

## SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE REPORT

### BROWNS FERRY NUCLEAR PLANT

50-260/96-99 AND 50-296/96-99

#### I. BACKGROUND

The SALP Board convened on September 25, 1996, to assess the nuclear safety performance of the Browns Ferry Nuclear Plant for the period March 19, 1995, through September 7, 1996. The Board was conducted in accordance with Management Directive 8.6, "Systematic Assessment of Licensee Performance." Board members were J. P. Jaudon (Board Chairperson), Acting Deputy Director, Division of Reactor Projects; B. S. Mallett, Director, Division of Nuclear Materials Safety; and F. J. Hebdon, Director, Project Directorate II-3, 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 facility. It includes activities such as 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 was superior throughout this assessment period. Strong management involvement in all aspects of plant operation, including day-to-day operational activities, was clearly evident. Management policies and expectations for operations were effectively communicated to the plant staff.

Operator knowledge and performance during plant maneuvers were superior throughout the period. This was demonstrated by handling plant transients effectively and proper implementation of the emergency responses for reactor trips and off-normal conditions. Responses by the Operations' staff were decisive and conservative. Particularly noteworthy were the excellent overall performance during Unit 3 startup testing and effective transition to dual unit operation.

Plant management has been responsive to challenges identified in the previous SALP report. Potential distractions in control room operations were addressed such that control room professionalism is now considered a strength. Three-part communications by the control room staff, improved control room logs, and an emphasized managerial role of the shift supervisor have contributed to improvements in this area. In addition, operational controls during shutdown conditions have been strengthened.

Enclosure

Improvements were also noted in self-assessment capabilities. These include critical external assessments, the implementation of an internal self-assessment program conducted by all Operations department management, and an increased emphasis to lower the threshold of Operations' generated problem evaluation reports.

Deficiencies were identified with the quality of some safety assessments and evaluations, indicating a need for a more questioning attitude. In addition, there were occasional examples of operator inattention to detail which resulted in component mispositions.

The Plant Operations area is rated Category 1.

### III. MAINTENANCE

This functional area addresses activities associated with diagnostic, predictive, preventive, and corrective maintenance of structures, systems, and components. It also includes all surveillance testing, in-service inspection and other tests associated with equipment and system operability.

Management involvement in maintenance was good. Maintenance activities which presented a potential risk to reliable operations were recognized, received management attention and were thoroughly evaluated for contingencies. Personnel performance was generally good. Errors due to inattention to detail caused one reactor trip and several safety equipment actuations. Continued attention is indicated in procedure adherence. Controls and supervision over some activities were not always effective, and on several occasions this adversely impacted safety equipment.

Routine maintenance was effectively planned and scheduled using a twelve week rolling schedule. The licensee effectively merged Unit 3 maintenance into the existing site program and effectively controlled backlogs within established goals. Preventive maintenance was adequately implemented, although difficulties occurred in completing some activities within specified intervals. Online maintenance was formally evaluated to consider risk and the impact of simultaneous activities. Corrective maintenance was performed well in most cases. However, some activities were not performed on safety systems during planned outages and inappropriately scheduled shortly after a startup.

Outage maintenance activities were well coordinated with active supervisory involvement. Department morning meetings were effective in establishing priorities and safety focus. A good interface with Operations and Engineering was demonstrated with "Fix it Now" teams, which were used for troubleshooting and repairs that did not involve modifications or major components.

Maintenance personnel continued to be effective at problem identification and implementation of the corrective action program. Immediate problem resolution of degraded equipment was good, although the need for scope expansion was not always recognized. Strong emphasis was placed on independent assessments by quality assurance and third parties. Departmental self-assessments were initiated toward the end of the SALP period and improved in quality.

Safety system availability was high, and was maintained at or above licensee established goals. Equipment failures caused some plant trips and transients.

In-service inspection procedures were well written and appropriate. Examinations were effectively completed by qualified personnel. Surveillance testing was effectively performed in accordance with requirements. Overall, procedures were observed to be good and personnel were knowledgeable. The Unit 3 power ascension testing program was effectively implemented. Equipment was thoroughly tested and exercised to demonstrate readiness of operation. Some in-service pump and valve tests were not correctly implemented because of inadequate procedures or inadequate understanding. Some weaknesses were found in post-maintenance testing, and the process was found to be complex. Improvement of in-service testing and post-maintenance testing is considered to be a challenge.

The Maintenance area is rated Category 2.

#### IV. ENGINEERING

This functional area addresses activities associated with the design of plant modifications, engineering support for operations, maintenance, surveillance, and licensing activities.

Plant management has committed significant resources to upgrading plant programs, procedures, and facilities. Considerable efforts have been made to improve reliability and functionality of key plant equipment. Engineering reviews have improved plant procedures and operational flexibility.

Efforts to improve the analytic and licensing basis have been effective in identifying long-standing problems which otherwise would not have been recognized. Prompt action was taken to correct the deficiencies. Probabilistic safety analyses have been updated beyond licensing commitments and have been incorporated into routine planning.

The quality monitoring program made effective use of outside reviews and has taken the initiative to review performance comprehensively in areas of significant regulatory interest.

Engineering support to operations and maintenance has not been fully effective. Plant transients have resulted from ineffective assessment and resolution of problems. Resolution of equipment issues needs to be improved to avoid repetitive problems which unnecessarily reduce equipment availability.

Major modifications generally made effective use of comprehensive review and testing of systems, as evidenced by the successful restart of Unit 3. However, after Unit 3 restart, emphasis shifted to smaller scope modifications and testing, which do not have comparable, broad programmatic requirements. Engineering personnel and processes have not always ensured effective and thorough implementation of technical and regulatory requirements. This problem was illustrated by difficulties observed in developing appropriate tests to confirm adequacy of modifications or to fulfill test requirements. Design personnel have not always considered actual plant process conditions or all relevant regulatory requirements in analyses.

Problems have been identified with site implementation of 10 CFR 50.59, which permits certain facility changes to be made without prior NRC review and approval. The site 10 CFR 50.59 program did not clearly implement all regulatory requirements. Further, instances have been observed where inadequate safety assessments have been performed. Recent safety assessments have lacked complete documentation of critical thought processes.

Plant management has taken steps to address these problems, including additional engineering management review of design changes, review of procedures, and inclusion of systems engineers in design review. Site engineering also recently completed a lengthy reorganization.

The Engineering area is rated Category 2.

#### 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 licensee exercised strong radiological controls throughout the assessment period. As a result of proactive management, radiation dose to individuals and for specific work units on site remained well within regulatory limits and goals. Planned initiatives significantly reduced radiation source terms to As Low As Reasonably Achievable. The program to control the spread of radioactive contamination was successful in achieving very low levels of individual and facility areas of contamination. Aggressive environmental monitoring and effluent controls maintained plant radioactive material releases well below regulatory limits. Radioactive waste was processed with attention to dose and contamination and reducing volume to external burial.



Radiation monitoring instrumentation performance was generally good, with some attention needed to continuous air monitors used to assess environmental radiation levels in the plant.

Plant chemistry programs were excellent in control of parameters within standards and in support of plant operations. Laboratory assessment capabilities and staff qualifications were maintained at a level above that required by the NRC.

The emergency preparedness performance was superior. Management and staff exhibited timely and technically sound responses during exercises and actual events. The licensee was aggressive in maintaining equipment, facilities and individual response capabilities at a level well above minimum regulatory requirements. Lessons learned were utilized to improve performance.

Plant security system and detection performance improved from the previous assessment period. Control of safeguards information and fitness-for-duty programs remained at a high level of performance throughout the assessment period. Qualifications of staff and training continued to be strengths in the program. The licensee was proactive in looking for and implementing tools to improve performance and reduce compensatory measures.

Fire protection was good with timely and effective steps taken to address emergent issues. Fire brigade qualifications and response performance were program strengths. Fire protection systems and equipment were in good condition as a result of management support. The licensee was proactive in examining ways to improve performance. Implementation of compensatory fire watches during maintenance and modification work was not always at the expected level of performance.

Housekeeping controls and attention remained successful in keeping frequently accessed areas clean and free of hazards.

Self-assessments and audits in all areas were thorough and contributed significantly to strong performance. Management and staff were diligent in identifying and correcting problems during the period.

The Plant Support area is rated Category 1.