Dresden Generating Station -- SALP 14
(Report Nos. 50-237;249/96001)

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 Dresden Nuclear Power Station for the SALP 14 period from March 19, 1995, through December 28, 1996.

An NRC SALP Board, composed of the individuals listed below, met on January 8, 1997, 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

G. E. Grant, Director, Division of Reactor Safety, RIII

Board Members

C. D. Pederson, Director, Division of Nuclear Material Safety, RIII
J. A. Grobe, Deputy Director, Division of Reactor Projects, RIII
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II. PERFORMANCE ANALYSIS

Plant Operations

Overall performance improved throughout the assessment period and was good. Successful improvement initiatives were evident inside the control room and in the general conduct of operations. Normally, conservative decisions were made and supported by station management. Problem identification was good throughout the period; however, the NRC identified some significant issues. Improvements were seen in operator training, but an initial license exam was canceled due to an exam compromise.

Good performance in the conduct of plant operations in the control room was evident throughout the period. Improvements noted since the last assessment period included consistent implementation of effective performance standards and improved procedural adherence. As a result of these improvements, better operator response was observed

during recent feedwater transients and a recirculation pump trip. Operators appropriately challenged information used to assess changing plant conditions. For example, control room operators rejected an on-line trouble shooting recommendation for high pressure coolant injection (HPCI) system problems and stopped a unit startup. Good communication skills were routinely observed in the control room, and control room operators demanded clear communications from all station personnel. Some human performance events occurred in the control room this period, but the significance of those events was low. For example, an operator inadvertently inserted a reactor trip signal while the unit was shut down.

Operating activities conducted outside the control room generally improved, but not to the same degree as that inside the control room. Personnel errors continued in implementing the out-of-service program, executing and maintaining system alignment and locked valve checklists, and self-checking during operator equipment rounds.

Strong management support of conservative operations was evident. For example, one unit was shut down, and the other maintained shutdown, while all safety-related 4kV circuit breakers were overhauled following a circuit breaker failure. In another case, an unexpected transient during testing caused reactor water level to rapidly decrease, then the level appeared to stabilize just above the auto trip setting. In accordance with the pretest briefing, plant operators conservatively initiated a reactor trip. In both examples, neither unit was restarted until thorough investigations and corrective actions were completed.

Heightened awareness of problems was evident as operators identified and documented most problems using the integrated reporting process. Control room deficiencies and operator workarounds were given a high priority to reduce the impact of equipment problems. Late in the assessment period, the licensee further enhanced awareness of system configuration control and identified several additional workarounds. However, there were some instances of failure to recognize problems before NRC identification. The NRC identified improper use of mechanical blocking devices on the main control panels and a proceduralized workaround for the service water strainers.

Usually, problems identified by operations personnel were promptly corrected. However, the NRC identified some corrective actions that were not effective to prevent recurrence. The NRC identified repeat problems in the execution of system lineup checklists and drywell closeout inspections. Once repeat problems were identified to station management, effective corrective actions were taken.

Some improvements were made in operations training since the previous assessment period. For the first time in three years, no requalification program weaknesses were identified by the NRC. However, a self-assessment of training identified problems in completing corrective actions for past findings. Late in the assessment period, an initial licensed operator exam was canceled after the licensee identified the exam was compromised.

The Plant Operations area is rated Category 2.

Maintenance

Overall performance in the maintenance area was adequate. During the assessment period, a major effort was focused on plant material condition resulting in many improvements. Some improvements were also noted in the work control processes. However, throughout the assessment period, plant performance was challenged with continuing problems rooted in material condition, work control, test control and the quality of maintenance activities. These same problems, except for test control, were noted during the last assessment period.

Progress toward improving the general material condition of the station was made during the assessment period by completing a number of significant modifications, major equipment upgrades and component refurbishments. Important system upgrades or modifications were performed on the feedwater level control systems, station blackout equipment and the Unit 2 reactor water cleanup system. However, poor performance of important plant systems and/or components, such as the high pressure coolant injection (HPCI) systems, safety-related 4kV electrical breakers, feedwater systems, and the control room emergency ventilation system, led to forced shutdowns, plant transients, and reduced safety system availability and reliability.

Several improvements were made to develop and strengthen the work control process. Changes included implementation of the electronic work control system to track and control work issues, initiation of a 12-week rolling schedule and the formation of the Fix-it-Now and control room deficiency teams to more efficiently complete work. However, during the majority of the assessment period, work control implementation remained cumbersome with problems evident in the ability to plan, schedule, and execute work and meet the station's backlog reduction goals. Emergent work items like the 4kV breaker problems, the recirculating pump failure and off-gas system problems, coupled with a backlog of old work continued to challenge work control by impacting planned work and scheduled preventive maintenance. In addition, some maintenance support processes such as the inconsistent use of performance improvement forms (PIFs) and implementation of the out-of-service program have delayed or impacted the efficient performance of maintenance activities.

Significant testing deficiencies were identified late in the assessment period that resulted in the failure to detect degraded systems and components. For example, testing was not adequate to ensure conformance with design and licensing basis requirements for the 250 volt station batteries and the control room emergency ventilation system. Also, some long-standing programmatic problems with the In-Service Test (IST) program were not promptly recognized, evaluated, or comprehensively addressed. Discrepancies between actual valve stroke times, ASME Section XI required times, and the design basis document required stroke times were identified. Also, a HPCI pump suction check valve was omitted from the IST program. A full time group of analysts was assigned to the post-maintenance testing program in an effort to improve performance. Success of that effort was limited since most analysts had little operational experience or system-specific training, group responsibilities and coordination were not well defined, and the post-maintenance testing matrix used by the group was limited in scope.

While several complex maintenance activities were performed well, such as the recent Unit 3 recirculating pump repair, problems were still evident in the quality of maintenance work. Deficiencies were identified in procedures, work packages, and work practices. Those problems resulted in plant events, increased safety equipment outage time, rework, and increased radiation exposure. Some continuing problems associated with poor work practices and procedures included inoperable containment cooling service water pumps due to foreign material introduced during maintenance, both trains of core spray instrumentation made inoperable due to incorrect reuse of parts, and an unanticipated start of an emergency diesel generator during switch contact verification. Similar problems also led to rework on an instrument air compressor, emergency core cooling system keep fill pump, scram valve position indication and hydrogen recombiner exhaust fan.

Aggressive management action was taken between November 1995 and January 1996, when the Unit 2 refueling outage was suspended in order to retrain outage management personnel and to rescope and reschedule the outage. Following the rescoping effort, work control was more effective during recent forced outages (e.g., feed regulating valve and recirculation pump failures) indicating improvement in the execution of the work schedule. Additional positive actions taken by management late in the assessment period included a 5-day work stoppage to convey management expectations concerning safety and work package adherence.

The Maintenance area is rated Category 3.

Engineering

Overall safety performance in the area of engineering during this assessment period was adequate. In response to previously identified performance deficiencies, a number of positive initiatives were initiated to improve plant engineering activities. However, significant challenges to continued improvements remain to maintain design basis documents, to assure quality of engineering work, to resolve long-standing problems, and to identify performance deficiencies and technical errors.

Strong engineering efforts continued to result in many plant material condition improvements. Increased focus on temporary alterations, control room deficiencies, and operator workarounds, led to improvements during the assessment period. However, over the last 8 months of the assessment period, material condition problems continued to cause unit shutdowns and expanded the scope of forced outages. Some examples were the Unit 2 shutdown due to elevated HPCI discharge piping temperatures, and a Unit 3 reactor protection system motor-generator set trip while shut down.

Frequently, the quality of engineering work was inconsistent and varied between activities. Highly visible problems, such as the feedwater level control issue and the 4-kV breakers, were resolved thoroughly. However, some routine engineering activities were not effective. For example, engineering's initial response to deficiencies identified with the emergency core cooling system (ECCS) corner room structural steel was inadequate. Also, several engineering evaluations, such as modifications to the HPCI steam traps were narrow in scope.

There were numerous discrepancies between the Updated Final Safety Analysis Report (UFSAR), design bases documents and calculations. The NRC identified that the design bases of the ECCS systems were not always adequately maintained and that there were significant problems with the control of design basis calculations. The issues identified reflected the lack of a strong engineering presence in the past to control design basis calculations and multiple design interfaces. A challenging and questioning attitude in engineering was not evident, and engineering was unable to resolve some long-standing problems. For example, 125 Vdc calculations were not accurate, sizing calculations for the 250 Vdc battery were non-conservative, and degraded voltage calculations were unsupported.

Resolution of identified nonconforming conditions was slow and not aggressive in some cases until prompting by the NRC. Early in the assessment period, insufficient emphasis was placed on resolving UFSAR and other licensing document commitments. For example, resolution of the following issues was inadequate until the NRC prompted additional review: 1) the 125 Vdc and 250 Vdc battery chargers were not seismically mounted; 2) a Vulnerability Assessment performed by the licensee in 1992, identified two significant discrepancies in the standby liquid control system that were closed without any corrective actions; and 3) the emergency core cooling system corner room structural steel known design deficiencies were not resolved in a timely manner. Following the latter example, the licensee increased the focus on the identification and resolution of UFSAR discrepancies.

The ability to identify broad engineering performance deficiencies and specific technical issues was inconsistent. Good performance was recently demonstrated in reviews of the control rod drive system and the control room ventilation system. However, some initial engineering efforts were inadequate. For example, the engineering trending program failed to identify a potential common mode failure of safety-related relays and generic problems with mechanical linkages in circuit breakers.

Steps taken to improve engineering's performance included improving plant system engineers' capabilities, focusing resources to address engineering backlogs, and resolving drawing issues.

The Engineering area is rated a Category 3.

Plant Support

Overall, plant support performance was good. Some improvement was noted in radiation protection performance as evidenced by a decrease in the total personnel exposure and a reduction in contaminated areas. A slight decline in Security performance was noted during this assessment period but overall performance was satisfactory. Performance in Chemistry, Emergency Preparedness, and Fire Protection was good.

Radiation Protection performance was satisfactory. Early in the assessment period, rework and emergent work led to a high collective station dose. However, increased emphasis on the as low as is reasonably achievable (ALARA) program resulted in better work and dose control as the assessment period progressed. Contamination control improved from the

previous assessment period. The reduction in contaminated spaces removed long-standing barriers to operators and access was unimpeded to most areas of the plant. Additionally, late in the period, the frequency and significance of radiological events lessened in comparison to previous periods. Of note during this period was the accomplishment of radiologically significant Unit 1 work without incident. However, the station continued to experience some problems in the areas of radioactive material control, radiation protection technician performance, and radiation worker performance. Late in the assessment period, after implementation of enhanced training and other corrective actions, radioactive material control and radiation protection technician performance improved.

The Chemistry and Radiological Environmental Monitoring Programs (REMP) were effectively implemented. Excellent water quality was maintained throughout the assessment period for each operating unit. Prior concerns with the REMP were effectively corrected.

Security performance was satisfactory, but some increase in personnel errors and procedural adherence problems occurred. These problems impacted effective implementation of access authorization and material control programs and led to an incorrectly placed vehicle barrier. However, the overall security program provided the required level of protection. Licensee self-assessment activities were effective in identifying an increase in personnel errors but failed to identify the access authorization, material control, and barrier problems noted above.

Performance in the Emergency Preparedness (EP) area was good. Strengths included well-maintained response facilities and equipment, the annual EP program audits, knowledge of key emergency response personnel, and the effective implementation of the emergency plan during two unusual events that occurred during the assessment period. The 1995 EP exercise demonstrated good overall performance to a challenging scenario.

Overall, the Fire Protection program was good. Most problems were self-identified and substantial progress was made toward correcting programmatic issues. Fire Protection program strengths included control of transient combustibles, a low number of fires during the period, and a low number of impairments requiring a fire watch. In general, emergency lights were in good condition. However, a problem was noted regarding the failure to test emergency lights for the required eight hours during surveillances.

The Plant Support area is rated Category 2.