FERMI 2 SALP 14

REPORT NO. 50-341/94001

I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) process is used to develop the NRC's conclusions regarding a licensee's safety performance. 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 Fermi 2 Nuclear Plant for the period July 1, 1992, through April 2, 1994.

An NRC SALP Board, composed of the individuals listed below, met on April 13, 1994, 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."

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E. G. Greenman, Director, Division of Reactor Projects, RIII

Board Members
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R. V. Crlenjak, Acting Deputy Director, Division of Reactor Safety, RIII
L. B. Marsh, Director, Project Directorate III-1, NRR

II. PERFORMANCE RATINGS

The current SALP process assesses performance in four functional areas instead of the previous seven. The four areas are Operations, Maintenance, Engineering, and Plant Support. Safety Assessment/Quality Verification is considered for each of the four functional areas rather than as a separate functional area. The Plant Support functional area assesses radiological controls, emergency preparedness, security, chemistry, and fire protection. Three category ratings (1, 2, and 3) will continue to be used in the assessment of performance in each functional area. Performance trends, improving or declining, have been eliminated as part of the ratings.

Current Functional Areas and Ratings:

Functional Area	Rating This Period
Operations	3
Maintenance	2
Engineering	2
Plant Support	1

Previous Functional Areas and Ratings:

Functional Area	Rating and Trend Last Period
Plant Operations	2 Improving
Maintenance/Surveillance	2
Engineering/Technical Support	2 Improving
Radiological Controls	1
Emergency Preparedness	1
Security	1
Safety Assessment/Quality Verification	1

III. PERFORMANCE ANALYSIS

A. Operations

Overall performance in the area of operations was adequate. However, unnecessary challenges to operations occurred throughout the period due to management's inability to correct recurring performance deficiencies. Specifically, management failed to establish an effective work control process and did not effectively address a culture within the Fermi organization where schedule pressures and inattention to detail overshadowed the importance of fundamental safety precautions.

The control of plant operations by the operators was mixed. The response of operators was effective and prompt during the five reactor scram events, the identification of a relay failure in the high pressure coolant injection (HPCI) system, the response to a loss of Division I offsite power, and the response to the turbine failure event. However, failures to adequately maintain configuration control and inattention to detail during routine operations were also noted. Examples included a reactor scram and system challenges when the wrong valve was opened while putting a demineralizer back in service, a HPCI pump suction transfer during a surveillance, an inadequate isolation of the standby control system prior to modification work, and the failure to maintain the turbine building at a negative differential pressure.

Management oversight of operations and focus on safety was mixed. On the positive side, shutdown risk management was good and the initial operator training program was strong as evidenced by a high pass rate. However, the continuation and increased significance of personnel errors due to inattention to detail during routine evolutions indicated weak oversight of plant activities and inadequate communication of management expectations. In addition, recurring work control process deficiencies and perceived schedule pressures were not effectively addressed by management resulting in fundamental safety precautions being overlooked, which ultimately led to three

maintenance workers receiving first and second degree burns when a pressurized system was opened without establishing appropriate plant conditions.

Identification and correction of problems was mixed. There were examples where problems were appropriately identified such as the detection of abnormal operation of the north condenser pump, identification of an abnormal reading on the HPCI Controller, detection of a degraded Modular Power Unit, and detection of increased off-gas levels. However, there were also examples of inadequate identification of problems such as operators failing to notice that the reactor pressure recorder was reading zero while at power and failure to recognize a malfunctioning level control valve. Deficiencies, once identified, in many cases, were not effectively resolved. Examples included the failure to correct the problems associated with inadequate communication of management expectations, and the work control process. In addition, recurrent deficiencies with the plant simulator continued from the previous assessment period. Also, the longterm acceptance of a degraded gland seal system without corresponding training of operators to the condition resulted in the loss of the condenser for cooldown during a plant transient.

In response to many of the above weaknesses and escalated enforcement for inadequate corrective actions, plant management recently initiated a comprehensive corrective action improvement initiative. NRC review of the effectiveness of these initiatives had not been completed as of the end of this assessment period.

The performance rating is Category 3 in this area. During the previous assessment period, this area was rated a Category 2 with an improving trend.

B. Maintenance

Overall performance in the area of maintenance was good. Management oversight and involvement in turbine failure recovery activities were strong. Corrective and preventive maintenance backlogs were trending downward during the latter half of the SALP period. Teamwork and communications were effective for high visibility activities. However, deficiencies were noted in the numbers and significance of personnel errors and a lack of effective communication and teamwork on several occasions for routine maintenance and surveillance activities. Lack of effective followup and prioritization for corrective actions of previously identified deficiencies, perceived schedular pressure, inattention to detail, failure to follow procedures, and an inconsistent safety focus contributed to these deficiencies. Contractor control problems were also noted. Personnel errors and corrective action program problems were identified during the previous SALP period as concerns.

Management involvement and focus on safety were mixed. While many programs and activities appeared to be geared towards safety, these were not always effective in resolving routine maintenance activity teamwork problems and human performance issues. Management expectations were also not understood by all levels of the organization. Significant problems with work planning, corrective action implementation, and weaknesses in communication were identified during this SALP period. Many of these deficiencies were evident during a torus hatch event and improper installation of post accident

monitoring recorders early in the SALP period. The safety focus, teamwork, communications and management involvement improved in response to significant events such as the extraction steam line failures and the turbine failure event.

The equipment condition of the plant, while good, has declined somewhat. While housekeeping remained a strength, especially the impressive efforts in response to the turbine failure event, there were several recurring equipment problems indicating reduced equipment reliability, especially in the balance of plant. Examples included motor-operated valve (MOV) failures, modular power unit voltage regulator problems, reactor water cleanup check valve problems, auxiliary contact switch failures, and loss of control room indicating lights during a scram. Plant management had recently developed plans to implement significant balance of plant improvements during the current outage; modifications and related work were beginning as of the end of the assessment period.

Identification and resolution of issues was mixed. While good inter- and intra- department teamwork and communications were evident for high visibility activities, these were not always observed for routine maintenance activities. Identification of issues was good, but corrective action program, material control, and technical support problems impeded effective resolution of self and third party identified issues. Recurring problems were also identified with abnormal lineup sheet and yellow lining of drawings processes. While the licensee began several new programs, including maintenance self assessment and performance indicator monitoring, these were only moderately effective in improving maintenance performance during this assessment period.

The quality of maintenance and surveillance activities was good. Personnel errors, while historically high, were of higher safety significance this assessment period, resulting in two reactor scrams and greater safety-related equipment down time. Teamwork, communications, and management oversight problems contributed to this trend. However, fewer significant problems were noted near the end of the SALP period and corrective and preventive maintenance backlogs had been trending downward.

The performance rating is Category 2 in this area. During the previous assessment period, the maintenance and surveillance area was rated a Category 2.

C. Engineering

Performance in the engineering area improved during the second half of the assessment period and was good. Improvement was noted with respect to the identification of safety issues. However, slow resolution of these issues was observed throughout the assessment period. Management response to the turbine-generator failure event was thorough and effective. In general, work quality was good where management expectations for engineering job performance were clearly delineated. However, occasional lapses in management expectations were noted, resulting in erratic performance from the engineering staff, particularly in the area of motor operated valves. Also, control of contractors was a problem, resulting in a plant trip and the unavailability of

a plant safety system. Interdepartmental communications was inconsistent and contributed to the ineffective resolution of identified system problems.

Safety focus within the engineering department was mixed. The licensee was conservative in placing components requiring inservice inspection or testing (ISI or IST) on an increased inspection and testing frequency and in resolving equipment problems in this area. In addition, the licensee was thorough in responding to a potential for pressure locking in gate valves. Also, the onsite review process was effective in the assessment of engineering evaluations and nuclear engineers quickly responded to indications of a leaking fuel assembly to minimize its effects. However, engineering prioritization of significant long-standing problems did not adequately consider the impact on plant operations. An example was the turbine gland seal system that was operated in manual for four years without an adequate understanding of the consequences on plant operations and components. This contributed to operators' failure to maintain condenser availability during the August 13, 1993, reactor scram. In addition, safety focus was deficient during the review and evaluation of water hammer effects in the residual heat removal system.

Management oversight of engineering activities was mixed. Oversight of several programs was insufficient, including the design change and modification process, implementation of MOV dynamic testing, definition and understanding of engineering staff responsibilities and duties, and engineers' performance and involvement in problem resolution. To improve overall engineering performance, a Technical Performance Improvement Plan was initiated during this period. The plan specifically addressed general areas that showed a need for improvement. Also, the role of system engineering during system outages improved during this assessment period. Management response to the turbine-generator failure event was effective.

Engineers' understanding of plant design was adequate. Concerns were noted with engineering's operability and design reviews and the treatment of uncertainties and assumptions in various valve calculations. Also, implementation of the program for design changes and system modifications was inadequate. In addition, problems were noted with IST evaluation of a problematic valve actuator.

Identification and resolution of technical issues was mixed. In general, system and IST engineers were knowledgeable of their assigned systems as demonstrated by the identification of system problems during testing. However, concerns were noted in the resolution of issues in some problematic areas, including: MOV dynamic testing; engineering operability assessments of IST and containment isolation valves; and implementation of corrective actions for the HPCI water hammer and the lube oil system contamination issues.

Engineering support to other organizations was good. Communication and coordination within engineering and with other plant organizations were acceptable overall. Good communications and teamwork were evident for high visibility items such as the development of temporary modifications for water control during the turbine generator failure event and the repair of a modular power unit. However, this was not the case for routine activities, where

inadequate communications between engineering and plant organizations contributed to ineffective corrective action and resolution of system problems. An example of this was the handling of auxiliary contact failures on MOVs.

Performance in the area of engineering programs and procedures was mixed. The development of a good check valve program enhanced the ability to identify and evaluate system operating performance. However, a lack of procedures to maintain this program and discrepancies in surveillance procedures were examples where improvements were needed. Also, the trending program for setpoint calibration was weak, hindering effective equipment problem resolution. Finally, a narrow approach in Information Notice reviews for applicability to Fermi 2 sometimes inhibited the opportunities to address potential equipment problems.

The performance rating is Category 2 in this area. During the previous assessment period, the area of engineering and technical support was rated Category 2 with an improving trend.

D. Plant Support

The overall performance in the plant support area was excellent. Management provided strong support toward maintaining excellent radiation protection, water chemistry, security, and emergency preparedness programs. This support was reflected in the consistent intra- and inter-departmental teamwork and the demonstration of ownership, especially in radiation protection, displayed by the workers. This teamwork aided recovery after the December 25, 1993, turbine event and resulted in prompt restoration of normal water chemistry and successful treatment and discharge of the excessive water volume generated from the event.

Continued support of the as-low-as-reasonably-achievable (ALARA) and source term reduction programs contributed to excellent radiological performance as evidenced by a low three year collective dose average (172 rem/1.72 Sv). Excellent reactor water chemistry (prior to the turbine event) also aided source term reduction efforts and helped maintain effluent releases low. Continued excellent radiological housekeeping kept personnel contamination events (15 in 1993) low and significantly mitigated the radiological consequences from the turbine event. Conversely, weaknesses were noted concerning solid radioactive waste storage (lack of package stacking guidance and inspection program) and in management oversight of the post accident sampling system. Increased attention was also warranted towards water samplers used in the Radiological Environmental Monitoring Program. The staff was well qualified.

Management continued strong support for the security and fitness for duty (FFD) programs and several system upgrades were completed. Although self assessments were thorough and effective in identifying problems, corrective actions did not always prevent recurrence. Security plans and procedures were generally excellent, but some weaknesses were noted in the FFD program (resolved during the assessment period) and a plan change was not submitted in a timely manner. Performance by the uniformed security force was excellent

although documentation of compensatory measures was somewhat weak. Overall, the security program was viewed as effective.

Strong management support resulted in several improvements to emergency response facilities and communications equipment. Staffing changes resulted in a stronger, more experienced team and programs and procedures were generally excellent. However, some concerns were identified regarding the ability to follow the procedure to promptly assemble and account for personnel during an emergency. Also, concerns regarding the ability to promptly and correctly classify emergencies was a recurrent problem based on initial licensing examinations of senior reactor operators and past emergency exercises. These weaknesses were observed during the turbine event although the overall response was good.

Fire protection performance was good. Excellent response was noted for the thermolag issue and fire protection systems effectively contained fires generated from the turbine event. Additionally, prompt cleanup of areas affected by the turbine event minimized residual fire loading. However, performance of routine firewatch duties warranted improvement and several coordination, training, procedure, and equipment problems were evident during response of fire protection personnel to the turbine event.

The performance rating is Category 1 in this area.

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