion event occurred. Further, a significant operator work-around on the leakage detection system was not pursued and resolved until it caused a steam line isolation and a reactor scram.

Engineering weaknesses continued to be evident in problem identification and resolution. A temporary alteration had been installed on the 2B diesel generator fuel pump for approximately five years without permanently correcting the problem. This resulted in an alarm each time the diesel engine was started. Also, during the June 1996 service water event, engineering evaluation of service water systems' operability was untimely, incorrect and lacked technical justification. This resulted in a continuing challenge to the Ultimate Heat Sink of both units and a second service water transient. Incorrect vendor information on the characteristics of the foreign material in the service water systems was accepted without technical evaluation or challenge.

The Engineering area is rated Category 3.

D. Plant Support

This functional area addresses all activities related to radiological controls, radioactive effluents, chemistry, emergency preparedness, security, fire protection, and housekeeping controls. Overall performance in the area of plant support was good. While radiation protection, chemistry, and emergency preparedness performance improved during the period, challenges remain in all plant support areas.

Overall radiation protection performance improved throughout the assessment period. System decontamination and zinc injection initiatives contributed to improved source term control. The ALARA planning improvements noted at the end of the previous period continued throughout this period and resulted in lower than anticipated dose expenditure. However, weaknesses in the station's ability to effectively schedule, control, and perform work, and a high level

of rework, continued to cause unnecessary worker dose. Radiation protection technician performance generally improved; however examples of inadequate radiation surveys occurred, including failure to identify high radiation levels from a laundry bag and from a reactor core isolation cooling (RCIC) system valve stem. While there was a decrease in significant radiological events during this assessment period, challenges remain with radiation worker performance. For example, an engineer was working in the radiologically controlled area without knowledge of the radiation hazards and required precautions.

Performance in the chemistry and Radiological Environmental Monitoring Program (REMP) areas was good, with excellent radiochemical and chemical analytical ability demonstrated by the staff. Although feedwater iron levels remained high, plant water chemistry was generally good with improvements noted in reactor water sulfate levels. Maintenance of the post accident sampling system improved, but materiel condition problems continued to impact chemistry. For example, two resin intrusion events, involving the Unit 2 condensate polisher and Unit 1 reactor water cleanup filter demineralizer, were caused by materiel condition problems. Audits of the chemistry and REMP programs improved, but inspectors identified several deficiencies in REMP program implementation.

Emergency preparedness performance was good. Emergency response facilities were maintained in an improved state of readiness, and a dedicated Operations Support Center was established. However, an issue related to the effect of new site structures on the accuracy of data from the meteorological tower was not addressed in a timely manner. An event involving a malfunction of the Traversing Incore Probe system that created very high localized radiological conditions was handled well. Performance during the 1996 exercise was good. Emergency classifications, offsite notifications, and offsite protective action recommendations were correct and timely. The 1995 annual audits and particularly the peer reviews of the emergency preparedness program contributed to the improvement of the emergency.

Although security equipment was maintained in an excellent manner and overall security performance was good, there was a decline in performance from the previous period. Most significantly, several human performance problems were identified. These included the failure of personnel to make timely reports to management of an impaired security officer and a security officer who displayed aberrant behavior. In addition, a first-line security supervisor attempted to mislead management about an entry into an alarm console which inadvertently disabled some security equipment and two operations staff members attempted to conceal a violation of the security plan. Root cause investigations and corrective actions for these and other security problems were thorough.

Overall performance in the area of fire protection was acceptable. While there were few fire protection impairments requiring a fire watch, a large number of fire protection work requests dating back to 1994 remained open. Many fire protection program implementation weaknesses were identified through self assessments and an improvement plan has been initiated. Although some performance improvement resulted, human performance in the conduct of fire protection activities was poor. For example, several technical specification-

required hourly fire watches and required fire protection surveillance tests were not performed. In addition, poor welding work practices led to a significant fire.

The Plant Support area is rated Category 2.