U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/85063(DRS)

Docket No. 50-440 License No. CPPR-148

Licensee: Cleveland Electric Illuminating Company
Post Office Box 5000
Cleveland, Ohio 44101

Facility Name: Perry Nuclear Power Plant, Unit 1

Inspection At: Perry Site, Perry, Ohio

Inspection Conducted: September 14 through October 18, 1985

Inspectors: G. F. O'Dwyer — Date: 11/5/85

D. E. Hills — Date: 11/5/85

P. R. Reseneske — Date: 11/5/85

Approved By: M. A. Ring, Chief
Test Programs Section — Date: 11/5/85

Inspection Summary

Inspection on September 14 through October 18, 1985 (Report No. 50-440/85063(DRS))
Areas Inspected: Routine, announced inspection of previous inspection findings, preoperational test procedure verification, preoperational test procedure review, preoperational test witnessing, preoperational test results verification, preoperational test results review, preoperational test program implementation, and startup test procedure review. The inspection involved a total of 90 inspector-hours onsite by 3 inspectors including 9 inspector-hours during off-shifts. In addition, there were 168 inspector-hours spent offsite.
Results: Of the eight areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

*C. M. Shuster, Manager, Nuclear Quality Assurance Department
*J. J. Waldron, Manager, Perry Plant Technical Department
*G. R. Leidich, General Supervising Engineer, Nuclear Test Section
*G. H. Gerber, Element Supervisor Administration, Nuclear Test Section
*J. G. Cantlin, Operations Engineer (Startup Test Engineering Lead), Perry Plant Technical Department
*B. B. Liddell, Operations Engineer, Perry Plant Technical Department
*N. J. Lehman, Staff Analyst, Perry Plant Technical Department
*L. B. Biddlecome, Senior Staff Engineer
*T. G. Swansiger, Supervisor, Operational Quality Section
*F. H. Songderoth, Senior Engineer

The inspector also interviewed other licensee employees including members of the quality assurance, technical, operating, and testing staff.

*Denotes persons attending the exit meeting of October 18, 1985.

2. Licensee Action on Previous Inspection Items

a. (Closed) Unresolved Item (440/85013-05(DRS)): Resolution of questions/comments generated during review of preoperational test procedure TP 0M40-P001, "Fuel Handling Area Ventilation System," Revision 1. The inspector verified that these comments have been adequately addressed and resolved. The inspector has no further concerns in this area.

b. (Open) Unresolved Item (440/85002-02(DRS)): Consideration of instrument inaccuracy in determination of preoperational test procedure acceptance criteria. The licensee developed a Special Project Plan 0301, "Coordination of Setpoints and Interrelated Documents," to address this item in addition to several related issues. This plan established a review team to investigate various problem areas including test acceptance criteria versus instrument inaccuracy. A final report of these efforts has been issued which indicates that in many cases, except for those values given in General Electric (GE) test specifications and their associated documents, test equipment accuracy was not considered with regard to preoperational test acceptance criteria. Thus, decision charts were developed to be used in reviewing acceptance criteria against preoperational test results and test equipment accuracy to determine acceptability and appropriate actions. This additional review effort has been initiated by the Nuclear Test Section for all quantitative data except for that prescribed by the GE test

specifications and related documents which is recorded from GE supplied/designed equipment and instrumentation. GE has indicated that the basis for this acceptance criteria is conservative to account for instrument inaccuracies. All quantitative acceptance criteria is to be examined and, where applicable, instrument inaccuracy, for either permanent plant instrumentation or measuring and test equipment, will be used to adjust the results. In cases where this causes the measured values to exceed the acceptance criterion tolerance, appropriate action is to be taken including engineering evaluation and retest if necessary. The licensee indicates that at the end of these efforts a summary report will be issued.

c. (Closed) Unresolved Item (440/85005-01(DRS)): Resolution of questions/comments generated during review of TP 0M25/26-P001, "Control Room HVAC and Emergency Recirculation System," Revision 1. The majority of these comments were upgraded to examples of a violation in Inspection Report 440/85013(DRS). The inspector reviewed the remaining comments and verified that they have been adequately addressed and resolved. The inspector has no further concerns in this area.

d. (Closed) Violation (440/85013-01(DRS)): Preoperational test procedures TP 0M25/26-P001, "Control Room HVAC and Emergency Recirculation System," Revision 1, TP 1M98-P001, "Supplementary Charcoal and HEPA Filters Efficiency Test," Revision 0, and GEN-M-016, "Test Balancing (Air)," Revision 6, determined to be inadequate. Additional examples, TP 1B33-P002, "Recirculation Flow Control Valves," Revision 1 and 1E12-P001, "Residual Heat Removal System," Revision 1, were identified in inspection report 440/85017(DRS). As described in inspection report 440/85042(DRS), the inspector verified that problems have been corrected for these two additional examples. In addition, this same report also identified TP 1C41A-P001, "Standby Liquid Control System," Revision 0, as an additional example. The inspector has now verified that the identified problems with TP 0M25/26-P001, TP 1M98-P001, GEN-M-016 and TP 1C41A-P001 have been corrected by incorporation of changes in procedure revisions. The effectiveness of licensee corrective actions to ensure adequacy of preoperational test procedures will be tracked by previous inspection item 440/85053-01(DRS).

e. (Closed) Violation (440/85042-01(DRS)): Preoperational test procedures TP 1C71-P001, "Reactor Protection System," Revision 1, TP 1C71-P002, "Reactor Protection System Motor Generator Sets," Revision 0, TP 1M51-P001, "Combustible Gas Control System," Revision 0, determined to be inadequate. The inspector verified that the identified problems have been corrected by incorporation of changes in procedure revisions and test change forms. The effectiveness of licensee corrective actions to ensure adequacy of preoperational test procedures will be tracked by previous inspection item 440/85053-01(DRS).

f. (Closed) Open Item (440/85042-05(DRS)): Preoperational test procedure TP 1M51-P001, "Combustible Gas Control System," Revision 0, to be revised to make it consistent with technical specification surveillance requirements. The inspector reviewed Revision 1 to this procedure and verified that the indicated additional testing has been incorporated. The inspector has no further concerns in this area.

g. (Closed) Open Item (440/85042-02(DRS)): Licensee to provide Initial Checkout and Run-in test procedures for reactor protection system response time testing. The licensee has provided these procedures which the inspector has reviewed and found to be adequate. The inspector has no further concerns in this areas.

h. (Closed) Violation (440/85042-06(DRS)): Inadequate measures to indicate the status of equipment in the control room. The inspector verified that Test Program Instruction (TPI)-9, "Turnover to the Nuclear Test Section (NTS)," has been revised to require that all control devices under NTS jurisdiction in the control room be tagged or identified with a dot (except for indication instruments). The inspector physically verified the implementation of this requirement by observing blue tags and dots on appropriate equipment in the control room. The inspector also reviewed training records to ensure appropriate personnel have been trained to this revised requirement. The inspector has no further concerns in this area.

i. (Closed) Violation (440/85042-07(DRS)): Inadequate measures to ensure that the System Test Engineer (STE) is aware of the status of his system with respect to temporary alterations while undergoing testing. The licensee conducted a review to determine the extent that the identified ambiguities of TPI-18, "Temporary Alterations," Section 4.1.1 and 4.1.2 affected the test program. The inspector examined documentation of the results of this review which compared the System Test Engineer (STE) memoranda against the Release for Test (RFT) dates. The purpose of this memoranda is to provide the STE with the option of controlling temporary alterations on his system prior to RFT. The review showed that all but one STE had submitted the memorandum prior to the RFT date. For the remaining system, another RFT had been conducted following cancellation of the original performance and a revision of the procedure. Therefore, the actual effect upon test performance appears to have been minimal. As mentioned in Inspection Report 440/85042(DRS) the licensee has issued Revision 4 of TPI-18 which transferred control of the implementation of all new temporary alterations to PAP-1402, "Control of Lifted Leads, Jumpers, Temporary Electrical Devices and Mechanical Foreign Items." Test Change Notice (TCN)-005 to this procedure was issued to require the STE's concurrence to temporary alterations. In addition, Section 4.1 of TPI-18 has been revised to require STE review and approval for removal of temporary alterations under Nuclear Test Section (NTS) control. This revision is consistent with PAP-1402. Furthermore, the inspector verified that applicable portions of TPI-25, "Initial Checkout and Run-in

Conduct of Testing," and TPI-28, "Conduct of Preoperational, Special and Acceptance Tests," have been revised to assure that the Test Coordinator is cognizant of all temporary alterations implemented or removed per approved Nuclear Test Section (NTS) test procedures. This allows the Test Coordinator to take appropriate actions if there is any impact on current testing activities. The inspector also verified that additional training has been given to appropriate personnel concerning these administrative changes. The inspector has no further concerns in this area.

j. (Closed) Unresolved Item (440/85042-04(DRS)): Inspector to review changes to testing of combustible gas control system compressors. The inspector has completed this review to ensure conformance with regulatory requirements and has no further concerns in this area.

k. (Closed) Open Item (440/85053-02(DRS)): Licensee to correct FSAR discrepancies regarding safety-related instrument air. The inspector has reviewed Change Requests Nos. 448, 471, and 521 to ensure that they address the indicated discrepancies and have been approved by the licensee staff for submittal to the Office of Nuclear Reactor Regulation (NRR) for incorporation into the FSAR. The inspector has no further concerns in this area.

l. (Closed) Open Item (440/85022-41(DRS)): SER Confirmatory Issue 26 to verify that the anticipated transient without scram recirculation pump trip is tested. The inspector reviewed applicable portions of TP 1C22-P001, "Redundant Reactivity Control System," test results to ensure that the recirculation pump trip portion of this system had been tested. The inspector has no further concerns in this area.

3. Preoperational Test Procedure Verification

The inspector verified that the following preoperational test procedures were prepared, reviewed, and approved in accordance with the requirements of Regulatory Guide 1.68, the Test Program Manual (TPM), the Final Safety Analysis Report (FSAR), the Safety Evaluation Report (SER) and the Quality Assurance (QA) Program and found them satisfactory except as noted below:

TP 1N32-A001, "Turbine Control EHC," Revision 0
TP 1N64-A001, "Off-gas Charcoal Vault Refrigeration," Revision 0
TP 2M42-A001, "Turbine Power Complex Ventilation," Revision 0
TP 1G60-A001, "Miscellaneous Sump System," Revision 0
TP 1R61-A001, "Main Control Room Annunciator System," Revision 1
TP 1R10-A001, "Normal AC Power Distribution System," Revision 0
TP 1P52-A002, "Loss of Instrument Air," Revision 0
TP 1N27-A001, "Feedwater System," Revision 0
TP 1M14-A001, "Containment Vessel and Drywell Purge," Revision 1
TP 1C85-A001, "Steam Bypass and Pressure Regulation System," Revision 0
TP 0P84-A001, "Hypochlorite Generation, Cooling Tower Feed and Plant Discharge Dechlorination System," Revision 0

TP 0P43-A001, "Nuclear Closed Cooling System, "Revision 2
SP 1E68-001, "System Vibration," Revision 1
SP 1E68-002, "System Thermal Expansion," Revision 0

No violations or deviations were identified.

4. Preoperational Test Procedure Review

The inspector reviewed the following approved test procedures against the FSAR, the SER, Regulatory Guide 1.68, QA Manual, Test Program Manual, applicable Regulatory Guides and American National Standards Institute (ANSI) Standards and docketed correspondence and found them satisfactory except as noted below:

a. TP 1B21C-P001, "Nuclear Boiler: Nuclear Steam Supply Shutoff System," Revision 0

b. TP 1R76-P001, "Emergency Core Cooling System Initiation/Loss of Offsite Power," Revision 1

c. TP 1E53-P001, "Containment Isolation System," Revision 1

FSAR Section 6.2.4.1 indicates that "after initiation of containment isolation, either automatically or manually, the function goes to completion." Upon review of this test procedure, the inspector did not note any testing of the valve logic which verifies this design function. However, this testing may have been included in other related testing procedures. This is considered to be an unresolved item until the inspector has reviewed and determined the extent to which this logic has been tested in other procedures (440/85063-01(DRS)).

No violations or deviations were identified; however, a portion of this program area requires further review and is considered an unresolved item.

5. Preoperational Test Witnessing

The inspector witnessed the following preoperational tests to ascertain through observation and review of documentation that testing was conducted in accordance with approved procedures and that test results appeared to be acceptable or proper corrective actions were taken. Additionally, the performance of licensee personnel was evaluated during the test. These were found to be satisfactory.

a. TP 1C71A-P001, "Reactor Protection System," Revision 2. The inspector witnessed portions of step 6.J8, in particular the preparation for testing the response time of the turbine control valve fast closure scram signal. The testing was temporarily terminated because of a larger loss of condenser vacuum than was expected by the operators when the turbine control valves (TCV) were opened. The operators had expected a pressure drop because

opening the TCVs increases the volume on which a vacuum is drawn by the extent of piping from the Turbine Control Valves back to the MSIVs.

b. TP 1B21C-P001, "Main Steam Isolation Valve (MSIV) Isolation Logic," Revision 0. The inspector witnessed portions of this test. On step 6.25.16 when the MSIV solenoid was deenergized the pilot solenoid current light on panel H13-P623 (the DIV I AUX relay panel) did not de-energize as expected. The STE stopped testing and documented the failure with a test exception.

c. TP 1E22-P001, "High Pressure Core Spray (HPCS) System," Revision 1. The inspector witnessed test addendum No. 1, steps 6.13.1.k through 6.13.21 consisting of manual initiation of the HPCS bus normal supply breaker. The HPCS diesel generator is to be verified to start and pick up loads and the HPCS system is to be verified to reach rated flow within prescribed time limits. However, following initiation in test step 6.13.20, the HPCS Injection Valve 1E22-F004 failed to open. The remainder of the HPCS system functioned properly. This failure was attributed to the reactor vessel high water level relay K13 remaining energized which prevented valve 1E22-F004 from opening. Previously, step 6.13.1.j had been performed which prescribed pulling fuse F12 in the circuitry to disable interrupting relay signals including reactor vessel high water level. However, this action failed to de-energize the K13 relay because the seal-in logic was already energized prior to pulling the fuse. The circuitry containing the reactor vessel high water level seal-in bypasses fuse F12. A test change was therefore written to depress the high water level reset pushbutton prior to initiation and the test was successfully repeated in reperformance No. 2.

No violations or deviations were identified.

6. Preoperational Test Results Verification

The inspector verified that the following preoperational test results were documented, reviewed and approved by the licensee in accordance with the requirements of Regulatory Guide 1.68, the TPM, the FSAR, the SER, and the QA Program and found them satisfactory.

TP 1N32-A001, "Turbine Control EHC," Revision 0
TP 1N64-A001, "Off-gas Charcoal Vault Refrigeration," Revision 0
TP 2M42-A001, "Turbine Power Complex Ventilation," Revision 0
TP 1C51C-P001, "Recirculation Flow Bias Subsystem," Revision 0
TP 1C34-P001, "Feedwater Level Control," Revision 1
TP 1F13-P001, "Vessel Servicing Equipment," Revision 0
TP 1G60-A001, "Miscellaneous Sump System," Revision 0
TP 1R43-P001, "Division 1 Standby Diesel Generator," Revision 1
TP 1R25-P001, "120V AC 1E Instrument and Miscellaneous Distribution Panels," Revision 0
TP 1E22-P002, "High Pressure Core Spray Diesel Generator," Revision 1
TP 1R43-P002, "Division 2 Standby Diesel Generator," Revision 1

No violations or deviations were identified.

7. Preoperational Test Results Review

The inspector reviewed the results of the following tests against the FSAR, the SER, Regulatory Guide 1.68, the QA Manual, and the Test Program Manual, and determined that test changes and test exceptions were processed in accordance with administrative controls, test deficiencies were identified, processed, and corrected as required, results were evaluated and met the acceptance criteria, and the results were reviewed and approved as required.

- TP 1E15-P001, "Containment Spray System," Revision 0
- TP 1M15-P001, "Annulus Exhaust Gas Treatment System," Revision 2
- TP 1M56-P001, "Hydrogen Igniter System," Revision 0
- TP 0M25/26-P001, "Control Room HVAC and Emergency Recirculation System," Revision 3
- TP 0M40-P001, "Fuel Handling Building Ventilation System," Revision 1
- TP 1C41A-P001, "Standby Liquid Control System," Revision 0

No violations or deviations were identified.

8. Preoperational Test Program Implementation

a. The inspector randomly selected three approved test procedures and verified that the review and approval were in accordance with administrative procedures. Per the requirements of TPI-27, "Release for Test: Preoperational and Acceptance Tests," testing is to be conducted to the system's as-built configuration at the time of the test. A listing of drawings depicting the as-built configuration covered by the test is developed and included in the Release for Test (RFT) package. The inspector reviewed the RFT packages for two test procedures and verified that applicable drawings had been listed. In addition, verifications in the RFT packages had been completed ensuring that the test procedure had been written to the latest revision of design documentation listed in the test procedure reference section and that test changes and exceptions had been submitted to test to the as-built configuration. Prior to the release for test, Nuclear Test Section (NTS) as-built drawings are submitted to the Systems Engineering Response Team (SERT). Any missing drawings are placed on the Master Deficiency List (MDL) and evaluated for impact on testing. The inspector reviewed documentation which verified that NTS as-built drawings had been submitted to SERT for these same test procedures.

b. Per the requirements of TPI-27, the Software Pretest Checklist is to be included in the RFT package with verifications that completed design changes have been incorporated into the test,

incomplete design changes have been placed on the MDL and reviewed for impact on testing, and pending design changes have been reviewed with the Lead Test Engineer. The inspector reviewed two RFT packages and verified that these verifications had been completed.

c. The inspector also verified by direct questioning of a System Test Engineer and I&C Supervisor that they appeared to be familiar with administrative controls covering the conduct of corrective and preventative maintenance during preoperational testing.

No violations or deviations were identified.

9. Startup Test Procedure Review

The inspector reviewed the following approved test procedures against the FSAR, the SER, Regulatory Guide 1.68, QA Manual, appropriate licensee administrative procedures, applicable Regulatory Guides and ANSI Standards and docketed correspondence and found them satisfactory except as noted below:

a. STI-B21-026, "Safety Relief Valves," Revision 0

b. STI-B21-027, "Turbine Trip and Generator Load Rejection," Revision 0

c. STI-C61-028, "Shutdown From Outside the Control Room," Revision 0

d. STI-R43-031, "Loss of Turbine Generator and Offsite Power," Revision 0

e. STI-J11-003, "Fuel Loading," Revision 0

During the review and resulting discussions the licensee indicated the following changes would be made to the procedure:

- Regulatory Guide 1.68, Appendix C, Section 2.b(3) indicates that the procedure should ensure "proper seating and orientation of fuel and components. A visual check of each assembly in each core position should be specified." The procedure verifies this per Section 8.2, "Verification of Core Loading," which is performed following loading of all the fuel assemblies. In order to ensure that the intent of the regulatory guide is met, the licensee has agreed that either this procedure, or a corresponding fuel handling instruction used in conjunction with this procedure will be revised to include observations to be made while in the process of loading fuel that ensure correct orientation of assemblies.

- Regulatory Guide 1.68, Appendix C, Section 2.c(1) indicates that the procedure should contain criteria for stopping fuel loading including, among other circumstances, an inoperable source-range detector. Although the procedure may imply

this requirement for an inoperable source-range detector, it is not explicitly stated as it is for the other criteria. In order to provide clarification, the licensee has agreed to explicitly state in the procedure the criteria involving inoperable source-range detectors in regards to suspending core alterations.

- Per the note following step 6.2.7 of the procedure, "...technical specifications which are required to be verified within 24 hours or less prior to beginning core alternations are listed separately in Section 6.3, Initial Conditions for Fuel Loading." However, Section 6.3 does not include surveillance requirements of Technical Specification Section 4.9.1.2, that the reactor mode switch refuel interlocks shall be demonstrated operable by a channel functional test within 24 hours prior to core alterations. This requirement would have been included anyway by the completion of step 6.2.7 which prescribes verification that all applicable technical specification surveillances are complete and current and all equipment required by technical specifications for operational condition 5 is operable per PAP-1114, "Operational Condition Change Checklist." The operational condition change checklist for preoperational to operational condition 5 includes the subject surveillance. The licensee has, however, agreed to also include this surveillance requirement in Section 6.3 of the test procedure in order to provide procedure consistency.

  This is to remain an open item until the procedure is revised to incorporate these indicated changes (440/85063-02(DRS)).

In addition, the following approved test procedures are currently under review and will be completed in a subsequent inspection.

- STI-J11-021, "Core Power Mode Response," Revision 0
- STI-C51-006, "SRM Performance and Control Rod Sequence," Revision 0
- STI-C11-005, "Control Rod Drive System," Revision 0
- STI-J11-004, "Full Core Shutdown Margin," Revision 0
- STI-C51-010, "IRM Performance," Revision 0
- STI-C51-011, "LPRM Calibration," Revision 0
- STI-C51-012, "APRM Calibration," Revision 0
- STI-B21-025A, "MSIV Function Test," Revision 0
- STI-C91-018, "Core Power Distribution," Revision 0

No violations or deviations were identified; however, a portion of the area requires further review and is considered an open item.

10. Unresolved Items

Unresolved items are matters about which information is required in order to ascertain whether they are acceptable items, violations, or deviations. The unresolved item disclosed during the inspection is discussed in Paragraph 4.b.

11. Open Items

Open items are matters which have been discussed with the licensee which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. The open item disclosed during the inspection is discussed in Paragraph 9.e.

12. Exit Interview

The inspector met with licensee representatives denoted in Paragraph 1 on October 18, 1985. The inspector summarized the scope and findings of the inspection and discussed the likely content of this inspection report. The licensee did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.