SALP 11

INITIAL SALP REPORT

U.S. NUCLEAR REGULATORY COMMISSION
REGION III

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Inspection Report No. 50-315/93001; 50-316/93001

Indiana Michigan Power Company

Donald C. Cook Nuclear Plant

January 1, 1992, through April 30, 1993

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated U. S. Nuclear Regulatory Commission (NRC) staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance on the basis of this information. The program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC's assessment of the facility's performance in each functional area.

This report is the NRC's assessment of the licensee's safety performance at D. C. Cook Nuclear Plant for the period January 1, 1992, through April 30, 1993.

An NRC SALP Board, comprised of the staff members listed below, met on June 9, 1993, to review the observations and data on performance and to assess licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance."

Board Chairman

C. E. Norelius, Director, Division of Radiation Safety and Safeguards (DRSS)

Board Members

T. O. Martin, Acting Director, Division of Reactor Safety (DRS)
W. M. Dean, Acting Project Director, Project Directorate (PD) III-1, Office of Nuclear Reactor Regulation (NRR)
W. D. Shafer, Chief, Branch 2, Division of Reactor Projects (DRP)
B. A. Wetzel, Project Manager, PD III-1, NRR
J. A. Isom, Senior Resident Inspector, D. C. Cook

Other Attendees at the SALP Board Meeting

C. E. Brown, Reactor Engineer, DRP
B. L. Burgess, Chief, Operations Section, DRS
J. R. Creed, Chief, Safeguards Section, DRSS
J. L. Hansen, Licensing Examiner, DRS
B. L. Jorgensen, Acting Chief, Reactor Support Programs Branch, DRSS
J. R. Kniceley, Physical Security Inspector, DRSS
J. W. McCormick-Barger, Chief, Emergency Preparedness and Non-Power Reactor Section, DRSS
R. A. Paul, Senior Radiation Specialist, DRSS
W. D. Pegg, Reactor Inspector, DRS
M. C. Shumacher, Chief, Radiological Controls Section 1, DRSS
E. R. Schweibinz, Acting Chief, Section 2A, DRP
H. J. Simons, Radiation Specialist, DRSS

II. SUMMARY OF RESULTS

Overview

Overall performance at the D. C. Cook plant during the appraisal period was characterized by improvement across a broad spectrum of appraisal areas. The Maintenance/Surveillance area improved from a Category 2 rating to a Category 1 rating, while the Security and Emergency Preparedness areas retained Category 1 ratings. This is indicative of a superior level of performance. Each of the remaining four areas was assigned a Category 2 rating with an improving trend. This rating is indicative of a clearly discernable trend in performance which, if continued, could result in an improved rating in the next SALP assessment period.

In some areas, such as Maintenance/Surveillance and Engineering/Technical Support, the improvements resulted from long-term programmatic efforts and were a continuation of progress observed during the previous appraisal period. Both these areas had been assigned Category 3 ratings for SALP Cycle 9, which ended on August 31, 1990. In other areas, such as Safety Assessment/Quality Verification, improvements were more recently observed.

Both plant and corporate efforts appeared to be involved in the positive results achieved across the several appraisal areas, which is notable.

The performance ratings during the previous assessment period and this assessment period according to functional areas are given below:

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

III. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

Plant operations were characterized by safe, conservative operations and by improved operator performance in most areas.

Management's effectiveness in ensuring quality was excellent, with few exceptions. Plant management closely monitored issues that could impose either operational or safety challenges for the operators. Initiatives were taken to minimize the number of lit control room annunciators and equipment

controllers not in automatic. Also, evolutions that could cause balance-of-plant transients were reviewed closely to minimize these challenges. Management continued to display a strong, conservative and safety-conscious approach to both operational and shutdown plant decisions.

Operator responses to the reactor trips and other operational transients were excellent. For example, when an auxiliary equipment operator (AEO) caused automatic pressurizer level control to be lost, control room operators promptly and correctly diagnosed the problem through noting the change in the volume control tank level. Also, operator response to the Unit 1 main feedwater transient, caused by a pressure controller failure, and their response to a loss of condensate event were very good. Likewise, there was an improvement in operator performance during reactor startups and shutdowns. Performance during startups showed some weakness in the previous assessment period. There were no operational events during the numerous Unit 2 reactor and turbine startups and generator tests, and operator errors adversely affecting the plant were very rare.

Shift performance during routine operations was good. Shift turnover, log-keeping practices, and control room professionalism remained strong throughout the assessment period. Operator attentiveness to parameters in the control room remained good; however, operators were not always attentive to details of plant conditions outside the control room. Operators were typically excellent in reacting to events, but did not always analyze routine plant conditions to prevent problems from developing. For example, the lack of a questioning attitude and inadequate review of the emergency diesel generator (EDG) lube oil tank level readings caused a condition in which a steady loss of oil from the tank was left uncorrected for a period of about 5 months. This eventually led to one EDG being inoperable for a period greater than allowed by the technical specifications (TS). A Severity Level III violation was issued for this.

The identification and resolution of technical issues from a safety standpoint remained strong. The licensee continued to perform full-core off loading during outages to minimize shutdown risk. Critiques and lessons learned from both industry events and events that occurred at the plant were routinely made available to the operations shift through memoranda and newsletters. Additionally, general plant appearance and cleanliness continued to improve during this assessment period. Compensatory fire protection measures, which had experienced problems during the previous assessment, appeared to be better controlled during the current period.

Plant staffing was ample with experienced operating staff. Most operations department management staff were either currently or formerly licensed. Overtime of licensed operators was adequately controlled. The training and qualification programs for personnel were effective and contributed to the good operating performance of both units. Unlike the last assessment period, problems experienced in conducting transient evolutions and in implementing EOPs were not evident. Also, there was an improvement in the performance of the operators during initial and requalification examinations. They had a pass rate of 85 percent (11 out of 13 individuals) on the initial examinations, and a pass rate of 97 percent (31 out of 32 individuals) on the requalification examinations.

2. Performance Rating

Performance is rated Category 2 with an improving trend in this functional area. Performance was rated Category 2 in the previous assessment period.

3. Recommendations

None.

B. Radiological Controls

1. Analysis

Performance in this functional area was characterized by effective management with good support from an experienced staff which resulted in good overall radiological controls.

Management effectiveness was good. Good support for source term reduction was indicated by chemical decontamination of the resistance temperature detector lines, early boration, and hydrogen peroxide addition. Management backing for as-low-as-reasonably-achievable (ALARA) efforts was evident in the use of a reactor head shield, remote monitoring, robotic tools, and electronic dosimeters. Management also supported the commitment to good water quality, National Registry of Radiation Protection Technicians certification of radiation protection technicians, upgrading the liquid effluent monitoring system, and station programs for self identification and correction of problems. Management was less aggressive in resolving problems with startup flash tank system use that resulted in low-level ground contamination outside the plant.

The identification and resolution of technical issues was good. Cumulative dose in 1992 (about 490 person-rem) was low, and was consistent with the original station goal despite a longer than expected outage (400 days). Significant radiological work included plugging and resleeving of more than 1800 steam generator tubes as well as considerable first time and emergent work. During the appraisal period, there was a reduction in contaminated areas and a corresponding reduction in protective clothing use. Other improvements noted were the oversight of exits from radiologically controlled areas and assessing the cause of personnel contamination events. Cold chemistry measurement comparisons with the NRC remained good (28 agreements in 31 comparisons), and the station maintained a satisfactory crosscheck program with vendors. Radioactivity in liquid and gaseous effluents remained well below regulatory limits, efforts to reduce solid radwaste continued, and the radiological environmental monitoring program was effectively implemented.

Performance weaknesses were noted in a violation of a transportation regulation, and in a violation for unauthorized transfer of a small amount of radioactive material. Prompt corrective actions were implemented and were effective.

Overall, staffing, training, and experience level in the radiological controls area were good.

2. Performance Rating

Performance is rated category 2 with an improving trend in this area. Performance was rated Category 2 during the previous assessment period.

3. Recommendations

None.

C. Maintenance/Surveillance

1. Analysis

Performance in this functional area was characterized by an improvement in the quality of maintenance work and evidence of strong root-cause investigations.

Management's effectiveness in the maintenance area continued to improve and was excellent. Emphasis on improving the material condition of both the auxiliary and the turbine buildings continued as evidenced by the reduction in the number of steam, water, and oil leaks in the plant. The material condition of the plant was good. Plant management closely followed maintenance on equipment problems that could possibly affect safety or operation of the plant until they were satisfactorily addressed. Corrective actions were typically well founded on aggressive and thorough failure analyses and root cause investigations.

The surveillance program and procedures were good; although, there were a few missed nonroutine surveillances. There was only one reactor trip caused or associated with equipment failures, an improvement from the previous assessment period.

Improvements in the maintenance program continued. For example, an integrated scheduling group was formed late in the assessment period to schedule all maintenance activities. As a consequence, after some problems in this area, improvements in planning and scheduling were noted. Also, the maintenance procedure upgrade work was completed and procedure use was excellent. Some positive effects of program changes became increasingly evident in the latter portion of the assessment period. The backlog of non-outage corrective job orders was somewhat high but showed slow but steady improvement over the assessement period.

Identification and resolution of technical issues, with a view to safety, was excellent. The quality of root-cause analyses improved from the last period and is considered excellent. Timely, effective, and thorough actions were taken in response to the findings. Examples included resolution of water entrainment in the vital electrical switchgear room ventilation system, which caused several trips of the spent fuel pit pump, and adjustment to the reactor trip breaker undervoltage trip attachment. Engineering resources were effectively utilized.

The quality of the maintenance performed by the crafts was excellent. There were a few examples of rework early in the assessment period typically involving either difficult or infrequently performed outage maintenance

activities. Maintenance activities such as work on an emergency boration valve, repairs to a reactor trip breaker, and another safety-related breaker were excellent. Problems relating to procedural adherence, identified during the previous assessment period, were not observed during this assessment period.

Maintenance department staffing was ample and overtime usage was controlled. Except for the rework activities mentioned above, training effectively supported a well qualified and experienced staff.

2. Performance Rating

Performance is rated Category 1 in this functional area. Performance was rated Category 2 in the previous assessment period.

3. Recommendations

None.

D. Emergency Preparedness

1. Analysis

Performance was characterized by strong management support for the well maintained emergency preparedness (EP) program and acceptable exercise performance.

Management effectiveness in ensuring quality was good. The emergency plan and emergency response facilities (ERFs) were maintained in an excellent state of readiness. In addition, improvements, such as the addition of an automated telephone call system to activate the emergency response organization (ERO), were made to the ERFs and the EP program. However, during the 1992 exercise, five weakness were identified.

The approach to identifying and resolving technical issues, with a view to safety, remained excellent. The exercise weaknesses involved accident classification, proper activation of the Emergency Operations Facility, command and control of the onsite emergency response efforts, timely dispatch of repair teams, and the ability to perform post-accident sampling and analysis. These were not programmatic in nature, and aggressive corrective actions were taken to address the root causes of the weaknesses. For example, weekly post-accident sampling drills and walkthroughs were initiated and this capability was promptly redemonstrated. In addition, identified weaknesses in EP implementing procedures were promptly corrected. Periodic emergency plan revisions continued to be well done and enhanced the plan. The EP response to operational events was excellent as demonstrated by the proper classification of four unusual events. Notifications of these events were detailed and timely.

The EP staffing and qualifications were excellent. A full-time Assistant EP Coordinator was assigned to the program and all the non-managerial EP training

was placed under one trainer for better uniformity. The ERO staffing levels remained excellent with at least three persons qualified for each key position.

The ERO training program was reviewed in depth in view of the exercise weaknesses; the program was judged excellent and further upgrades were made to the program. The program was comprehensive and included a detailed qualification program that required demonstration of knowledge to be fully qualified as a member of the ERO.

2. Performance Rating

Performance is rated Category 1 in this area. Performance was rated Category 1 during the previous assessment period.

3. Recommendations

None.

E. Security

1. Analysis

Performance was characterized by excellent management attention and support.

Management effectiveness in ensuring quality was excellent as evidenced by the continued reduction in the personnel error and equipment events identified in the safeguards event log. The security self-assessment and quality assurance (QA) audits and surveillances were excellent in monitoring and evaluating program effectiveness. The Plant Manager's support of the security program fostered a high level of awareness towards security by the plant staff and security force personnel. An example of management support was the upgraded computerized badge fabrication system. Site management liaison with local-law-enforcement agencies (LLEAs) was excellent. The licensee shared their training facilities and provided their training video on non-lethal force to LLEAs. The LLEAs were also allowed to use the licensee's trained dog in area drug enforcement activities.

The approach to identifying and resolving technical issues from a safety standpoint was excellent as shown by the development of effective compensatory measures to ensure that security concerns were adequately addressed during the construction of a new fire protection pumping station inside the protected area. Additionally, the development and implementation of a monthly preventive maintenance program and the support of plant management resulted in a low number of door-related security events.

Evaluation of loggable events was excellent. These events were properly identified, analyzed, and documented. There were no events that were required to be reported within 1 hour of discovery.

Staffing continued to be excellent. Several key management position vacancies were filled in a timely manner with experienced individuals. Fitness-for-duty

functions were centralized in the Security Department resulting in improved communications and consistency in implementation of 10 CFR 26 requirements.

The effectiveness of the training and qualification program was excellent. Security personnel were knowledgeable and proficient in performing their assigned duties. Tactical response capability improved through the conduct of limited force-on-force drills in the plant and range instruction in the tactical combat course.

2. Performance Rating

Performance is rated Category 1 in this area. Performance was rated Category 1 during the previous assessment period.

3. Recommendations

None.

F. Engineering /Technical Support

1. Analysis

Engineering and technical support effectiveness in performing routine and reactive engineering activities was good. Improvements in this area were noted and weaknesses identified in the last assessment period were effectively addressed.

Management effectiveness in ensuring quality continued to improve and was good. There was evidence of management emphasis and oversight in the design change program, motor operated valve program, and inservice inspection program. Attention to previous issues involving communication and coordination between corporate and onsite engineering resulted in better data evaluation, thorough root-cause analysis, and more effective corrective actions. This improved management attention to detail contributed to fewer operational events and no violations in this area. Examples in which management ensured proper problem resolution included improvements in acoustic valve monitor reliability and modification to the air supply for the post-accident hydrogen monitoring system valves. Management effectively communicated performance expectations to the technical staff as indicated by continuing system engineering performance improvements. On the other hand, management did not effectively address problems with battery room temperature control.

Technical issue identification and resolution were generally good. Technical evaluations and corrective actions were technically sound, timely, and displayed an understanding of safety implications. Engineering resources were effectively utilized in safely recovering an incorrectly grappled spent fuel bundle. Engineering reviews of equipment maintenance and performance history resulted in timely modifications, appropriate repairs, or replacement. Corrective actions for problems were often broadened to encompass generic as well as specific issues. This was evidenced by the addition of many valves to the inservice testing (IST) program following investigation of a single failure, and by a system-wide upgrade of supports and restraints on branch

lines off the residual heat removal system. A rigorous safety review program was instituted during this appraisal period to ensure engineering safety evaluations were appropriately detailed and were technically based. This also was an improvement from the last assessment period.

On the other hand, the identification and resolution of some problems was not timely or conservative. Examples included recurring diesel performance problems after design-related modifications intended to achieve corrective action were completed and problems with accelerated wear on auxiliary feedwater pump bearings. In addition, ac short-circuit calculations were less conservative than accepted industry standards.

Engineering and technical support staffing was excellent. Onsite and corporate engineering positions were filled with experienced individuals with specific expertise. Engineering issues were effectively resolved with minimal outside support. Where consultants were used, as in the nondestructive examination program, personnel were qualified and knowledgeable, and proper oversight was given. The training organization maintained a good staffing level.

Staff training and qualification were excellent. The training program for the systems and project engineers was considered to be a strength. System engineers had completed required comprehensive instruction involving classroom lectures, self-study, on-the-job training, and examinations. The site engineering staff had a thorough knowledge of plant systems and system interfaces. The operator training and requalification program also was good and had improved from the last assessment period. This was reflected in the proposal to more realistically staff the simulator control room during the last requalification cycle and the higher pass rate on NRC-administered examinations.

2. Performance Rating

Performance is rated Category 2 with an improving trend in this area. Performance was rated Category 2 in the previous assessment period.

3. Recommendations

None.

G. Safety Assessment and Quality Verification

1. Analysis

Management was effective in ensuring issues which affected quality were identified and resolved in a timely manner. Improvements were noted in conduct of root-cause analyses and communications between corporate and the site.

Management's effectiveness in ensuring quality was good. A low threshold for reporting quality assurance (QA) issues continued, while adequate planning and prioritization aided in resolving quality-related issues in a timely manner. A more aggressive and thorough approach toward conducting root-cause analyses

was noted. Management supported self-improvement initiatives that resulted in improved material condition of the auxiliary and turbine buildings, installation of a system to minimize the effect of zebra mussel infestation, useful monthly performance indicators, and an internal audit program focusing on areas to be evaluated during upcoming major team inspections. An example of an effective self-assessment activity was the safety system functional inspection (SSFI) conducted on the containment spray system. SSFIs are conducted annually, contributing to a good self-assessment of engineering activities. In the latter part of this reporting period, a graded corrective action program that assigns resources for investigating and analyzing problems on the basis of the safety impact was implemented.

The onsite QA audit program was adequately managed with an appropriate mix of performance- and programmatic-based audits and surveillances. The audits were of good quality and were positive contributors to Security, Emergency Preparedness, and Radiation Protection activities. Audit findings were adequately dispositioned with few exceptions. One exception involved failure to ensure the IST coordinator was informed whenever pump maintenance was expanded beyond its original work scope, so pump IST reference values could be reverified.

The approach to identifying and resolving technical issues reflected a conservative philosophy with regard to considering equipment operable. An example of this was the conservative operability assessment for a main steam isolation valve that was found to be outside its surveillance period during a plant startup. There was noted improvement in the process to determine if an unreviewed safety question existed. 10 CFR 50.59 reviews were typically well-documented with good technical rationale.

On the other hand, there were some instances when corrective actions did not prevent subsequent equipment problems. Examples of these were mentioned in earlier sections of this report. Further, a few operational events were not effectively resolved. These included the problems with the EDG slow start modification and boron chemical control of the refueling water storage tank. However, subsequent evaluation of these issues demonstrated an aggressive and thorough approach to achieve a complete resolution.

Technical information and justification for proposed TS changes were good. The extensive effort to provide logically oriented and thorough documentation to support the NRC's review of the proposed analog-to-digital conversion of the reactor protection system was particularly noteworthy. Although some effort was needed to clarify original submittals, such as the response to Generic Letter 87-02 on seismic qualifications, and a request to remove the alarm feature of the subcooling margin meters, the information provided for both design reviews and amendments was sufficient to perform a technical review and safety evaluation.

The Nuclear Safety Design Review Committee (offsite review committee) and the Plant Nuclear Safety Review Committee (onsite review committee) were well staffed and met frequently. Both groups contributed to a stronger self-assessment capability and demonstrated a conservative approach in resolving issues. Audits conducted under the cognizance of the offsite review committee were thorough and were successful in raising substantive issues.

Management focused attention on improving communications between the corporate office and the site. Efforts in this area were successful, as corporate management participated in daily status discussions with the plant staff and conducted monthly interface meetings in the corporate office that included site managers. Communications with the NRC staff were also emphasized and were improved, resulting in enhanced interactions with the NRC technical staff and improved license amendment applications.

The staffing and experience level of the onsite QA organization and the training and qualifications of the QA auditors were good. The level of expertise among the corporate QA staff was excellent.

2. Performance Rating

Performance is rated Category 2 with an improving trend in this area. Performance was rated Category 2 during the previous assessment period.

3. Recommendations

None.

IV. SUPPORTING DATA AND SUMMARIES

A. Major Licensee Activities

UNIT 1:

On June 22, 1992, the unit was shut down for a refueling outage. While shutting down, an engineered safety feature actuation occurred when both source range detectors failed as they were being energized.

On July 5, 1992, refueling operations were halted when the refueling machine grapple assembly did not properly engage the top of a fuel assembly and could not be freed.

On July 18, 1992, an Unusual Event was declared when essential service water was shut off for about half an hour to both emergency diesel generators because of a rupture in a nonessential service water expansion joint.

On September 9, 1992, the licensee completed extensive plugging and resleeving operations on the steam generators.

On October 28, 1992, the unit was paralleled to the grid. About 2 hours later, the reactor tripped from a turbine trip caused by a main turbine thrust bearing trip.

On October 28, 1992, the unit was returned to service and reached 100-percent power on November 15, 1992, where it remained through April 30, 1993, with no significant operational problems.

Unit 2

On January 22, 1992, unit shutdown commenced because of high boron concentration in the refueling water storage tank (RWST). A temporary waiver of compliance was granted for 6 days and the unit did not shut down. On January 24, 1992, the boron concentration in the RWST was returned within specifications.

On January 24, 1992, power was reduced to 34 percent to repair a through-wall leak in the high-pressure turbine exhaust piping. On January 27, 1992, the unit was returned to 100-percent power.

On February 1, 1992, power was reduced to 70 percent because of a different through-wall leak in the high-pressure turbine exhaust piping that could not be repaired at power.

On February 22, 1992, the unit shut down for a refueling outage.

On June 19, 1992, excessive turbine vibration was observed during turbine roll up. The licensee commenced efforts to balance the turbine-generator.

On July 2, 1992, during investigation of the turbine vibration problems, the reactor tripped from a turbine trip because of a loss of condenser vacuum.

On September 2, 1992, the unit was paralleled to the grid.

On September 8, 1992, the unit was shut down from 87 percent power because of high generator vibration. The generator rotor was shipped to the vendor for repairs.

On November 30, 1992, the unit commenced power operation for turbine-generator balancing efforts. After modifications to the bearing and the hydrogen seals, the unit was paralleled to the grid on December 12, 1992.

Unit 2 reached 100 percent power operation on December 26, 1992, where it remained through April 30, 1993, with no significant operational problems.

B. Major Inspection Activities

1. Inspection Data:

The inspection reports discussed in the SALP are listed below:

Docket Nos: 50-315 (Unit 1) and 50-316 (Unit 2) Inspection Reports (same number applies to both units): 92002 through 92006; 92008 through 92012; 92013 (Unit 1 only); 92014 through 92023; 93002 through 93011.

2. Special Inspection Summary

a. From February 3 through March 6, 1992, the NRC conducted an electrical distribution system functional inspection (IR No. 92003/003).

b. From April 6 through 10, 1992, the NRC conducted a review of the licensee's peer inspection process (IR No. 92008/008).

c. From August 31 through October 9, 1992, the NRC conducted an engineering and technical support program inspection (IR No. 92015/015).

d. From December 3 through 18, 1992, the NRC inspected the failure of the Unit 2 "AB" emergency diesel generator from a trip on low lube oil pressure and Unit 2 operation in Mode 2 with expired steam generator stop valve surveillances (IR No. 92022/022).

e. From February 23 through March 8, 1993, the NRC conducted a review of inservice testing of pumps and valves and of the effectiveness of the program regarding the performance of check valves (IR No. 93008/008).

f. From March 22 through April 1, 1993, the NRC conducted a review of the implementation of the motor-operated valve program established in response to Generic Letter 89-10 (IR No. 93006/006).