

SALP REPORT - CRYSTAL RIVER 3
50-302
FEBRUARY 20, 1994 - SEPTEMBER 16, 1995

I. BACKGROUND

The SALP Board convened on October 5, 1995, to assess the nuclear safety performance of Crystal River 3 for the period of February 20, 1994, through September 16, 1995. The Board was conducted pursuant to NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance." Board members were Ellis W. Merschoff (Chairperson), Director, Division of Reactor Projects, Region II (RII); Albert F. Gibson, Director, Division of Reactor Safety, RII; and David B. Matthews, Director, Project Directorate II-1, Office of Nuclear Reactor Regulation.

The performance category ratings and the assessment functional areas used below are defined and described in NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance (SALP)."

II. PERFORMANCE ANALYSIS - PLANT OPERATIONS

This functional area assesses 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.

Overall performance in the operations area during this SALP period has been good. The plant has been operated safely, with few transients and no reactor trips during the entire assessment period. The previous SALP also noted good performance in the area of operations, with deficiencies occurring late in the SALP period indicating a need for improved management involvement and oversight. This weakness continued into the current SALP period, with several significant performance deficiencies occurring at about the midpoint of the SALP. Some improvement has been noted during the final six months of the period, due to a renewed effort by management to set and enforce expectations for plant operators.

Management has exhibited a good sensitivity to risk during this period, through the application of an innovative on-line risk monitor, as well as improved work and access controls to the switchyard. Additionally, industry operating experience had been effectively employed to assure industry lessons are applied at Crystal River.

Plant startup, shutdown, and refueling activities, as well as routine operations, were well planned and controlled, with appropriate attention given to shutdown risk. Conversely, non-routine activities and disposition of abnormal conditions were not handled well, due largely to weak interfaces between operations, maintenance, and engineering; weak vertical communications; and weak management involvement in day to day operations. Recently, operations has exerted more control over the work control process and has enforced improved standards for planning and procedures.

Performance in the area of self assessment has been mixed during this period. Audits have effectively used internal and external operating experience to identify deficiencies. The line organization, however, has lacked an aggressive, focused effort to identify and resolve problems.

The Plant Operations area is rated **Category 2**.

III. PERFORMANCE ANALYSIS - MAINTENANCE

This functional area assesses licensee activities in the areas of testing and maintaining plant structures, systems, and components. Activities assessed include preventive, predictive, and corrective maintenance, as well as surveillance, post modification, and post maintenance testing.

Performance in the area of maintenance improved over the period. There were no trips caused by equipment failures or maintenance errors. Few shutdowns or power reductions were caused by equipment failures and few repetitive equipment problems occurred. The appearance and material condition of the plant were improved.

Predictive maintenance and troubleshooting were effective. Techniques such as vibration analysis, thermography, and oil analysis were used to identify degraded equipment so that it could be repaired prior to failure. Special instrumentation was being developed and a prototype had been installed to monitor the performance of safety-related heat exchangers. The program for monitoring flow assisted corrosion continued to be used effectively to predict degradation of plant piping. Time delayed reflectometry was used to identify grounds in electrical systems.

Outage activities, both during the refueling outage and on-line system outages, were implemented well. Few equipment problems occurred following the refueling outage. Assessment of the increased risk associated with on-line maintenance activities improved over the period. Reviews performed late in the period were thorough and the associated maintenance was planned and controlled to minimize risks.

Procedural adherence, which was a problem during the previous SALP period, continued to be a challenge this period. Failure to follow procedures resulted in valves being mispositioned, accumulation of trash in the Reactor Building Sump, and improper equipment setpoints. Several instances of missed surveillances occurred due to procedure inadequacies and personnel errors. These resulted in the loss of a vital AC bus, failure to properly test relays, and inaccurate testing of diesel fuel oil.

The licensee completed a comprehensive self-assessment of the maintenance program late in the period which provided valuable insights into strengths and weaknesses of the maintenance program.

The Maintenance area is rated Category 2.

IV. PERFORMANCE ANALYSIS - ENGINEERING

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

Licensee performance in this area, primarily in the early period of this SALP cycle, showed declining performance. Weaknesses were identified in the areas of (1) control of modifications, (2) management oversight, (3) human performance errors, and (4) quality of licensing submittals.

Design engineering has been slow and, in certain cases, ineffective in providing support to plant operations. Untimely engineering support resulted in physical implementation of modifications without supporting design calculations and without procedures to properly implement and verify that the modifications would function as intended. Management did not exercise adequate oversight to ensure that calculations were based on sound technical bases and had received appropriate quality checks. The weak management oversight may have contributed to design discrepancies in establishing conservative design parameters and limits for plant operations.

Weaknesses identified this period were, in general, self-revealing or identified by self-assessment, and licensee actions or the extent of corrective actions have been largely reactionary. Several of the licensee's self-assessments and root cause analyses lacked depth. Management of human performance issues was weak as manifested by lack of attention to detail which resulted in several design deficiencies and lack of quality in licensing submittals.

Licensee performance in the nuclear plant technical support area continued to be strong. Planning and coordination of on-line system outages have been conservative and effective. The licensee closely monitored equipment condition and initiated actions to resolve several long-term equipment problems. These actions contributed significantly to good plant performance.

During this SALP cycle, several long-standing design deficiencies emerged as safety-significant issues and the backlog of requests for engineering assistance increased. This posed a significant challenge to the engineering area, and could have contributed to the weak performance. The licensee consolidated its engineering staff at the site and integrated the Nuclear Plant Technical Support into the Nuclear Engineering and Projects organization. This reorganization should result in improved interface between engineering staffs. The licensee also initiated corrective action programs and management processes to enhance human performance and reinforce safety attitude.

These management actions, which were implemented during the later part of this SALP period, are beginning to show improvement and are resulting

in more timely and thorough reviews. The timeliness and quality of information submitted to the NRC show improvement. Organizational and interface improvements have resulted in improved interdisciplinary coordination. Continued management involvement will be required to minimize errors, control design processes, and ensure the ability of engineering to provide critical plant support.

The Engineering area is rated **Category 2**.

V. PERFORMANCE ANALYSIS - PLANT SUPPORT

This functional area addresses radiological controls, radioactive effluents, chemistry, emergency preparedness, security, fire protection, and housekeeping controls.

Overall, the radiological control program was effectively implemented. Personnel radiation exposures were well controlled during the period with exposures significantly below regulatory limits. Site collective dose was as low as reasonably achievable. Management support of the As-Low-As-Reasonably-Achievable program was a strength as evidenced by the implementation of several effective dose reduction initiatives. The radiation protection training program was comprehensive in scope and in maintaining a high level of staff qualifications.

Chemistry and radiological effluent programs remained effective. An effective effluent control program limited effluents and associated doses to the public to a small fraction of regulatory limits. Good techniques were used in the collection, preparation, and analysis of effluent samples. Environmental monitoring demonstrated that plant operations had caused negligible impact to environs of the plant. Radioactive material was transported in accordance with regulatory requirements. The licensee maintained an aggressive plant chemistry program to assure that system degradation was minimized.

The emergency preparedness (EP) program continued to provide a high level of readiness to respond to events as evidenced by the licensee's fully successful performance during an off-hours exercise. Licensee readiness to respond to an emergency was further supported by a strong training program and good emergency response facilities. Continuing challenges for the EP program remained, however, in that the required EP program audit needed strengthening and some corrective action needed in emergency facility maintenance was not completed in a timely manner.

The overall plant security program was effectively implemented. The security program was enhanced significantly by an effective fitness for duty program with strong program audits, by proactive security officers who were effective in identifying abnormal plant conditions during facility patrols, and by the use of security professionals from other licensees on audit teams to strengthen an already strong audit function.

Fire protection response capabilities were maintained in a good state of readiness. Maintenance of fire detection and suppression systems

provided good equipment availability. Effective self assessments included weekly walkdowns to identify fire hazards and proactive identification of fire protection program deficiencies. Increased management oversight to ensure adequate fire brigade manning and to maintain fire brigade training status current would strengthen the fire protection program.

The Plant Support area is rated **Category 1**.