U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/95010

FACILITY

Perry Nuclear Power Plant, Unit 1

License No. NPF-58

LICENSEE

Cleveland Electric Illuminating Company
Post Office Box 5000
Cleveland, OH 44101

DATES

December 2, 1995, through January 22, 1996

INSPECTORS

D. Kosloff, Senior Resident Inspector
R. Twigg, Resident Inspector
J. Hopkins, Lead Project Manager
M. Kurth, Reactor Inspector
P. Louden, Senior Radiation Specialist
J. Smith, Senior Reactor Inspector

APPROVED BY

R. D. Lanksbury, Chief
Reactor Projects Branch 2

3/22/96
Date

AREAS INSPECTED

A special announced inspection of operations, engineering, maintenance, and plant support was performed. Safety assessment and quality verification activities were routinely evaluated. Follow-up inspection was performed for non-routine events and for certain previously identified items.

RESULTS

Assessment of Performance

OPERATIONS: The licensee continued to demonstrate a conservative operating philosophy. Operator response to plant transients was prompt and appropriate and the plant was well controlled during routine operations. Oral communications remained excellent. However, operations personnel did not always have high enough expectations for performance of other organizations that provided them with information or support. For example, information from engineering on an emergency diesel generator (EDG) and an emergency service water (ESW) modification could have been more complete.

MAINTENANCE: The licensee continued to slowly improve plant material condition during online maintenance. Personnel continued to identify planning and scheduling problems. No personnel errors were identified during the inspection period, an improvement from previous performance. However, a Division I equipment maintenance outage was poorly conducted in December, resulting in safety-related equipment being out of service several hours longer than planned. Divisional outages during this operating cycle had gone well, making the problems encountered during this outage of particular concern. Also, maintenance management personnel did not attend the equipment outage critique, indicating a lack of aggressiveness on the part of management in correcting the outage deficiencies.

ENGINEERING: Overall, good support continued for other organizations, as demonstrated by the prompt and thorough evaluation of an indication of a fuel leak. However, there were weaknesses in information provided to operations about EDG sensitivity to room temperature and response to a concern about ESW keepfill pressure was slow.

PLANT SUPPORT: Performance in the radiation protection area continued to be good. The licensee had effectively implemented the Revised 10 CFR Part 20 regulations which were effective on January 1, 1994. A strength was noted in improved control of high radiation area keys. The licensee had taken significant actions in reducing radioactive waste volumes stored onsite. Many of the problems identified during the previous refueling outage with respect to dose monitoring, work control, and mock-up training appeared to be appropriately addressed. However, the overall effectiveness of these corrective actions will be determined during the upcoming refueling outage. One non-cited violation was identified for failure to post a high radiation area in the control rod drive rebuild area. Plant housekeeping improved.

SAFETY ASSESSMENT and QUALITY VERIFICATION: Quality assurance (QA) and self-assessment activities continued to have a positive impact on station performance. Although QA was aggressive in identifying the need to have managers involved in a critique of a poorly planned and executed equipment outage, this initiative was not effective because no managers participated in the critique. A wide variety of personnel continued to identify issues with potential safety significance. An audit of the QA function provided a good example of the use of outside personnel for safety assessment.

Summary of Open Items
Violations: Not identified in this report
Unresolved Items: Not identified in this report
Inspector Follow-up Items: Not identified in this report
Non-cited Violation: Identified in Section 4.1.4

INSPECTION DETAILS

1.0 OPERATIONS

NRC Inspection Procedures 60705, 71707, 71500, and 92901 were used to perform an inspection of plant operations activities. No violations or deviations were identified.

1.1 Operations Summary

The plant was operati at 98 percent power and coasting down for the next refueling outage (RFO5) at the beginning of the inspection period. The plant operated at various power levels during the inspection period and was at about 81 percent power at the end of the inspection period.

1.2 Operator Control of Routine Plant Operations Was Good

The inspectors observed routine plant operations and concluded that overall performance was good. The plant shutdown for the refueling outage was well controlled. Appropriate briefings were conducted for infrequently performed tasks. Oral communications continued to be excellent. However, in two cases (see Section 3.4) engineering support was weak and operations could have been more aggressive in pursuit of resolutions to the issues.

1.3 Operator Control During Transients Was Good

On December 13, an unexpected 2 percent opening of a flow control valve (FCV) for one of two reactor recirculation loops occurred followed by a continuous slow closure from 88 percent open to 67 percent open over the next 2 hours. There was no significant impact on reactivity or plant operations. Operations management reviewed the situation with engineering and determined that the most likely problem was a failed solenoid valve associated with the operating subloop of the FCV Hydraulic Power Unit. The licensee planned to perform additional trouble shooting and make any necessary repairs during the upcoming refueling outage. The subloop was manually isolated and the FCV was returned to a normal status without incident using the alternate subloop. Operations responded in a conservative and cautious manner to this situation.

1.4 Operation's Response to Cooling Tower Basin Leakage Was Conservative

The licensee identified a circulating water leak (about 1 gallon per minute) on January 11, when water and ice were observed on the ground surface near the cooling tower. The licensee was concerned that the water might be coming from a leak in the underground piping. The licensee conducted a thorough investigation that included manhole inspections near the main circulating water underground pipe. The investigation found the source of the leak was from an expansion joint in the concrete wall between the tower basin and the circulating water

pump intake structure. The licensee notified the Ohio Environmental Protection Agency (OEPA) because the leak was treated water and notified the NRC of the OEPA notification in accordance with 10 CFR 50.72.

1.5 Operations Response to Underground Fire Protection Pipe Leak Was Prompt and Effective

At about 3:14 a.m. on Sunday, January 7, 1996, the operators received a report that the motor driven fire protection water pump had started automatically. The shift supervisor promptly directed the operators to begin a search for indications of fire protection system leaks or unreported usage. At 3:40 a.m. operators observed substantial water flowing to the surface of the ground south of the emergency service water pumphouse. Operators closed the valves closest to the leak and flow was significantly reduced. When operators were unable to completely isolate the leak the shift supervisor promptly called for the emergency response organization to activate the technical support center and the operations support center. This allowed the licensee to provide prompt backshift support to the operating shift even though there was no requirement to activate the site emergency plan. An NRC inspector responded to the site and verified that the operating shift was receiving appropriate support and that the leak was stopped (at about 10:50 a.m.). The licensee reported the leak to the OEPA as a discharge from an abnormal discharge point. The licensee also reported the leak to the NRC in accordance with 10 CFR 50.72 because they had made a report to the OEPA. The report to the NRC was conservative because there was no significant impact to the environment since the water from the abnormal discharge was untreated lake water.

2.0 MAINTENANCE AND SURVEILLANCE

NRC Inspection Procedures 62703, 61726, and 92902 were used to perform an inspection of maintenance and testing activities. No violations or deviations were identified.

2.1 Ability to Accomplish Work

A Division I maintenance outage was conducted during the week of December 11, 1995. Poor planning resulted in safety-related equipment being out-of-service several hours longer than expected. No limiting conditions for operation were exceeded. Numerous problems developed, with the schedule slipping almost 20 hours by the end of the first outage day. Some problems were: 1) key maintenance personnel were scheduled for and attended unrelated training at the beginning of the outage, 2) needed scaffolding was not built prior to the outage, and 3) outage coordinators were not clear on management expectations.

A planned critique of the outage performance was delayed so that managers could attend. However, no managers attended the critique and many section representatives were unprepared for the critique. As of the end of this inspection report period, the written critique report had not been completed.

Licensee and NRC personnel inspectors continued to identify other situations where planning and scheduling of work had been weak. These included surveillance tests that had not been scheduled, interfering work scheduled at the same time, temporary loss of the safety parameter display system (SPDS) computer due to poor communications, and the sale of needed parts as surplus. Most of these situations involved individuals who identified issues early enough to avoid any impact on plant operations and minimize work disruption. This early identification was an improvement from past performance.

3.0 ENGINEERING

NRC Inspection Procedures (IP) 37551, 40500, 71714, and 92903 were used to perform onsite inspections of the engineering function. No violations or deviations were identified.

3.1 Fuel Leak Indications Promptly Evaluated

In October 1995 the licensee identified and located a fuel leak and suppressed the cell (four fuel assemblies) by fully inserting the associated control rod. Because of the leak, the licensee entered Failed Fuel Action Level 1 of its procedure PAP-0805, "Fuel Reliability Improvement Plan." One of the actions taken in accordance with the procedure was to increase chemistry sampling frequency to daily for fission product isotopes in pretreatment offgas and reactor water. On January 2, 1996, the licensee observed an increase in xenon-133. This indicated the possibility of another small fuel leak or slight degradation of the earlier leak. There was no measurable increase in treated offgas dose equivalent iodine. Engineering promptly evaluated the indications and developed several possible action plans. The licensee chose not to attempt an immediate localization of the leak because the plant was slowly reducing power in coastdown to the refueling outage. This had significantly reduced the possibility of secondary degradation of leaking fuel. Daily samples for the remainder of the operating cycle verified that there were no increases in any fission product concentrations. Xenon-133 concentrations remained lower than the value observed on January 2. The licensee also developed a plan for sipping fuel during the outage to verify no leaking fuel would be retained in the core.

3.2 Cold Weather Preparations

Preparations this year for cold weather continued to improve over past efforts. Last year, two new procedures were developed, but implemented late with some items not completed until January. This year, all items were completed in early December although some repairs were still on hold for various reasons (i.e., parts not available), with compensatory actions available. The licensee was not satisfied that completion of the cold weather preparations was timely.

3.3 Weaknesses Were Identified in Resolving Operational Issues

The inspectors identified two operational issues that received weak support from Engineering. This performance was a departure from the prompt and appropriate response normally observed during recent inspection periods.

Engineering had demonstrated excellent performance by proactively identifying a negative trend of stabilization times for Emergency Diesel Generator (EDG) starting. Although not outside of the Technical Specification limits, the stabilization times had been trending in a non-conservative direction (increasing) and were inversely affected by the diesel room temperature. In a memo to operations management, Engineering requested that the room temperature be maintained above 60 degrees F (the USAR describes the lower temperature limit as 40 degrees F). But the memo did not identify compensatory actions to Operation's management. Several days later the inspectors found that the operations shift on duty was unaware of the Engineering request. The result was no change in room temperatures from what would have occurred without engineering efforts. There was no impact on EDG operability and the licensee plans to eliminate the problem during the February refueling outage.

Design Change 94-139 added a new source of keepfill water for emergency service water (ESW) and installed a new pressure gauge intended to help operators monitor the status of the keepfill system. On January 16, the gauge read 14.5 psig with a minimum of 15 psig allowed by the system operating procedure used with the old gauge. To ensure the ESW train 'B' was operable, the operators promptly started ESW Pump B. The engineering resolution was to lower the allowed minimum to 14.5 psig to accommodate the differences between the new and old gauges. The impact of those differences had not been accounted for in preparing the modification and final resolution was slow. As a result the ESW 'B' pump was run unnecessarily for more than 24 hrs to ensure ESW train 'B' was operable.

4.0 PLANT SUPPORT

NRC Inspection Procedures 71750, 81700, 84750, 92904, and TI 2515/123 were used to perform an inspection of Plant Support Activities. No cited violations or deviations were identified. One non cited violation was identified (Section 4.1.4).

4.1 Radiation Protection (RP)

4.1.1 Implementation of the Revised 10 CFR Part 20 (TI 2515/123)

The inspectors reviewed the various program elements and procedures established or modified to address changes in 10 CFR Part 20 regulations which were effective on January 1, 1994. Overall, the inspectors determined that the licensee had effectively implemented the revised rule. A strength was noted

with respect to the high and very high radiation area key control program (4.1.1.1).

4.1.1.1 **High and Very High Radiation Area (HRA and VHRA) Controls**

The plant maintained four levels of control for HRAs at different dose rate ranges. HRAs between 100 mrem/hr and 1,000 mrem/hr, in lieu of the requirements of 10 CFR 20.1601(a), were controlled administratively through postings, radiation work permits, and electronic dosimeters, consistent with Technical Specifications. HRAs between 1,000 mrem/hr and 3,000 mrem/hr (Level 1 HRAs); and 3,000 mrem/hr and less than 500 rad/hr @ 1 m (Level 2 HRAs) were controlled through locks and keys controlled by the RP Section. The main difference between the two levels was that a Level 2 area entry required a calculated stay time for all individuals entering the area. All HRA entries required an electronic dosimeter and RP supervision determined the level of health physics technician (HPT) coverage needed for various areas.

VHRAs included the inclined fuel transfer tube during fuel movements and the drywell during operations. These areas were controlled through a lock which required the use of two keys. Each key was kept separated (one in the RP area, one in the control room) and continuous coverage by an HPT was required during a VHRA entry.

The overall control of HRA keys was maintained by the RP Section and the keys were inventoried every shift by the responsible HPT at the RP desk. The keys for each level of control were uniquely identified and placed in specific locations in a storage case. The inspectors found the manner in which the station had implemented the HRA and VHRA key control program to be a strength.

Training had been provided to all HPTs on proper job coverage and responsibilities for high exposure work within HRAs. A selected sample of HPTs were interviewed to determine their level of understanding of their responsibilities for job coverage. All HPTs interviewed appeared to possess sufficient knowledge of their roles and responsibilities while covering work in HRAs.

4.1.1.2 **Planned Special Exposures (PSEs) and Declared Pregnant Workers (DPWs)**

The licensee had instituted a policy that PSEs would only be used in exceptional circumstances. Perry Administrative Procedure (PAP) 0514, "Perry Plant Personnel Radiation Dose Control Program," detailed the requirements for performing a PSE. Management authorization for a PSE was required to be pre-approved up through the Site Vice President. No PSEs had been performed at the plant.

The DPW program was discussed in PAP 0114, "Radiation Protection Program". As part of the General Employee Training program, all workers received information relative to declaring pregnancies. Declaration was a voluntary responsibility of the worker. To date, three workers had declared a pregnancy (none of which were radiation workers), and no exposures have been recorded for a DPW or a fetus.

4.1.1.3 Maintaining Total Effective Dose Equivalent (TEDE) ALARA

The plant's program for maintaining TEDE ALARA was covered in Health Physics Instruction (HPI) C0005, "Radiation Work Permit Preparation and Surveillance." The licensee used a total radiological risk assessment approach in determining the appropriate controls for a given work activity. The risk assessment accounted for such factors as heat stress considerations and job site work hazards (climbing, confined space entries, etc.). Protective clothing considerations were also considered which could result in a higher risk for personnel contaminations; however, consistent with the ALARA principle, maintains the overall lowest exposures to workers. Total radiological risk assessments were typically performed by supervisory personnel and were reviewed by HP management. The inspectors did not identify any problems with the total radiological risk methodology.

4.1.2 Solid Radioactive Waste Processing, Shipping, and Transportation (IP 86750)

The inspectors reviewed the licensee's program for solid radioactive waste storage and shipping and transportation of radioactive wastes offsite. Aggressive management support was noted for this programs as evidenced by significant reduction of radioactive wastes stored onsite and reduction in overall dry active waste storage.

The inspectors performed independent radiation measurements and walkdowns of a resin shipment prepared for transport during the inspection period. Shipment #95-0110 was a liner of spent resin classified as a low-specific activity exclusive use package. The inspectors performed independent radiation surveys of the cask containing the liner as it was prepared to leave the site and found all readings to be well within DOT limits. No problems were noted with respect to this particular shipment.

4.1.3 Planning and Preparation for the Upcoming Refueling Outage (IP 83750)

Due to work control and overall dose performance problems experienced by the licensee during the 1994 refueling outage, the inspectors performed a review of the licensee's planning activities in preparation for the upcoming 1996 refueling outage.

The review included interviews with various outage and radiation protection planners, managers and supervisors. Overall, the licensee had taken significant steps toward addressing the problems encountered during the fourth refueling outage (1994). The more significant items noted taken by the plant were with respect to outage scope freezes, and subsequent monitoring of work additions; timely completion of design change packages; and assigning area responsibilities to single points of accountability.

Another area in which the plant experienced problems during the previous refueling outage was with respect to mock-up training. The inspectors reviewed many areas of the mock-up training program including; discussions with trainers, interviews with outage and contract worker management, and interviews with skilled craftsmen who had already received mock-up training. The inspectors determined that the licensee had significantly enhanced the focus on mock-up training for radiologically significant work. Management expectations for all individuals involved in such work to be appropriately trained was being understood at all levels of the organization. The inspectors will continue to assess the effectiveness of the corrective actions taken to address prior mock-up training deficiencies throughout the upcoming refueling outage.

The inspectors reviewed outage organizational layouts and discussed planning activities with radiation protection planners. The preliminary dose goal for the outage was 270 person-rem. This goal appeared to be very aggressive based on the dose associated with the identified work scope at the time of the inspection (about 305 person-rem). The inspectors plan to continue to monitor the licensee's activities with respect to outage preparation, planning, and scheduling.

One topic noted by the inspectors was with respect to two recent work items which were projected to exceed their exposure goal by 125 percent. The particular jobs were with the inclined fuel transfer system and the condensate filter septa changeout. A potential issue form (PIF) was generated for both jobs in accordance with station procedures. However, the inspector made

the following observations regarding these two items during the interim exit meeting on December 8, 1995:

(1). Is the trigger level to generate a PIF at 125 percent of the expected dose too high to identify early job problems and thus saving overall worker doses?

(2). What is the quality of the work hour estimates provided to the ALARA group? These estimates are the bases for the overall exposure goals.

The licensee acknowledged the inspectors observations and stated that both incidents were being reviewed from a broader aspect and similar questions about the current process were being raised by the licensee personnel reviewing this issue.

4.1.4 High Radiation Area Not Properly Posted

On November 4, 1995, a radiation protection shift supervisor, during a routine plant tour, noticed a pump shipping cask in the control rod drive rebuild room which did not appear to be properly posted. Immediate actions taken by the supervisor revealed that the area was a contaminated/high radiation area and was only posted as a contaminated area. The supervisor ensured that the area was appropriately posted and initiated a potential issue form (PIF) to document the event. Other immediate corrective actions included a review of electronic dosimeter records in an attempt to determine if anyone inadvertently entered the unposted area. The results of the survey were negative. The station performed a root cause of the incident which revealed that the work being performed in preparing a reactor water cleanup pump for shipment was ongoing in the area and that the job was turned over "in the field" to a second HP crew. The root cause appeared to be personnel error on the part of the HPT covering the job not verifying the posted condition of the work area following the completion of work. The licensee took disciplinary action against the HPT in question and counseled more senior RP individuals. The lessons learned from this event was also discussed with all station and contract HPTs.

The failure to post a high radiation area is a violation of 10 CFR 20.1902(b); however since the violation was identified by the licensee and immediately corrected, the violation is being treated as a non-cited violation, consistent with Section VII of the NRC Enforcement Policy (NUREG 1600) as published June 30, 1995, in the Federal Register (60 FR 34381) (50-440/95010-01).

4.2 Housekeeping Improved

The inspectors observed that general plant housekeeping had been improved after a slight decline had been noted during the previous inspection period. However, the licensee and the inspectors observed some isolated housekeeping problems inside containment. The licensee promptly corrected the problems.

5.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION (SAQV)

NRC Inspection Procedures 40500, 92720, 92901, 91902, 91903, and 91904 were used to perform an inspection of Safety Assessment and Quality Verification activities. No violations or deviations were identified.

5.1 Emergency License Amendment

On November 29, 1995, the NRC staff issued license amendment (LA) 75 which granted a large number of Technical Specification (TS) surveillance extensions, allowing the licensee to operate until its planned refueling outage shutdown date of January 27, 1996.

On January 3, 1996, while reviewing LA 75 for implementation, the licensee discovered that four additional TS surveillances needed extension in order to avoid having to shut down 6 days earlier than planned. These surveillances were not included in the original extension request as shown by the marked-up TS pages, although justification for the surveillance extensions had been included. Subsequently, the licensee requested extensions for the surveillances by emergency LA in a letter dated January 10, 1996.

The NRC staff reviewed the request, including the emergency circumstances and found that the extensions were acceptable. Therefore, the staff issued an emergency LA granting the requested extensions. The licensee reviewed the circumstances leading to the emergency LA in order to gain insights to the cause so as to avoid a similar situation in the future.

5.2 Review of Self Assessment Organizations

The off site Nuclear Safety Review Committee (NSRC) met on December 20, 1995. The inspectors observed the meeting and concluded that the NSRC was effective in meeting regulatory requirements. The quorum, composition, and function of the NSRC was in compliance with Technical Specification 6.5.2. The upcoming refueling outage (RFO5) was discussed with a review of the scope of work for RFO5 and those work items dropped from the scope. Additional discussion was provided on recent improvements in plant operation. The NSRC members frequently asked probing questions, challenged the licensee to substantiate their assessments, and sometimes offered differing opinions. The inspectors concluded the discussions were effective in promoting licensee self-assessment and a questioning attitude.

5.3 Quality Assurance Audits and Corrective Actions

The licensee conducted an audit of its quality assurance (QA) activities. Most of the auditors were from outside organizations. The content of the audit report showed that there had been a rigorous, in-depth review of QA activities. The audit findings presented specific opportunities for improving evaluation and corrective action.

6.0 PERSONS CONTACTED AND MANAGEMENT MEETINGS

6.1 Management Meeting

The NRC Region III Deputy Directors for the Divisions of Reactor Projects and Reactor Safety inspected the plant and met with various members of the licensees staff to discuss current plant issues.

6.2 Exit Meeting

The inspectors contacted various licensee operations, maintenance, engineering, and plant support personnel throughout the inspection period. Senior personnel are listed below.

At the conclusion of the inspection on January 22, 1996, the inspectors met with licensee representatives (denoted by *) and summarized the scope and findings of the inspection activities. The licensee did not identify any of the documents or processes reviewed by the inspectors as proprietary.

D. C. Shelton, Senior Vice President
*R. D. Brandt, General Manager Operations
*N. L. Bonner, Engineering Director
*R. W. Schrauder, Nuclear Services Director
*L. W. Worley, Nuclear Assurance Director
*M. B. Bezilla, Operations Manager