SALP REPORT - TURKEY POINT NUCLEAR PLANT

50-250/94-99 AND 50-251/94-99

I. BACKGROUND

The SALP Board convened on September 8, 1994, to assess the nuclear safety performance of Turkey Point Units 3 and 4 for the period January 31, 1993, through August 27, 1994. The Board was conducted per Management Directive 8.6, "Systematic Assessment of Licensee Performance." Board members were Bruce A. Boger (Board Chairperson), Acting Director, Division of Reactor Projects; Albert F. Gibson, Director, Division of Reactor Safety; J. Philip Stohr, Director, Division of Radiation Safety and Safeguards; and Herbert N. Berkow, Director, Project Directorate II-3, NRC Office of Nuclear Reactor Regulation. This assessment was reviewed and approved by Stewart D. Ebneter, Regional Administrator, NRC Region II.

II. PLANT OPERATIONS

This functional area addresses the control and execution of activities directly related to operating the plant. It includes activities such as plant startup, power operation, plant shutdown, and response to transients. It also includes initial and requalification training programs for licensed operators.

Overall performance in the Plant Operations area remained superior during this assessment period. Operator performance was excellent. Operator training programs were strong, as evidenced by exam results and performance during unit startups, shutdowns, and events. Operations was well supported by management, maintenance, engineering, and plant support organizations. Teamwork among these groups was effective, as indicated by strong outage performance, testing and maintenance activities, and special and infrequent tests or evolutions where multi-disciplined groups were effectively integrated. Operators responded in a timely and effective manner during abnormal conditions and unit transients such as main condenser tube leaks, turbine generator problems, and moisture separator drain line steam leaks. Operators were also alert and proactive in addressing abnormal equipment indications and associated problems including reactor coolant pump seal problems, a pressurizer manway leak, and main generator voltage fluctuations. In addition, operators performed very well during planned and short-notice outages.

Management oversight and conservatism were exemplary and assured safe unit operation. Conservative operating decisions were made to remove a unit from service to repair degraded equipment well before potential failures or approaching applicable technical specification limits. Examples included cold shutdowns to repair a leaking pressurizer manway and a leaking pressurizer spray valve. Effective management oversight and conservatism were evidenced by the thorough unit restart readiness verification process used in returning each unit to service following refueling outages.

Independent reviews by quality assurance and the safety review committees were effective and demonstrated a strong safety attitude and perspective. For example, quality assurance performed a review of operational problems and effectively identified root causes and corrective actions. The onsite and offsite safety review committees conducted comprehensive self-assessments, especially during reviews of equipment degradation and prior to unit startups from refueling.

Root cause and corrective action programs were effective. Event review teams were assembled to perform collective, multi-disciplined, real-time problem reviews. These teams were successful in identifying causes and proposing corrective actions. Examples included moisture separator drain line steam leaks, reactor trips, emergency core cooling system minimum flow problems, and emergency containment cooler valve failures.

The licensee's commitment to risk management was evident. Troubleshooting activities which could place the units at risk were controlled by the "red sheet" process. This assured that a well thought-out, detailed, precise plan was in place prior to commencing work and that management had reviewed and concurred in the process. Infrequently performed tests and evolutions were also controlled by a special administrative procedure with requirements for a pre-evolution briefing and oversight by an appointed test director and manager. Management conservatism and commitment to reduce shutdown risk were noted by the practice of completely offloading the reactor core prior to beginning mid-loop operations. During a refueling outage, a risk assessment team was initiated to review critical path evolutions, safety system availability, and risk. This team made recommendations to change the outage sequence in order to minimize overall risk.

Operators generally displayed strong attention to detail with good supervisory oversight. However, late in 1993, several instances of poor control room oversight resulted in a reactor trip, an overdilution event, and other noted errors. These issues were partially caused by poor communications and a lack of self-checking. Management aggressively addressed these instances by emphasizing expectations that all personnel meet a high standard of performance and accountability, relocating the Assistant Nuclear Plant Supervisors into the controls area, and improving oversight of non-licensed operators. These actions were effective, as evidenced by strong personnel and unit performance during the last six months of the assessment period.

The Plant Operations area is rated Category 1.

III. MAINTENANCE

This functional area assesses activities associated with diagnostic, predictive, preventive, and corrective maintenance of plant structures, systems, and components. It also includes all surveillance testing and other tests associated with equipment and system operability. Overall performance in this area was superior during this period.

Overall maintenance program management was a strength during this period, as exemplified by effective processes and well-qualified staff. Management actions were effective in eliminating past SALP-identified weaknesses involving the quality of work and surveillances. Management involvement and conservative management decisions were evident.

The licensee has addressed identified weaknesses in maintenance work quality through individual counselling, procedural enhancements, and process improvements. Peer verification and self-checking programs were also initiated to reduce the personnel error rate. These management actions have been effective in improving performance in this area.

Performance in the surveillance area improved during this period in that personnel and procedural weaknesses were effectively addressed. Notwithstanding the improved performance, there were still some surveillance-related problems; the most significant of which was caused by a lack of adequate program oversight and attention to detail. This resulted in a number of missed valve surveillance tests. However, the licensee identified the problem near the end of the SALP period and took effective followup actions.

Effective maintenance work backlog management resulted in continued reductions in both the size and age of the backlog during this period. Specifically, the non-outage corrective maintenance plant work order (PWO) backlog, PWOs greater than 12 months old, control room deficiency tags, and out-of-service control room instruments continued to decrease as they have during the previous two SALP periods. In addition, performance has been better than the licensee's established goals. These are strong indications of effective backlog management.

Excellent coordination and cooperation both within the maintenance organization and with other groups was a significant strength. This was a major contributor both to the maintenance and operations performance. This was illustrated by the repair of a leak on the Unit 4 spare control rod drive mechanism canopy seal, repair of a failed component cooling water system outlet isolation valve associated with the 3C emergency containment cooler, and troubleshooting of a July 1993 relay failure while performing containment isolation periodic tests. These efforts were characterized by excellent planning, interdisciplinary teamwork, management oversight, high quality work, and timely completions. Two exceptions to this good performance were a reactor coolant system pressurization prior to completion of seal table leak repairs as a result of poor work control and communications weaknesses and a safety-related cable pull performed without calculating the pull stress during 3B charging pump work. These lapses were isolated occurrences; and, in both cases, aggressive and effective followup and corrective actions were taken.

Maintenance made significant contributions to excellent equipment reliability and plant availability. No instrumentation and control (I&C)-related trips occurred during the period. Maintenance has been

completed in a timely manner with good quality, contributing to safe and efficient refueling outages and minimizing plant transients.

Some examples of superior maintenance performance include the efforts related to auxiliary feedwater, intake cooling water, startup transformer, and main feedwater pump check valve maintenance during September - October 1993; preventative and corrective maintenance as well as troubleshooting on the reactor protection system (RPS), emergency diesel generator (EDG), and safety injection (SI) motor in late 1993; corrective maintenance on valve packing, RPS relays, SI motor, and spent fuel pool components in early 1994; motor-operated valve, EDG, reactor vessel, erosion/corrosion, and fuel up-ender work in April 1994; and I&C troubleshooting of rod position indication problems in October of 1993.

Exceptions to this excellent performance included a Unit 4 shutdown to repair a corrosion-induced thimble tube leak on the incore instrument system that was most likely caused by improper cleaning of the seal table area during a previous outage. Also, a lack of attention to detail and inadequate procedures led to high reactor cavity seal leakage due to missing studs on nuclear instrumentation covers during the 1993 Unit 4 refueling outage.

Many power reductions and some unit shutdowns have been necessary during this period as a result of balance-of-plant (BOP) problems. The root causes of the individual events were assessed; however, collective causes of and corrective actions for possible challenges to operators and safety systems resulting from BOP equipment failures or degradation are of concern. Potential inadequacies relative to equipment aging, maintenance, and design should continue to be addressed.

The Maintenance area is rated Category 1.

IV. ENGINEERING

This functional area includes activities associated with the design of plant modifications and engineering support for operations, maintenance, and outage activities. Performance in this area continued to improve and was an important contribution to good performance in other functional areas. Management oversight and control were effective in improving performance.

Good teamwork was apparent between engineering and other site organizations. For example, engineering design priorities were set by a Plant Review Board which included the Site Vice President and the Managers of Operations, Maintenance, and Engineering. This process assured that the resultant plant modifications met the needs of user organizations. Engineers from design, technical support, and construction organizations worked together effectively to assure proper design, installation, and testing of each modification. Design modification packages were critiqued before and after implementation.

Management of the backlog of engineering work was effective. The backlogs of Requests for Engineering Assistance, Plant Change Modifications, and Nonconformance Reports were reduced in size, appropriately prioritized, and closely monitored by station management. A long-term program to eliminate a large backlog of drawing updates was successfully completed early in the period. System walkdowns and additional updates have continued to improve the quality of drawings.

Strong design and system engineering programs provided good support to operations and maintenance. System engineers were well qualified and exercised full responsibility for the condition of their assigned systems. Plant performance was improved by implementing the recommendations of reliability improvement teams. Continued reductions in temporary system alterations, lighted annunciators in the control room, and other operator "work arounds" reduced the potential for operator errors.

Weaknesses in contractor oversight that were evident during the previous SALP period were corrected during this assessment period. A task force was established and corrective actions implemented to strengthen vendor interfaces. The licensee continued to reduce dependence on contractors for engineering services.

Engineering performance was improved by strong self-assessment efforts which identified areas for improvement. Effective corrective actions were taken to address the self-assessment findings. Weaknesses in engineering performance identified in the previous SALP period were corrected, and performance measures were established and monitored to assure that challenging goals were met.

The Engineering area is rated Category 1.

V. PLANT SUPPORT

The Plant Support functional area addresses all activities related to radiological controls, emergency preparedness, security, plant chemistry, fire protection, and plant housekeeping.

Performance in the radiological controls area continued at a high level. The as low as reasonably achievable (ALARA) program was effective in reducing doses, both during outages and routine operations. Effective ALARA activities during this period included the use of mockup training, source term reduction efforts associated with plant chemistry, and the installation of non-Stellite parts and equipment. Also, person-rem managers were assigned by individual departments to enhance ALARA efforts. As a result, the 1993 personnel exposures were the lowest since the beginning of plant operation. The 1994 Unit 3 refueling outage collective dose was controlled to well within the dose goal for the outage work. Contamination control programs facilitated maintaining internal exposures well below regulatory limits by effectively maintaining a relatively low contaminated floor area. A well run respiratory protection program also contributed. Respirator usage was

reduced as part of the effort to reduce total effective exposure, without an appreciable increase in internal exposures. During the period, there were some isolated cases of failure to follow radiation work procedures associated with personnel dosimetry and radioactive material control requirements for which corrective actions were promptly implemented. An aggressive waste management program was implemented which resulted in minimizing the generation and storage of dry radioactive wastes. Radiological effluents were well managed; and releases were only a small fraction of the regulatory limits, as verified by the environmental monitoring program. A weakness was identified in the program for measuring certain beta emitting radionuclides in liquids. The weakness included unexplained biases in some measurements and inadequate procedures and training for staff, but this was not significant regarding environmental doses. Improvements were made to the meteorological monitoring equipment with the addition of supplemental power supplies and the upgrading of the electrical switching equipment. Radiological control program audits were well planned, thorough, and well documented and followup actions were timely with items tracked to completion.

Performance in the emergency preparedness area continued to be strong. With good management support, the emergency preparedness training program maintained excellent response proficiency. This was reflected in excellent performance during the full participation exercise during this period in which the emergency facilities were activated and staffed properly, events were properly classified, and notifications were timely and proper with appropriate protective action recommendations. Also, the response to an actual event during this period was appropriate and in accordance with the Emergency Plan. Emergency facilities and equipment were maintained in an excellent manner. Communications enhancements included the installation of a high frequency radio system and an upgrading of the containment public address system. The emergency preparedness audit program, including the exercise critique process, was considered a strength. Corrective actions were sound and timely. Interactions with offsite agencies were effective, and good working relations were maintained with State and local agencies.

Performance in the physical security area continued at a superior level. Security training was effective, trainers were knowledgeable, and an extensive array of training materials and equipment was available. Management support for this area was evidenced by the new firing range and training building. The Security, Contingency, Training, and Qualification Plans and implementing procedures were maintained current. Access controls were well maintained, and the new hand geometry access control program was effectively implemented. The number of loggable security incidents trended downward during the period and was reflective, in part, of good testing and maintenance support for the security equipment. Alarm assessment aids were enhanced with the installation of an improved model of video capture equipment, reducing the number of false and nuisance alarms. Security audits were thorough and detailed. The fitness-for-duty (FFD) program was a strength. The FFD staff was well trained and qualified, collection facility operations

were well run, procedures were good, conservative screening levels were set, and program audits were effective.

The fire protection program performance was generally good. During the period, the fire brigade responded to four actual fires with the response being timely and effective in extinguishing the fires. One of the fires was outside of the protected area at the McGregor substation, and this led to interaction with offsite support. During the earlier portion of the period there were some instances of lack of attention to detail associated with failure to establish fire watches, an inadequate fire plan, and a failure to control combustible material. However, these weaknesses were not observed later in the period.

Overall, housekeeping was good, with a noted improvement in the latter portion of the period.

The Plant Support area is rated Category 1.