

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE REPORT
FARLEY NUCLEAR PLANT
50-348/96-99 AND 50-364/96-99

I. Background

The SALP Board convened on December 18, 1996, to assess the nuclear safety performance of Farley Nuclear Plant for the period March 26, 1995, through November 23, 1996. The Board was conducted in accordance with Management Directive 8.6, "Systematic Assessment of Licensee Performance." Board members were J. R. Johnson (Board Chairperson) Director, Division of Reactor Projects; A. F. Gibson, (former) Director, Division of Reactor Safety; and H. N. Berkow, Director, Project Directorate II-2, Office of Nuclear Reactor Regulation. This assessment was reviewed and approved by the Regional Administrator.

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, 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. The early portion of the assessment period was challenged by a significant number of plant transients: automatic and manual trips along with several power reductions and forced outages. These were primarily caused by secondary plant chemistry as well as main feedwater and main turbine control system equipment problems, and not by operator errors. The latter part of the period was characterized by much more stable plant operations with no automatic trips in 1996.

Performance by licensed operators was generally excellent. Their knowledge and performance during plant maneuvers was superior throughout the period. Particularly noteworthy was the proper implementation of plant operating procedures for routine startups and shutdowns. Defueling and refueling activities on both units were well controlled. Excellent implementation of abnormal and emergency operating procedures was observed during multiple transients due to electro-hydraulic control (EHC) system and feedwater pump problems, as well as responses to significant secondary system steam leaks. This performance was indicative of experienced and well trained licensed operators. The licensed operator requalification training was considered good; however, documentation of the conduct of remedial training was weak on occasion.

Routine plant shifts were well staffed with experienced operators. Stable and consistent crews were maintained for a year period. In addition, during the latest refueling outage, the entire shift crew remained together, strengthening teamwork for the outage. Operator overtime was well controlled. Staffing of the technical support center with Operations supervisors to assure proper tagging and scheduling of

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maintenance demonstrated an excellent safety focus. Improved performance was noted with wrong unit, wrong train component operation. Certain personnel errors related to system configuration control remained a challenge, especially in the latter part of the period. Configuration control was also a challenge during the last SALP period. Several personnel errors by non-licensed system operators resulted in operability challenges to emergency diesel generators and transients in the letdown and volume control tank portions of the reactor coolant system.

Operations management was closely involved in the review of plant incidents and occurrence reports. Senior reactor operator (SRO) experience in site managerial positions remained a strength throughout the Farley organization. This included not only SRO qualification but also significant on-shift operating experience. Management participation during requalification exams improved late in the period. Control room professionalism, awareness demonstrated by operators at the controls, and a minimum of lit annunciators or control room deficiencies indicated strong management support for plant operations. Management decisions to shut down Unit 1 for a short mid-cycle outage prior to the olympic games, and a decision to shut down Unit 2 prior to the arrival of hurricane Opal were considered conservative, and the evolutions were conducted without incident.

Operations self-assessments and safety committee reviews were generally acceptable. Root cause trending of human performance problems has improved. Management typically supported sending shift crews to other facilities to benchmark good practices. During the last month of this assessment period, plant management initiated a manager's tour program to improve in-plant observations and self-assessments. The site audit program conducted by the Safety Audit and Engineering Review group was thorough and self-critical, and included extensive SRO expertise as well as other specialists when required.

The Plant Operations area is rated Category 1.

III. MAINTENANCE

This functional area addresses activities associated with diagnostic, predictive, preventive, and corrective maintenance of plant structures, systems and components; maintenance of the physical condition of the plant; and training of the maintenance staff. It also includes surveillance testing, in-service inspection and testing, instrument calibration, operability testing, post-maintenance testing, post-outage testing, containment leak rate testing, and special testing.

Management support and involvement were evident in the planning and conduct of plant maintenance activities. This involvement was demonstrated by the successful completion of three outages and many major maintenance evolutions. The pre-planning and control of work packages

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were considered good. Good support to Operations reduced the number of operator work arounds and corrective maintenance backlogs.

The surveillance, in-service inspection and in-service testing programs continued to be effectively implemented. The predictive maintenance program was also effective. Safety-related equipment performance was good; however, Balance of Plant (BOP) equipment problems continued to adversely affect the overall performance of the plant, as evidenced by numerous power reductions, transients, and trips. The majority of these power reductions and trips were caused by main turbine and main feedwater pump EHC problems and steam generator (SG) chemistry control (sodium) problems during the first half of the period.

The SG maintenance and inspection program was a strength. Management was effective in monitoring and maintaining the integrity of the SGs.

The corrective actions and root cause analyses of maintenance issues continued to be generally effective. The corrective actions addressed immediate needs and the long-term actions were appropriately based on root cause evaluations. This was demonstrated by the resolution of the electro-hydraulic control system problems.

Personnel errors, mostly due to a lack of attention to detail, adversely affected some maintenance activities. Procedural issues contributed to several maintenance and test deficiencies. Additionally, emergency diesel generator availability was adversely impacted by several problems associated with fuel oil leaks, service water leaks, and surveillance test failures.

The Maintenance area is rated Category 2.

IV. ENGINEERING

This functional area addresses engineering and technical support activities. It includes support to operations and maintenance, management support for process improvement initiatives, modifications, root cause analysis, corrective actions, as well as licensing activities.

Engineering performance continued at a superior level during this period. Previously identified strengths were maintained, and the licensee aggressively addressed challenges to safety and operation.

Engineering support to Operations and Maintenance was effective. This was evident in major maintenance and modification activities, aggressive and innovative SG maintenance and repair activities, and actions related to BOP equipment. The quality and effectiveness of major modifications demonstrated further improvement over the previous period.

Several instances of breakdowns in communication, oversight, and quality assurance between Farley personnel and vendors were observed with regard

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to understanding current plant design configuration and technical support. Continued attention to vendor control is considered a challenge to assure continued success.

Engineering root cause analyses and follow-up corrective actions were comprehensive and effective, especially during the latter part of the SALP period. Engineering was a major contributor to resolution of the SG sodium contamination and the EHC/Digital EHC system problems which caused numerous power reductions while returning from the Unit 2 refueling outage in April 1995.

With the exception of vendor oversight, effective management oversight at the site and in the corporate office continued during this SALP period. Farley management has conducted several performance improvement initiatives including: the Safety System Self-Assessment Program to identify and correct design and operational deficiencies in critical safety systems; the Updated Final Safety Analysis Report Verification Program to assure conformance with the license; and the Single Point Vulnerability Study to identify major contributors to trips, power reductions and shutdowns. Several process improvements have also been implemented, including the Engineering Projects Council and Configuration Control Board.

While modification control was generally good, there were several instances of inadequate control of the as-built configuration, both pre-existing and recent, involving welds, pipe supports, bolt torque values and other systems and components that collectively indicate the need for additional management focus.

Licensing submittals were generally of high quality; however, some significant licensing action requests were not submitted in a timely manner to fully support the requested review schedule.

The Engineering area is rated Category 1

V. PLANT SUPPORT

This functional area assesses activities related to the plant support function, including radiological controls, radioactive effluents and waste, plant chemistry, emergency preparedness, security, fire protection and housekeeping.

The radiological control program provided good protection of the health and safety of facility workers and members of the public. The program was effective in limiting the internal and external radiation exposures of workers to levels well below established regulatory limits. The ALARA program was satisfactory. Extensive steam generator work contributed significantly to occupational radiation exposure but administrative controls and other dose reduction initiatives were effective in reducing dose. The effluent control program limited exposures to members of the

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public by maintaining radionuclide effluent releases, and the resultant radiation doses from those releases, at a small percentage of regulatory limits. The environmental monitoring program confirmed the effectiveness of the effluent release program. The chemistry program maintained good primary coolant quality. Radioactive waste storage on site was minimal. Resolution of procedural and equipment inadequacies and reduction of the frequency of procedural non-compliances, noted toward the end of the assessment period, are challenges to the radiological control program.

The emergency preparedness program was effective in maintaining site readiness to respond to emergencies; however, weaknesses associated with the tone alert radio system were corrected late in the period. Emergency preparedness training and drills were appropriate.

The licensee continued to have a strong, well-managed security program. Equipment was reliable and consistently met the requirements of the Physical Security Plan. Security management was generally proactive in recognizing potential weaknesses. Plant operations continued to have good communications with the security force. Training and qualification of the security force was a strength. Continued vigilance regarding thorough searches of items entering the protected area was a challenge.

Performance in implementation of the fire protection program declined during this SALP period. Organization and administration of the fire protection program was good. Fire protection and prevention procedures, including procedures for the control of ignition sources, transient combustibles and housekeeping, were adequate. Implementation of procedures was satisfactory except for specific instances of inadequate control of the fire watch program. The fire brigade training program and performance of the fire brigade during drills and actual fires were good. Quality assurance audits of the fire protection program were generally thorough and corrective action for identified major problems was timely; however, these audits did not detect poor inspection programs for fire barriers.

Maintenance and performance of the fire protection systems and equipment were marginal. Multiple failures of the diesel driven fire pumps occurred during the first part of the SALP cycle. Performance improved toward the end of the period due to enhanced preventive maintenance and accelerated testing. Multiple failures of the automatic sprinkler systems occurred in early 1996. Enhanced preventive maintenance and accelerated testing were implemented but, by the end of the SALP period, the root cause of the sprinkler system problem had not been identified. Maintenance and inspection of Kaowool raceway fire barriers were inadequate, resulting in fire barriers that failed to meet the required design configuration. The facility fire protection program, as it relates to equipment and fire barriers, warrants increased management attention.

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Plant housekeeping for both units degraded significantly during Unit 1 Refueling Outage 13 and cleanup actions were very slow following completion of the refueling outage. Housekeeping practices associated with the material condition and maintenance of the radiation monitoring systems were not fully effective. Station management has recently initiated a management tour program, in part, to improve observation of housekeeping and material condition.

The Plant Support area is rated Category 2.