

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/85017(DRS)

Docket No. 50-440

License No. CPPR-148

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

Facility Name: Perry Nuclear Power Plant, Unit 1

Inspection At: Perry Site, Perry, OH

Inspection Conducted: March 23 through May 10, 1985

Inspectors: *D. E. Hills*
D. E. Hills

6-11-85
Date

S. G. DuPont
S. G. DuPont

6-11-85
Date

G. F. O'Dwyer
G. F. O'Dwyer

6-11-85
Date

R. D. Lanksbury
R. D. Lanksbury

6-11-85
Date

M. A. Ring for
Approved By: M. A. Ring, Chief
Test Programs Section

6-12-85
Date

Inspection Summary

Inspection on March 23 through May 10, 1985 (Report No. 50-440/85017(DRS))

Areas Inspected: Routine, unannounced inspection of previous inspection findings, preoperational test procedure verification, preoperational test procedure review, preoperational test witnessing, preoperational test results verification, preoperational test results review, independent inspection effort, overall preoperational test program review, and preoperational test program implementation. The inspection involved a total of 283

inspector-hours onsite by 4 inspectors including 86 inspector-hours during off-shifts. In addition, there were 106 inspector-hours spent offsite.

Results: Of the nine areas inspected, no items of noncompliance or deviations were identified in six areas. Within the remaining three areas, four items of

noncompliance were identified (Paragraph 2.a: failure to provide adequate administrative procedural controls; Paragraphs 5.a and 5.b: failure to adequately accomplish release for test pretest checklist verifications; Paragraph 5.b; operation of a plant system without a written procedure; Paragraph 5.b; failure to provide adequate controls for proper sequencing of testing in procedures) and two additional examples of a previous noncompliance (Paragraphs 4.a and 4.b; failure to provide adequate preoperational test procedures).

DETAILS

1. Persons contacted

- *A. Kaplan, Vice President, Nuclear Operations Division
- *M. D. Lyster, Manager, Perry Plant Operations Department
- *G. R. Leidich, General Supervising Engineer, Nuclear Test Station
- *R. J. Tadych, General Supervising Engineer, Operations
- *B. D. Walrath, General Supervising Engineer, Quality Assurance Section
- *K. A. Matheny, Element Supervisor, Administration, Nuclear Test Section
- *N. H. Lehman, Staff Analyst, Administration, Perry Plant Technical Department
- *E. Riley, General Supervising Engineer, Construction Quality Section
- *M. Hayner, Licensing Specialist
- *M. Milkovich, Junior Engineering Aide, Licensing

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 May 10, 1985.

2. Licensee Action On Previous Inspection Findings

- a. (Closed) Unresolved Item (440/85013-08(DRS)): Insufficient controls and direction to govern conduct of integrated run-in testing performed under control of Temporary Operating Instructions (TOIs) prior to preoperational test release for performance. This item has been upgraded to an item of noncompliance. During subsequent discussions following identification of this item, the licensee agreed to the following additional controls.
 - ° TOIs are to be included on the Plan of the Day (POD) and coordinated through the shift supervisor to ensure interfacing with other testing and operating activities. The inspector reviewed various issues of the POD and determined that TOIs were included. In addition, the shift supervisor has now assumed the duties of the test coordinator to ensure proper coordination. Finally, Test Program Instruction (TPI)-6 has been revised to require that cognizant control room personnel shall be made aware of all abnormalities encountered which affect the proper implementation and completion of all TOIs.
 - ° Testing conducted under TOIs is to be performed in accordance with step-by-step instructions with sign-offs. The inspector verified that this requirement has been incorporated into TPI-6 which described the requirement for "signature/date attestation checklists." However, upon reviewing several TOIs, the inspector did not find sign-offs provided except for initial lineups. This remains an inspector concern.
 - ° Specific requirements for TOI content and format are prescribed. The inspector verified that this requirement has

been incorporated into TPI-6 including prescribing appropriate prerequisites. Following this, all TOIs were withdrawn, revised if necessary to comply with the new requirements, and then reissued.

- ° System Operating Instructions (SOI) are to be used whenever possible in order to contribute to the process of ensuring their adequacy per requirements of Regulatory Guide 1.68, Revision 2, Section C.7. The inspector verified that TPI-6 has been revised to require that when an existing procedure such as an SOI is adopted for use, it must have a properly completed TOI Approval Page applied. The inspector was also assured that whenever an SOI exists that covers the planned system evolution when it is under test jurisdiction, the SOI will be used with the TOI Approval Page. However, the inspector has since noticed system operation with TOIs that do not appear to adequately resemble the corresponding SOI. This remains an inspector concern.
- ° A list of significant events which occurred prior to a system's release for test will be included in the Release For Test (RFT) package for review by the Test Program Review Committee (TPRC). This requirement is to be incorporated into TPI-27. Although originally agreed upon at the same time as these other items, there has been an inexplicable delay in instituting this action. As a consequence, a large number of tests have been released in the ensuing time which do not have this list compiled and included in the RFT package. This remains an inspector concern.

As described in Inspection Report 440/85013(DRS), the inspector noted as examples two adverse events which occurred during integrated testing under a TOI (inadvertent containment spray actuation and exceeding the design pressure of the Emergency Service Water Heat Exchanger). The inspector also indicated the nonuniform approach to the implementation of this type of testing, all of which exemplifies the inspector's determination after reviewing the administrative procedures that sufficient administrative controls and direction did not exist to govern its conduct. 10 CFR 50, Appendix B, Criterion V states that "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings." This failure to provide adequate administrative procedural controls is considered an item of noncompliance (440/85017-01(DRS)).

- b. (Closed) Item of Noncompliance (440/84-22-03(DRS)): Failure to identify all systems requiring preoperational testing. The inspector reviewed the May 3, 1985, issue of the Software Status Report and found that the licensee had included the Containment Atmosphere Monitoring System (D23), Feedwater Leakage Control System (N27B), 480V 1E Motor Control Centers (R24), and 120 VAC Class 1E Instrument and Miscellaneous Distribution Panels (R25) as

preoperational tests to be performed. With regard to the Seismic Monitoring System (D51) the inspector noted that the licensee had changed their commitment in Final Safety Analysis Report (FSAR) Section 14.2.12.3 (Amendment 15) to specify that the six criteria specified in Section C.1 of Regulatory Guide 1.68, Revision 2, would be used to select which plant features are tested during the preoperational test phase (preoperational and acceptance tests) vice as preoperational tests. With this change in place the inspector considers the licensee's decision to use an acceptance test for the Seismic Monitoring System to be acceptable. The inspector has no further questions in this area.

- c. (Open) Open Item (440/84-22-02(DRS)): Licensee to submit and approve all required FSAR test abstracts. The inspector reviewed FSAR Section 14, Amendment 17, and noted that the licensee had added preoperational test abstracts for eleven tests (P41, P49, G51, C22, D19, N27B, P53, P87, R14A, R71 and M98). The inspector currently has an open issue with the Office of Nuclear Reactor Regulation (NRR) regarding which test abstracts are required to be included in FSAR Section 14. This item remains open pending resolution of this issue.
- d. (Closed) Open Item (440/84-11-01(DRS); 441/84-11-01(DRS)): Review licensee's documentation detailing new test organization. The inspector reviewed the specified documentation governing the test organization to verify that qualifications, responsibilities, method of appointing key individuals, lines of authority and controls for delegating responsibility as related to Nuclear Test Section (NTS) personnel were formally specified in writing. Additionally, the inspector reviewed the administrative controls related to interfaces between organizations to verify that organizational responsibilities and interface methods were clearly established in writing. The inspector also reviewed specified improvements in the test organization that more closely aligned the test organization to the operating organization, encouraged increased upper level management involvement in testing activities, and provided common management supervision to both testing and operating organizations. The most recent of these improvements include the assumption of test coordinator duties by the shift supervisor. The inspector has no other concerns in this area.
- e. (Closed) Open Item (440/84-11-13(DRS); 441/84-11-13(DRS)): Review licensee actions in response to Measuring and Test Equipment (M&TE) controls. Of the original five comments, four of these were resolved as described in inspection report 440/84-15(DRP); 441/84-14(DRP). The remaining inspector concern has now been completely resolved in that the inspector has reviewed the Test Program Manual "Test Program Description" and TPI-16 and verified that they have been revised to indicate their applicability for M&TE used in all preoperational testing and not limited to just that used on safety-related systems and components. The inspector has no further concerns in this area.

- f. (Open) Noncompliance (440/85013-01(DRS)): Failure to provide adequate preoperational test procedures. As described in Paragraphs 4.a and 4.b of this report, the inspector identified two additional inadequate test procedures. Both TP 1B33-P002, "Recirculation Flow Control Valves," Revision 1, and TP 1E12-P001, "Residual Heat Removal System," Revision 1, contained numerous examples of failing to test various system features.

No additional violations or deviations were identified.

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, the FSAR, the Safety Evaluation Report (SER) and the Quality Assurance (QA) Program and found them satisfactory.

TP 1C91-A001, "Process Computer," Revision 0
TP 0F11-P001, "Fuel Servicing Equipment," Revision 1
TP 1F12-P001, "Servicing Aides," Revision 0
TP 1F17-P001, "Under Reactor Pressure Vessel Servicing Equipment," Revision 0
TP 1G42-A001, "Suppression Pool Cleanup System," Revision 2
TP 0L51-A002, "Emergency Service Water Pump House Crane," Revision 0
TP 0L51-P002, "Fuel Handling Area Crane," Revision 0
TP 1L51-P001, "Reactor Building Polar Crane," Revision 0
TP 1M11-P001, "Containment Vessel Cooling System," Revision 2
TP 0M21-A001, "HVAC - Controlled Access Area," Revision 2
TP 0M27-A001, "HVAC Computer Room," Revision 3
TP 0M29-A001, "HVAC - Control and Computer Room Humidification," Revision 1
TP 1M38-A001, "HVAC - Auxiliary Building," Revision 2
TP 1M39-P001, "HVAC - Emergency Core Cooling System Pump Room Cooling,"
Revision 0
TP 1P35-A001, "Reactor Plant Sampling System," Revision 0
TP 1P46-A001, "Turbine Building Chilled Water System," Revision 1
TP 1P50-A001, "Containment Vessel Chilled Water System," Revision 2
TP 2P51-A001, "Service Air System," Revision 1
TP 0P72-P001, "Plant Foundation Underdrain System," Revision 0
TP 1R14-P001, "ATWS-120 Volt Uninterruptible Power Supply," Revision 0
TP 1R24-P001, "Motor Control Centers," Revision 0
TP 2R24-P001, "Motor Control Centers," Revision 0
TP 2R42-P001, "Division III Class 1E DC System," Revision 0
TP 1S11-A002, "Main and Auxiliary Power Transformers," Revision 1
TP 0D51-A001, "Seismic Instrument System," Revision 0
TP 1R22-P001, "4.16 KV Metal Clad Switchgear," Revision 0
TP 2R22-P001, "4.16 KV Metal Clad Switchgear," Revision 0
TP 1R63-A001, "Vibrations and Loose Parts Monitoring," Revision 1
TP 1R42-P002, "Class 1E DC Bus Independence and Division 3DC Power System,"
Revision 0
TP 2R23-P001, "480 Volt Load Centers," Revision 0
TP 0M28-P001, "Emergency Closed Cooling Pump Area Cooling," Revision 3

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 1B33-P002, "Recirculation Flow Control Valves," Revision 1. The inspector identified several system functions which were not adequately tested in the preoperational test procedure. These functions involving the hydraulic power units included the following:

- (1) The valve is maintained in the last position demanded if control power to the modicon controller is lost.
- (2) Automatic transfer of control of the flow control valve to the other subloop (if it is in the "ready" mode) upon warm oil temperature or low oil reservoir level and the corresponding indicating lights on the P614 panel.
- (3) Hydraulic lock on flow control valve motion upon hot oil reservoir temperature or low-low (empty) oil reservoir level and the corresponding indicating lights on the P614 panel.
- (4) Automatic transfer of control of the flow control valve to the other subloop (if it is in the "ready" mode) or hydraulic lock on flow control valve motion (if it is in the "maintenance" mode) upon undervoltage or overcurrent conditions on the operating hydraulic pump.
- (5) Actuator drain and filter differential pressure indicating lights on the P614 panel.

This is a further example of the inadequate preoperational test procedures identified in previous noncompliance 440/85013-01(DRS) in that various system features were not completely tested.

- b. TP 1E12-P001, "Residual Heat Removal (RHR) System," Revision 1. The inspector identified several system functions which were not adequately tested in the preoperational test procedure. These functions included the following:

- (1) In section 6.1.4.b the RHR A Containment Inboard Isolation Valve 1E12-F042A downstream loop pressure open permissive is tested. However, the procedure does not verify the design feature which "seals in" the permissive even if loop pressure again rises above the setpoint. This also applies to valve 1E12-F042B. Following inspector identification of this concern, the licensee incorporated this testing into the procedure with Test Change Notice (TCN)-55.

- (2) In section 6.1.4.m by jumping across contacts on relay 1E12A-K95A, the procedure verifies that RHR A Heat Exchanger Bypass Valve 1E12-F048A opens on Low Pressure Coolant Injection (LPCI) initiation. However, the procedure does not verify circuitry that prevents the valve from being reclosed within a specified time period following LPCI initiation. This also applies to valve 1E12-F048B. Following inspector identification of this concern, the licensee incorporated this testing into the procedure with TCN-55.
- (3) In section 6.1.9.e the procedure verifies that upon a high drywell pressure isolation signal valves 1E12-F008 and 1E12-F023 should close. However, per system design, these valves will not close as a result of high drywell pressure. Instead valves 1E12-F075A and B, 1E12-F040, 1E12-F037A, and 1E12-F053A should have been verified to close under that condition.
- (4) In section 6.1.9.f the procedure verifies that upon a vessel pressure high isolation signal valves 1E12-F075A and B, 1E12-F040, 1E12-F037A, and 1E12-F053A should close. However, per system design, these valves will not close as a result of high vessel pressure. Instead valves 1E12-F008 and 1E12-F023 should have been verified to close under that condition.
- (5) Step 6.1.9.f.9 indicates that by inputting a signal to 1B21-N679D a high drywell pressure condition is simulated. However, per system design, this would instead simulate a high reactor vessel pressure.
- (6) The equations given for the determination of Net Positive Suction Head (NPSH) did not account for the actual difference in the suppression pool water level during the test and the minimum suppression pool water level design condition needed to provide a basis for comparison to the acceptance criteria. Following inspector identification of this concern, the licensee incorporated in the procedure requirements for the NPSH equations to account for the suppression pool level.
- (7) Section 6.1.9.e indicates that a high drywell pressure condition simulated at 1C71-N650A or 1C71-N650B would de-energize relays 1B21-K23A and 1B21-K59A. However, per system design, both simulations would be required simultaneously to de-energize the relays. The licensee indicated that they had already identified this discrepancy and were planning to institute a procedure change but had not yet done so.
- (8) Section 6.1.9.c indicates that when RHR System Logic Test switches 1B21-S21A or 1B21-S21D are placed in the test position relays 1B21-K23A, 1B21-K54, 1B21-K59A, and 1B21-K129A de-energize. However, per system design, both switches would be required to be placed in the test position simultaneously to de-energize the relays. The licensee indicated that they had

already identified this discrepancy and were planning to institute a procedure change but had not yet done so.

- (9) Section 6.1.9.d indicates that a reactor vessel level 3 condition simulated at 1B21-N680A or 1B21-N680D would de-energize relays 1B21-K23A, 1B21-K54, 1B21-K59A, and 1B21-K129A. However per system design, both simulations would be required simultaneously to de-energize the relays. The licensee indicated that they had already identified this discrepancy and were planning to institute a procedure change but had not yet done so.

These are further examples of the inadequate preoperational test procedures identified in previous noncompliance 440/85013-01(DRS) in that various system features were not completely tested.

The inspector also noted that FSAR section 5.4.7.1.3 states "shutdown suction has two gate valves, F008 and F009, in series which have independent pressure interlocks to prevent opening at higher inboard pressure for each valve," this function was not tested in the procedure. The System Test Engineer (STE) subsequently determined that the present design provides isolation only under a High Reactor Vessel Pressure condition, thus allowing valves 1E12-F008 and 1E12-F009 to be opened with a pressure greater than the RHR suction piping pressure rating causing overpressurization of RHR suction piping. The STE has submitted Field Question 046362 to resolve this concern. Furthermore, the inspector noted that FSAR section 5.4.7.1.3 also states that "the shutdown return line has a swing check valve, F050, to protect it from high vessel pressures. Additionally, a globe valve, F053, is located in series and has pressure interlocks to prevent opening at high inboard pressures, this function was not tested in the procedure. The STE subsequently determined that the present design provides isolation only under a High Reactor Vessel Pressure Condition, thus allowing valves E12-F050A and B to be opened subjecting RHR discharge piping to greater than design pressure in the event E12-F050A or E12-F050B leak by their seats. The STE has submitted Field Question 046363 to resolve this concern. This is considered an open item (440/85017-02(DRS)) until the inspector has reviewed the responses to Field Questions 046362 and 046363.

- c. TP 1E22-P001, "High Pressure Core Spray (HPCS)," Revision 0. During the review of this test procedure the inspector identified two FSAR discrepancies. FSAR section 6.3.2.2.1 indicates that a relief valve located between the two isolation valves of the test line to the Condensate Storage Tank (CST) is set at 15 psid. However, this relief valve does not exist in the current Perry design. In addition, FSAR section 6.3.2.2.1 indicates HPCS injection valve 1E22-F004 opens within 12 seconds following receipt of a signal to open. However, the test procedure indicates an opening time of 27 seconds. This is considered to be an open item (440/85017-03(DRS)) until an FSAR Change Notice is initiated to correct the discrepancy regarding the relief valve noted above and pending further investigation of the HPCS injection valve opening time.

During the course of this review, this procedure was released for test with a revision to the test procedure being approved just one day prior to that release. Since the new revision contained extensive changes from the previous revision provided by the licensee for NRC review pursuant to the required 60 day review cycle, the inspector intends to conduct an intensified review in conjunction with the test results review to determine the acceptability of the new revision. Discussions had been previously conducted concerning the licensee's practice of approving major revisions to test procedures just before or during the release for test which allow testing to be conducted in accordance with a procedure substantially different from that which was provided for NRC review. The licensee had indicated that in most cases only minor changes would be involved and that only in a very few instances would major changes need to be done in this way. Since this has continued to present a problem to the inspection effort, the licensee has now agreed to notify the inspector in cases where a new revision is being approved within a short time of its release for test. This should preclude the inspector from reviewing procedures that were recently superseded and thus are no longer applicable for NRC review. Furthermore, the licensee had earlier agreed to provide revision bars in test procedures so as to more easily identify the changes in new revisions. However, the inspector has reviewed several test procedure revisions which were issued after that agreement and has yet to see any revision bars. After the inspector questioned why this agreement had never been implemented, the licensee indicated that they have now decided not to include revision bars but to instead institute revision summary sheets. The adequacy of identifying specific procedure changes in this manner will be determined through the normal inspection process.

- d. TP 1M56-P001, "Hydrogen Igniter System," Revision 0. The test procedure contains acceptance criteria as directed by test change C-1 that "all hydrogen igniters are capable of providing glow plug temperatures of at least 1700°F at 120 VAC... and of at least 1500°F at 108 VAC..." However, correspondence PY-CEI/NRR-0199L dated March 1, 1985, (M. Edelman to B. Youngblood) indicates that testing will verify that the hydrogen igniters have a surface temperature of at least 1700°F with a voltage of 120 VAC±10% applied. The inspector interpreted this as specifying a minimum of 1700°F over the entire 108 to 132 VAC range. This would ensure adequate combustion temperature over the entire range of normally encountered voltage fluctuations. Although the test procedure does not appear to comply with correspondence PY-CEI/NRR-0199L, it does reflect design requirements in the hydrogen ignitor technical manual, purchase specifications, and the Hydrogen Control Owners Group (HCOG) Program Plan which is currently under review by the Office of Nuclear Reactor Regulation (NRR). In subsequent discussions, on May 7, 1985, NRR (A. Notafrancesco) indicated that a 1500°F surface temperature is sufficient to ensure proper controlled hydrogen combustion and therefore determined the test procedure acceptance criteria to be adequate. The inspector did, however, note that the

licensee was not utilizing any tracking mechanism to ensure that the test procedure would be revised and required retesting be performed should NRR decide not to approve the HCOG Program Plan. As a result of the inspector's concern, the licensee added this to the Master Deficiency List via Nonconformance Report (NR) NTS-461. Based on NRR's determination that the acceptance criteria are satisfactory, the inspector has no further concerns in this area.

- e. TP 1E15-P001, "Containment Spray System," Revision 0.
- *f. TP 1C71-P001, "Reactor Protection System," Revision 0.
- *g. TP 1C71-P002, "Reactor Protection System M-G Sets," Revision 0.
- *h. TP 1B21B-P001, "Nuclear Boiler Automatic Depressurization System," Revision 0.
- *i. TP 1P57-P001, "Safety Related Instrument Air," Revision 0.

*Currently under review and will be completed in a subsequent inspection.

No additional violations or deviations were identified.

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 on proper corrective actions were taken. Additionally, the performance of licensee personnel was evaluated during the test. These were found to be satisfactory unless otherwise noted.

- a. TP 1E12-P001 Residual Heat Removal (RHR) System, Revision 1. The inspector witnessed sections 6.2.2.f(3), f(4), g, i, j, m, n, and s consisting of division II logic testing. In step 6.2.2.n.2 when fuse 1E12-F40 was removed, relay 1E12A-K46 did not energize, contact M1/R1 of relay 1E12A-K46 did not close, and DIV 2 ASSOCIATED TRIP UNIT TRBL annunciator did not actuate as intended. The problem was investigated and after apparently failing to identify the cause, the test was repeated successfully. It was later determined that the fuses had been mislabeled which had resulted in the wrong fuse initially being removed. During the problem investigation an electrician had identified and corrected the problem without informing the STE. The electrician was thoroughly counseled concerning the matter and the STE issued a memo to all applicable personnel to reaffirm requirements during RHR testing for test exception identification and subsequent actions including the importance of reporting information to the responsible STE. However, this memo was only applicable to RHR testing while the importance of keeping the STE cognizant has generic implication to all testing. It is advisable therefore to stress this generic

applicability to all personnel involved with systems under Nuclear Test Section jurisdictional control and as such is considered an open item (440/85017-04(DRS)).

In addition, in step 6.2.2.m.6 the DIV 2 ISOLATOR 24 V PWR LOSS/CARD 00 FILE annunciator did not actuate as intended when the input cables from isolator input cards B21C-AT7-I and B21-AT8-I were pulled. Further investigation showed that wiring to provide power to these cards did not exist. It was later determined that this configuration was per design in that these cards were designated as spares by Engineering Change Notice (ECN) NJ35313 (dated September 22, 1982) and were depicted as such in the applicable plant as-built plant conditions. Test Program Instruction (TPI)-27 section 4.2 requires the release for test package to include the completed pre-test checklists to ensure among other things that the pre-operational test is conducted to the as-built condition of the plant. The E12-P001 software pre-test checklist included verifications that completed design changes were incorporated in the test, Revision 1 of the test had been approved to the as-built configuration, and the test had been written to the latest approved revision of design documentation. In addition, during preoperational testing of the Division 1 Standby Diesel Generator it was discovered that the out of service alarm in the control room had lifted leads and would not annunciate when required by step 6.8.17 of preoperational test procedure 1R43-P001. Inspection by the licensee revealed that the lifted leads to the alarm circuit had been controlled and documented in the lifted leads and jumper log; however, the test engineers had failed to verify the pretest checklist for all systems required or related to the diesel generator testing including the control room annunciating system (R61). This is considered to be a violation of 10 CFR 50, Appendix B, Criterion V, and an item of noncompliance (440/85017-05(DRS)) in that actions pursuant to these checklist verifications per TPI-27 were inadequately accomplished.

In addition, the inspector also later witnessed RHR Pump B 24 hour endurance run of test section 6.4.3.b at full flow conditions in the test return mode. Approximately 45 minutes into the test, operation was suspended due to clogging of suppression pool suction strainers resulting from silt picked up from the suppression pool. The strainers experiencing the plugging were 40 mesh strainers installed specifically for testing purposes to prevent foreign debris from entering RHR piping. Actions were initiated to drain, clean, and refill the suppression pool. Subsequent to the draining, the inspector inspected the suppression pool and in addition to silt found large amounts of debris including boards, wood splinters, tie wraps, sheets of plastic wrap, paper items, a sheet of plexiglass, metallic objects, etc. Silt and other debris could prove to be detrimental to proper system operation on those systems which take suction on the suppression pool. Inadequate cleanliness conditions in the suppression pool is considered an unresolved item (440/85017-06(DRS)) at this time.

The inspector also witnessed various portions of section 6.4.4 consisting of RHR Loop B performance testing in the suppression pool cooling mode.

- b. TP 1R43-P001, "Division 1 Standby Diesel Generator," Revision 1.
TP 1R43-P002, "Division 2 Standby Diesel Generator," Revision 1.

The inspector witnessed portions of the Division 1 Standby Diesel Generator load test (section 6.13), the Division 1 and 2 consecutive start tests (section 6.12), and the Division 1 synchronization and load rejection tests (section 6.10). The objectives of the tests were to verify: the ability of the diesel generator unit to shed the largest single load with the unit operating at 3700 kilowatt (KW); not exceeding 4580 generator voltage or 484 RPM engine specification (section 6.10); the ability of the unit to experience a complete loss of rated load (7000 KW) and not trip on overspeed or exceed 4780 generator voltage (section 6.10); the ability of the unit to successfully perform 35 consecutive start and load tests (Section 6.12); and the ability of the unit to operate continuously at 100 percent load for 24 hours (section 6.13). The tests were performed satisfactorily except as noted below:

During the performance of the Division 1 consecutive starts tests, various coordination problems were observed by the inspector. On several occasions, testing of related systems had created load fluctuations on the generator. On one occasion, testing of the recirculation system required starting of the Recirculation "A" Pump which tripped the Division 1 Standby Diesel Generator on reverse power during the 15th consecutive start. The start was not invalidated because the start and loading had been achieved and the diesel generator was in the process of being secured for preparations for the next consecutive start. Even though these fluctuations did not result in affecting the qualification of the test, the licensee did not demonstrate the ability to control and minimize adverse effects from testing of related systems.

In addition to the coordination of testing related systems, the inspector observed the licensee operating the Low Pressure Core Spray (LPCS) system without utilizing an operating procedure. The System Test Engineer had instructed an operator to start the LPCS pump and to vary system flow from 2000 to 6000 gallons per minute (gpm) through the test return line for system operation as preparation for the standby diesel generator load reject test. Since the operator was not using a procedure, the operator was not aware of the expected limits for pump running current.

This is considered an item of noncompliance (440/85017-07(DRS)). Operation of safety-related equipment required for safe shutdown, without an approved procedure is in violation of 10 CFR 50, Appendix B, Criterion V.

Additionally, the inspector observed during the performance of the Division 1 load reject tests that step 6.10.30 had been performed and initialed three days prior to the proceeding steps of section 6.10. Regulator Guide 1.68, Revision 2 "Initial Test Program for Water Cooled Nuclear Plants," section C.4 states that the initial test program shall be conducted using test procedures that include appropriate checklists and signature blocks to control test performance and the sequence of testing. The licensee's testing instruction, TPI-7 "Preoperational, Acceptance and Special Test Procedure Preparation, Review and Approval," section 4.f states that "...at the beginning of section 6.0, any limitations (even if none) for performing procedure steps out of sequence" shall be stated. Because of the ambiguity of TPI-7, the requirement to state the limitations for performing procedure steps out of sequence has been implemented differently by various preoperational procedures. Some of the procedures contain clear and decisive instructions within section 6.0, such as, Reactor Core Isolation Cooling System preoperational test procedure TP 1E51-P001 which states "that the major sections (i.e., 6.1, 6.2, etc.) may be performed out of sequence and section 6.6 may be performed anytime the vessel head spray piping is in place." However, the required sequence of subsections within major sections is delineated in that portion of the test. Another example is the Reactor Recirculation System test procedure TP 1B33-P001 which states that "all steps shall be conducted in sequence except section 6.2 shall be performed before 6.1.4 and 6.1.10." TP 1G33-P-001, "Reactor Water Cleanup Filter Demineralizer System," preoperational test stated that subsections 6.1.1 and 6.1.2 may be performed in any order; however, the individual steps within each subsection must be performed in the sequence listed, and subsections 6.1.1 and 6.1.2 must be performed prior to 6.1.3." These are examples of procedures controlling the sequence of major sections, subsections and steps.

The following are examples of procedures that do not afford adequate controls to ensure sequential testing of systems:

- ° TP 1M16/1M17-P001, "Drywell and Containment Vacuum Relief Preoperational Test," states that "subsections may be done in any sequence but the individual steps in the subsections must be done in order."
- ° TP 1E31-P001, "Leak Detection System Preoperational Test," states that "subsections 6.1 through 6.10 may be performed separately and in any order desired." In addition, "subsection 6.9.1 through 6.9.6 may also be performed in any order." In this case, the definition of subsection is confusing because of the usage for both major sections (i.e., 6.1, 6.2, etc.) and subsections (i.e., 6.1.1, 6.1.2, etc.).
- ° TP 1R71-P001, "Essential and Emergency Lighting Systems Preoperational Test," allows testing of subsections in any sequence as long as the intent of the test is met.

- ° TP 1M13-P001, "Drywell Cooling Systems," and TP 1R43-P001, "Standby Diesel Generator," controls the sequence of testing only by the discretion of the System Test Engineer. Tests TP 1R71-P001, TP 1M13-P001 and TP 1R43-P001 are considered not to have adequate controls of testing sequence.

This is considered to be a violation of 10 CFR 50, Appendix B, Criterion V and an item of noncompliance, 440/85017-08(DRS) in that the licensee's instruction (TPI-7) is inadequate and does not control test performance and the sequence of testing as required by Regulatory Guide 1.68, Revision 2.

- c. TP 1C41A-P001, "Standby Liquid Control (SLC) System," Revision 0. The inspector witnessed section 6.11 consisting of SLC system initiation with the squib valves firing, pump suction valves opening, and SLC pumps running in parallel to inject water from the storage tank into the reactor vessel. Although the system initiated satisfactorily, SLC pump 1C41-C001A tripped unexpectedly after only a few seconds. Testing was subsequently halted and the problem investigated and documented in test exception E9. The licensee determined that the failure was attributable to blown control fuses and lifted control overloads resulting from excessive starting cycles on these components. Following replacement of the control fuses and squib assembly, the inspector later witnessed successful completion of this testing.
- d. TP 1E15-P001, "Containment Spray System," Revision 0. The inspector witnessed the air flow verification test which ensured unrestricted flow existed through all containment spray header nozzles.
- e. TP OM25/26-P001, "Control Room Heating, Ventilation, and Air Conditioning (HVAC) and Emergency Recirculation System," Revision 3. The inspector witnessed various portions of sections 6.1 through 6.12 with the exception of section 6.6. This testing verified proper operation of the system in the normal, smoke clear, and emergency recirculation modes including the ability of various Control Room HVAC Supply, Return, and Emergency Recirculations Fans to provide the design flow rate, demonstration of pneumatic damper control and interlocks, measurement of supply air roughing filters resistance to flow, and verification of duct heating coil output.
- f. TP 1M56-P001, "Hydrogen Ignitor," Revision 0. The inspector witnessed sections 6.3 and 6.4 consisting of functional testing of the hydrogen ignitors as supplied from various distribution panels to verify that hydrogen ignitor transformers' primary voltages are capable of providing satisfactory hydrogen ignitor secondary voltages and that hydrogen ignitors are capable of providing satisfactory glow plug temperatures.
- g. TP 1B21B-P001, "ADS/SRV," Revision 1. The inspector witnessed portions of section 6.6 consisting of various system logic testing.

No additional 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 Test Program Manual, the FSAR, the SER, and the QA Program and found them satisfactory.

TP 1C91-A001, "Process Computer," Revision 0
TP 0F11-P001, "Fuel Servicing Equipment," Revision 1
TP 1F12-P001, "Servicing Aides," Revision 0
TP 1F17-P001, "Under Reactor Pressure Vessel Servicing Equipment,"
Revision 0
TP 1G42-A001, "Suppression Pool Cleanup System," Revision 2
TP 0L51-A002, "Emergency Service Water Pump House Crane," Revision 0
TP 0L51-P002, "Fuel Handling Area Crane," Revision 0
TP 1L51-P001, "Reactor Building Polar Crane," Revision 0
TP 1M11-P001, "Containment Vessel Cooling System," Revision 2
TP 0M21-A001, "HVAC - Controlled Access Area," Revision 2
TP 0M27-A001, "HVAC - Computer Room," Revision 3
TP 0M29-A001, "HVAC - Control and Computer Room Humidification," Revision 1
TP 1M38-A001, "HVAC - Auxiliary Building," Revision 2
TP 1M39-P001, "HVAC - Emergency Core Cooling System Pump Room Cooling,"
Revision 0
TP 1P35-A001, "Reactor Plant Sampling System," Revision 0
TP 1P46-A001, "Turbine Building Chilled Water System," Revision 1
TP 1P50-A001, "Containment Vessel Chilled Water System" Revision 2
TP 2P51-A001, "Service Air System," Revision 1
TP 0P72-P001, "Plant Foundation Underdrain System," Revision 0
TP 1R14-P001, "ATWS-120 Volt Uninterruptible Power Supply," Revision 0
TP 1R24-P001, "Motor Control Centers," Revision 0
TP 2R24-P001, "Motor Control Centers," Revision 0
TP 2R42-P002, "Division III class 1E DC System," Revision 0
TP 1S11-A002, "Main and Auxiliary Power Transformers," Revision 1
TP 0D51-A001, "Seismic Instrument System," Revision 0
TP 1R22-P001, "4.16 KV Metal Clad Switchgear," Revision 0
TP 2R22-P001, "4.16 KV Metal Clad Switchgear," Revision 0
TP 1R63-A001, "Vibration Loose Parts Monitoring," Revision 1
TP 1R42-P001, "Class 1E DC Bus Independence and Division 3 DC Power
System," Revision 0
TP 2R23-P001, "480 Volt Load Centers," Revision 0
TP 0M28-P001, "Emergency Closed Cooling Pump Area Cooling," Revision 3

No items of noncompliance or deviation 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 1C61-P001, "Remote Shutdown System," Revision 1
- *TP 1E21-P001, "Low Pressure Core Spray," Revision 2

*Currently under review and will be completed in a subsequent inspection.

No violations or deviation were identified.

8. Independent Inspection

- a. During a plant tour, the inspector noted that Breaker EF1B13 (Tie Breaker to Bus EF1A) was racked out from its cubicle, thus taking it out-of-service, but was not tagged with an "Out-Of-Service" tag. This breaker was tagged as being turned over to Perry Plant Department. The inspector reported the occurrence to the shift supervisor who then had the breaker racked back into its cubicle. During subsequent discussions, the shift supervisor indicated that the most probable cause of the occurrence was that following removal for preventative maintenance the breaker was re-installed but was not racked back into its cubicle. The shift supervisor also indicated that it was common practice not to tag breakers out-of-service when they are removed for preventative maintenance and not to rack them back into their cubicles when they are reinstalled. This is considered an unresolved item (440/85017-09(DRS)).
- b. The inspector discovered that the controlled copy of the Test Program Manual (TPM) in the control room contained an out-of-date revision to TPI-6. Revision 3 had been issued for approximately one month and had not been incorporated into this particular copy of the TPM which contained revision 2. Although this appeared to be an isolated case; the inspector informed the licensee of the importance of keeping controlled copies current.

No violations or deviations were identified.

9. Overall Preoperational Test Program Review

The inspector reviewed the licensee's administrative program and procedures and verified that they contained a description of the preoperational test program including identification and assignment of responsibility for the following areas:

Flushing and cleaning of systems and components

Hydrostatic tests of piping, vessels, and systems designed to contain pressurized or radioactive fluids

Instrument calibration

System turnover from the constructor

Functional demonstration of equipment in all modes throughout its operating range, including applicable flow tests

Electrical, mechanical, and instrument and control testing

The inspector also verified that the test program includes requirements for testing consistent with FSAR commitments in that tests to be performed have been identified and sequenced and that the following information has been identified for each of the identified tests:

Test objectives

Summary of the test

Necessary prerequisites

Acceptance criteria

In addition, the inspector verified by review of administrative procedures that the format and content of preoperational test procedures are sufficient.

No violations or deviations were identified.

10. Preoperational Test Program Implementation

- a. During discussions in previous inspection periods, the licensee had indicated that the use of Initial Checkout and Run-in (IC&R) testing to satisfy preoperational testing requirements per Test Program Instruction (TPI)-7 step 4.1.2.2.g and TPI-27 step 4.3.e would be limited to simple functions such as instrument setpoints. However, during subsequent discussions concerning individual test procedures, the inspector encountered attempts to use IC&R test results to satisfy more complex preoperational testing requirements such as integrated logic testing. Therefore, the licensee agreed to provide a list of all IC&R testing being used to satisfy preoperational testing requirements for each individual test. However, there has been an inexplicable delay in providing this information and as such is considered an open item (440/85017-10(DRS)) until such a list has been provided.
- b. During various test witnessing activities, the inspector observed that there exists a nonuniform interpretation by STEs of TPI requirements dealing with the implementation of test exceptions and work authorizations when testing problems prohibit the completion of steps in the test procedure. Some STEs strictly interpret the requirements by immediately initiating a test exception and work authorization prior to any trouble shooting activities. However, other STEs believe they are allowed a reasonable amount of time for initial troubleshooting and only need to initiate a test exception and work authorization if that fails to correct the problem. As the TPIs are somewhat ambiguous pertaining

to this issue, the licensee has indicated that they are studying the problem in order to develop guidance for testing personnel to provide a uniform policy on the implementation of test exceptions and work authorizations. This is considered an open item (440/85017-11(DRS)) until licensee management has provided this uniform guidance.

11. Unresolved Items

Unresolved items are matters about which information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 5.a and 8.a.

12. 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. Open items disclosed during the inspection are discussed in Paragraphs 4.b, 4.c, 5.a, 10.a, and 10.b.

13. Exit Interview

The inspector met with licensee representatives denoted in Paragraph 1 on May 10, 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.

The licensee acknowledged the statements by the inspector with respect to the items of noncompliance in Paragraphs 2.a, 5.a, and 5.b and also the additional examples of a previous noncompliance in Paragraphs 4.a and 4.b.