

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-440/85053(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: August 3 through September 13, 1985

Inspector: *Mark A. Ring for*
D. E. Hills

10/2/85
Date

Gerard O'Dwyer
G. F. O'Dwyer

10/2/85
Date

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

10/2/85
Date

Inspection Summary

Inspection on August 3 through September 13, 1985 (Report No. 50-440/85053(DRS))
Areas Inspected: Routine, announced inspection of previous inspection findings, preoperational test procedure verification, preoperational test procedure review, preoperational test witnessing, preoperational test results review, overall startup test program review, and startup test procedure verification. The inspection involved a total of 147 inspector-hours onsite by 2 inspectors including 37 inspector-hours during off-shifts. In addition, there were 59 inspector-hours spent offsite.

Results: Of the seven areas inspected, no violations or deviations were identified in five areas. Within the remaining two areas, two violations were identified (failure to provide adequate preoperational test procedures - Paragraph 4; failures to properly follow procedures - Paragraphs 5.a, 5.b and 5.e).

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DETAILS

1. Persons Contacted

- *C. M. Shuster, Manager, Nuclear Quality Assurance Department
- *G. R. Leidich, General Supervising Engineer, Nuclear Test Section
- *B. D. Walrath, General Supervising Engineer, Operations Quality Section
- *G. H. Gerber, Element Supervisor Administration, Nuclear Test Section
- *M. W. Gmyrek, Senior Operations Coordinator, Perry Plant Operations Department
- *J. G. Cantlin, Operations Engineer (Startup Test Engineering Lead), Perry Plant Technical Department
- *B. B. Liddell, Operations Engineer, Perry Plant Technical Department
- *B. S. Ferrell, Licensing Engineer, Nuclear Engineering Department
- *N. J. Lehman, Staff Analyst, Perry Plant Technical Department

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 September 13, 1985.

2. Licensee Action on Previous Inspection Items

- a. (Closed) 10 CFR 50.55(e) (440/84-31-EE; 441/84-31-EE): Failure to include all preoperational testing requirements in Gilbert/Commonwealth, Inc., test specifications. This item was originally reported to address the lack of acceptance criteria in test specifications for Regulatory Guide 1.68, Revision 2, requirements for testing of the Fuel Pool Gates (sectionalizing devices). Regulatory Guide 1.68, Appendix A, Section 1.m requires conducting "operability and leak tests of sectionalizing devices and drains and leak tests of gaskets or bellows in the refueling canal and fuel storage pool." The licensee evaluated this problem by Deviation Analysis Report No. 194 and provided resolution through Project Organization Observation Action Request P084-65. Although the condition initially reported pertained to one test specification, the scope of the corrective action included all Gilbert/Commonwealth, Inc., test specifications. Adequate acceptance criteria for the fuel pool gates was incorporated into procedure GEN-M-021, "Fuel Pool Gates," with corresponding acceptance criteria pertaining to satisfactory completion of this procedure being incorporated into test specification TS-G41 and preoperational test procedure TP OG41-P001. More generic corrective action included improving licensee control and involvement in test specification development and review, conducting a review of all Gilbert/Commonwealth, Inc., test specifications, and revising those found to be incomplete. In response to NRC concerns about inadequate preoperational test procedures and several violations identified in that area, the licensee established a Management Procedure Review Team (MPRT) to determine the extent of the problem and present recommendations

for further corrective actions. In implementing the MPRT recommendations, the licensee has developed Special Project Plan 1102, "Test Procedure Assurance Review." The intent of this plan is to ensure preoperational test procedure adequacy by providing an additional review of all preoperational and selected acceptance test procedures, reinforcement of detail to ensure technical adequacy of test procedures, increased supervisory involvement during the evolution and conduct of test procedures and revisions, additional training for test personnel, a re-review of licensing commitments, a periodic status of progress, and a final summary of these efforts. Since the ultimate objective of providing complete and thorough test specifications is to develop adequate preoperational test procedures, the effectiveness of licensee corrective actions will be evaluated and tracked by previous inspection item 440/85013-01(DRS).

- b. (Closed) Violation (440/85017-08(DRS)): Administrative controls inappropriate to control test performance and the sequence of testing for test procedures. The inspector verified that Test Program Instruction (TPI)-7, "Preoperational, Acceptance and Special Test Procedure Preparation, Review, and Development," was revised to require that limitations for performing steps out of sequence be specific and identify procedure steps by number. In addition, a memorandum was issued to appropriate personnel indicating the requirement for performing steps in their exact procedural sequence unless the allowable deviation is specifically delineated in the procedure. The memorandum also directed the responsible System Test Engineers (STE) to perform reviews of all tests in progress to determine if they contain any instructions contrary to this requirement. Any discrepancies identified were corrected by processing a test change notice. Test procedures which have not yet been released are being corrected prior to their release. In addition, those test procedures which were already field complete at the time of these actions were not changed since the Test Program Review Committee (TPRC) considers sequence of testing during the test results review using the dated steps and chronological log. Finally, the inspector verified that additional training was provided to appropriate personnel to delineate these program requirements. However, as described in Paragraph 4 of this report, the inspector has since identified a similar problem involving test step sequencing in test procedure TP 1P57-P001, Revision 1, "Safety-Related Instrument Air." Therefore, further tracking of corrective actions and resolution for this item will be provided by inspection item 440/85053-01(DRS).
- c. (Closed) Open Item (440/85022-19(DRS); 440/85022-44(DRS)): Site confirmatory audit of installation and calibration of pressure switches used for relief/safety valve position indication per TMI Action Plan Item II.D.3 (Safety Evaluation Report (SER) Confirmatory Item 7.5.2.1). The inspector reviewed appropriate design drawings to verify design conformance with this SER issue. In addition, the inspector reviewed procedure 63-ICP-B2-0, "Generic Pressure Instrumentation Calibration," and corresponding completed

data sheets for the subject pressure switches to ensure that they were installed and calibrated. The inspector has no further concerns in this area.

- d. (Open) Open Item (440/85022-12(DRS)): Site confirmatory audit to verify Nuclear Steam Supply System (NSSS) vendor review of low power testing, power ascension, and emergency operating procedures per TMI Action Plan Item I.6.7 (SER Confirmatory Item 7.5.2.1). The inspector reviewed procedure PAP-1104, "Startup Test Program," and verified that it contains requirements that Startup Test Instructions (STI) be approved by the GE Site Operations Manager after General Electric (GE) review. This item is to remain open until a confirmatory audit is conducted to also ensure emergency operating procedures are reviewed by the NSSS vendor.
- e. (Closed) Open Item (440/85022-34(DRS)): Site confirmatory audit to verify adequacy of High Pressure Core Spray (HPCS) and Reactor Core Isolation System (RCIC) design capability to withstand a complete loss of offsite power to their respective space coolers for at least 2 hours per TMI Action Plan Item II.K.3.24. SER Section 9.4.5(3) indicates that this requirement is satisfied by providing an emergency power supply to the coolers from the diesel generators. The inspector verified the conformance of the actual design to this requirement by review of applicable design drawings. In addition, the inspector verified adequate testing of this design feature by review of preoperational test procedures TP 1E22-P002, "HPCS Diesel Generator," TP 1R43-P001, "Standby Diesel Generator," and TP 1M39-P001, "Emergency Core Cooling System Pump Rooms Cooling System." The inspector has no further concerns in this area.
- f. (Closed) Violation (440/85017-01(DRS)): Insufficient controls and direction to govern conduct of integrated run-in testing performed under control of Temporary Operating Instructions (TOI) prior to preoperational test release for performance. As described in Inspection Report No. 440/85017, several corrective actions were verified to have been implemented by the licensee. In addition to those actions mentioned in that report, the inspector has now verified the remaining corrective actions implemented by the licensee as described below:
- Test Program Instruction (TPI)-27, "Preoperational and Acceptance Tests," has been revised to require the System Test Engineer to prepare a report to be contained in the Release for Test Package which summarizes significant problems encountered during the Initial Checkout and Run-in (IC&R) phase activities. The types of problems to be included in the report as a minimum shall be:
 - . Recurring equipment problems
 - . Recurring system operation problems
 - . Problems encountered during "dry runs" of test procedures used as part of a Temporary Operating Instruction

- TPI-6, "IC&R Test Procedure, Temporary Operating Instruction and Alarm Response Instruction Preparation, Review, and Approval," has been revised to prescribe the use of TOIs for operating equipment outside the controls of a preoperational, acceptance, or IC&R test. TPI-6 also addresses the minimum content of TOIs to ensure adequate controls exist including prerequisites and restoration and to ensure that complex activities shall be prescribed with "signature/date attestation checklists."
- TPI-6 has also been revised to require that System Operating Instructions (SOI) be considered for use prior to initiating a TOI. When an SOI is endorsed in other than its entirety, an Operation Instruction Exception form is completed. This was implemented to aid in assuring SOI adequacy per Regulatory Guide 1.68, Revision 2, Section C.7, requirements.
- Additional training has been given to appropriate personnel to ensure they properly understand these requirements.

The inspector has no further concerns in this area.

- g. (Closed) Violation (440/85017-07(DRS)): Operation of a safety-related system required for safe shutdown without utilizing (or in accordance with) an approved procedure. This action was contrary to the requirements of procedure PAP-0201, Section 6.2, "Conduct of Operations." To ensure operating personnel meet the requirements of PAP-0201, daily instructions were issued to direct plant personnel not to operate or permit operation of any system without an approved and current procedure. Operations personnel have been counselled to be aggressive in assuming responsibility for the system operations aspect of the test program and to ensure their training and experience are utilized during plant testing activities. The inspector has no further concerns in this area.
- h. (Closed) Violation (440/85017-05(DRS)): Actions pursuant to pretest checklist verifications were inadequately accomplished. This item involved a failure to identify the effect of a design change on test procedure TP 1E12-P001, "Residual Heat Removal System (RHR)," and the effect of a lifted lead on test procedure TP 1R43-P001, "Division 1 Standby Diesel Generator," contrary to completed "release for test" pretest checklist verifications. The inspector verified additional training has been given to appropriate personnel emphasizing the importance of attention to detail in the development, review, and release of test procedures. TPI-27, "Release for Test: Preoperational and Acceptance Tests," has been revised to require the review of lifted leads and jumpers to also include generic support systems. In addition, the revision requires the Test Coordinator to review the Lifted Lead and Jumper Log every three months to ensure that lifted leads and jumpers which have been in place more than three months are still required. The inspector has no further concerns in this area.

- i. (Closed) Violation (440/85029-01(DRS)): Contrary to administrative procedures, test procedure TP 1M15-P001, "Annulus Exhaust Gas Treatment System," did not include any instructions for system restoration at the end of test section 6. The inspector verified that testing procedures in progress were reviewed to ensure that Section 6 of these procedures specified the requirement for system restoration following the test and were found satisfactory. Furthermore, additional training has been given to appropriate personnel to stress this requirement. The inspector has no further concerns in this area.
- j. (Closed) Open Item (440/85017-10(DRS)): Ensure that Initial Checkout and Run-in (IC&R) procedures used to collect preoperational test acceptance criteria are reviewed to the same level of detail as the preoperational test procedure. In conjunction with Special Project Plan 1102, "Test Procedure Assurance Review," preoperational test procedures were reviewed to identify affected IC&R procedures and an additional detailed review is being conducted to further ensure the adequacy of these procedures. This is to ensure that they receive a review as comprehensive as the Management Procedure Review Team (MPRT) reviews of preoperational test procedures. The acceptability of the IC&R procedures being used to satisfy specific preoperational test acceptance criteria will be evaluated in conjunction with the normal NRC inspection program. The inspector has no further concerns in this area.
- k. (Closed) Violation (440/85002-01(DRP)): Failure to meet safety-related Instrument Air leakage design requirements. As a result of the violation, the licensee has approved a new revision to correct the identified problems. The inspector has reviewed Revision 1 to test procedure TP 1P57-P001, "Safety-Related Instrument Air," in which further problems have been identified as described in Paragraph 4 of this report. Therefore, tracking of further corrective actions and resolution will be provided by inspection item 440/85053-01(DRS).
- l. (Closed) Unresolved (440/85038-05(DRS)): Inadequate control of lifted leads, fuses and jumpers. After further review of the licensee program and regulatory requirements, items relating to this issue were cited in previous Inspection Report No. 440/85042(DRS). Therefore, corrective actions and resolution will be tracked by inspection item 440/85042-07(DRS).

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

TP OF14-P001, "In-Vessel Servicing Equipment," Revision 1
 TP OP72-P002, "Plant Foundation Underdrain System Continuity Test,"
 Revision 0
 TP 1B13-P001, "Reactor Vessel Flow Induced Vibration Test Without
 Fuel," Revision 0
 TP 1B21A-P001, "Nuclear Boiler," Revision 1
 TP 1B33-P001, "Reactor Recirculation and Control," Revision 1
 TP 1C11A-P001, "Rod Control and Information System," Revision 1
 TP 1C11B-P001, "Control Rod Hydraulic System," Revision 0
 TP 1C22-P001, "Redundant Reactivity Control System," Revision 0
 TP 1C34-P001, "Feedwater Level Control," Revision 1
 TP 1C51A-P001, "Startup Range Neutron Monitoring," Revision 1
 TP 1C51A-P002, "Intermediate Range Neutron Monitoring," Revision 1
 TP 1C51B-P001, "Power Range Neutron Monitoring System APRM
 Preoperational In-Plant Test," Revision 1
 TP 1C51C-P001, "Recirculation Flow Bias System," Revision 0
 TP 1C51D-P001, "Traversing In-Core Probe (TIP)," Revision 1
 TP 1D23-P001, "Containment Atmosphere Monitoring System," Revision 1
 TP 1E22-P002, "HPCS Diesel Generator," Revision 1
 TP 1E31-P001, "Leak Detection," Revision 1
 TP 1E67-P001, "Control Room Leakage," Revision 2
 TP 1F13-P001, "Vessel Servicing Equipment," Revision 0
 TP 1F15-P001, "Refueling Equipment," Revision 1
 TP 1G33-P001, "Reactor Water Cleanup System," Revision 0
 TP 1G36-P001, "Reactor Water Cleanup Filter/Demineralizer System,"
 Revision 1
 TP 1M13-P001, "Drywell Cooling System," Revision 2
 TP 1M16/17-P001, "Drywell and Containment Vacuum Relief Systems,"
 Revision 0
 TP 1M99-P001, "Plant Environmental Conditions," Revision 0
 TP 1N64-P001, "Off-Gas System," Revision 1
 TP 1P45-PC01, "Emergency Service Water System," Revision 2
 TP 1P53-P001, "Penetration Pressurization System," Revision 1
 TP 1R25-P001, "120V AC Class 1E Instrument and Miscellaneous
 Distribution Panels," Revision 0
 TP 1R43-P001, "Standby Diesel Generator," Revision 1
 TP 1R43-P002, "Standby Diesel Generator," Revision 1
 TP 1R71-P001, "Essential and Emergency Lighting Systems," Revision 0
 TP 1E51-P001, "Reactor Core Isolation Cooling System," Revision 1

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 Programs Manual, applicable Regulatory Guides and American National Standards Institute (ANSI) Standards and docketed correspondence and found them satisfactory except as noted below:

TP 1P57-P001, "Safety-Related Instrument Air," Revision 1.

- a. During the review of this procedure, the inspector noted two inadequacies concerning the sequence of testing. Section 6.0, Note 2, indicates that "any independent section (6.1, 6.2, 6.3, 6.4, 6.5, 6.6) may be performed out of sequential order." Step 6.5.9 directs valve 1P57-F502 to be opened to rapidly depressurize the compressor discharge piping which assumes that valve 1P57-F501 was previously opened. However, the initial valve lineup performed in conjunction with prerequisite step 5.16 and Attachment 6 prescribed that valve 1P57-F501 be closed. This same valve is later opened in step 6.1.1. Therefore, contrary to Section 6.0, Note 2, procedure step 6.1.1 must be performed prior to Section 6.5 in order to establish the correct valve lineup for the test. In this case, the consequences of performing the sections in incorrect order would have been easily identifiable since failure to open valve 1P57-F501 would prevent depressurization of the compressor discharge piping.

In addition, Section 6.5, consisting of a system wide pressure drop test, assumes that valves 1P57-F015A and 1P57-F015B were previously opened. However, the initial valve lineup performed in conjunction with prerequisite step 5.16 and Attachment 6 prescribed that valves 1P57-F015A and 1P57-F015B be closed. These valves are again checked closed by prerequisite steps 5.19 and 5.20. These same valves are later opened in steps 6.3.6 and 6.3.8. Therefore, contrary to Section 6.0, Note 2, steps 6.3.6 and 6.3.8 must be performed prior to Section 6.5 in order to establish the correct valve lineup for the test. Failure to open valves 1P57-F015A and 1P57-F015B would result in isolating the safety relief valve accumulators, a potentially major source of leakage, from the test volume and therefore cause nonconservative testing conditions. Although the resulting pressure drop test on the partial system may indicate within acceptance criteria, in reality a system wide test with leakage through the accumulators could show unacceptable results. In this case, the incorrect valve lineup may or may not be identifiable during the testing depending on whether the unexpected pressure conditions are noticed on instrumentation downstream of these valves. However, the test procedure does not require the use of downstream pressure indication, instead prescribing that pressure readings be recorded from instrumentation upstream of these valves. Therefore, there is no assurance that this nonconservative testing condition would be identified during the test and thus could potentially show acceptable results on an unacceptable system.

Revision 0 of this test procedure was the subject of previous violation 440/85002-01(DRP) for failing to adequately test system design requirements. In addition, the failure of the test program to provide sufficient controls for the sequence of testing within test procedures was also the subject of previous violation 440/85017-08(DRS). Of particular concern is the fact that these problems were not identified in the Management Procedure Review Team (MPRT) review of this procedure. The MPRT reviews were instituted as corrective action to previous inadequate procedure

violations to ensure preoperational test procedure adequacy. Therefore, this is considered to be a repeat violation in that this procedure was inadequate for failing to provide proper controls for the sequence of testing (440/85053-01(DRS)).

- b. During the above review the inspector also noted a discrepancy between this procedure and the FSAR in regards to air receiver operating pressures. FSAR Section 6.8.2 reflects the air receiver low pressure switch setpoint at which the air compressor automatically starts as 2250 psig and the high setpoint at which the air compressor stops as 2500 psig. However, system design parameters have been modified to operate at higher nominal pressures in order to ensure that the receivers can makeup for system leakage for seven days as specified in the FSAR and SER. The test procedure reflects these higher operating parameters as a low pressure setpoint of 2500, +50, -0 psig and a high pressure setpoint of 2650, +50, -0 psig. The licensee has indicated that this discrepancy will be corrected by submitting an FSAR amendment depicting the new pressure and corresponding alarm setpoints. This discrepancy is to remain an open item until corrected (440/85053-02(DRS)).

No additional violations or deviations were identified.

5. Preoperational Test Witnessing

The inspector witnessed portions of 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 except as noted below:

- a. TP 1R76-P001, "ECCS Initiation/Loss of Offsite Power," Revision 1. The inspector witnessed Section 6.4, "Division 2 LOCA in Conjunction with Loss of Bus Power Test." In this test, a loss of offsite power simultaneous with a LOCA signal is caused by opening division 2 preferred source breaker EH1212 and simulating high drywell pressure. The proper operation of the division 2 diesel generator, Emergency Core Cooling Systems (ECCS), and required timing to inject rated flow into the reactor vessel is demonstrated. System design requires that diesel generator output breaker EH1201 close within 10 seconds after the diesel starts in order to start picking up loads per the loading sequence. Since Residual Heat Removal (RHR) Pump 1E12-C002C should have already received a start signal that was locked in due to the simulated LOCA, it should start immediately after power is provided to the bus by breaker EH1201 closing. However, during testing RHR Pump C failed to start. Further investigation showed that this occurrence was caused by a failure to turn on the charging spring motor when RHR Pump C breaker EH1210 was previously racked-in. Upon receipt of the LOCA signal breaker EH1210 had closed onto a dead bus since breaker EH1201 had not yet closed. Breaker EH1210

subsequently tripped on undervoltage. The undervoltage contact in the pump circuitry did not keep the breaker from initially closing since its corresponding relay has a three second time delay to prevent spurious undervoltage trips on large motor starts. Only when the relay had timed out and the contact opened did the breaker trip open on undervoltage. Per system design in this circumstance, breaker EH1210 would attempt to close again once breaker EH1201 closed and voltage was sensed on the bus causing the undervoltage contact to reclose. However, in this instance, breaker EH1210 had already discharged with the first closure and the charging spring motor was off preventing recharging, so the breaker could not reclose. Procedure step 6.4.9.a(4) required breaker EH1210 to be racked-in with its associated system in readiness for auto-start and operation. Failure to turn on the charging spring motor resulted in inadequately implementing this test step. This is considered a violation in conjunction with those occurrences described in Paragraphs 5.b and 5.e of this report in that it resulted from failure to properly perform a procedure step (440/85053-03a(DRS)). Due to the failure of RHR Pump C to start, reperformance #4 was conducted, which the inspector also witnessed. However, during this test applicable personnel failed to hear the signal to simulate the LOCA at the appropriate time and thus the entire section had to again be repeated with reperformance #5. The inspector witnessed the subsequent completion of this test section per reperformance #5. The inspector also witnessed portions of Section 6.3, "Division 1 LOCA in Conjunction with Loss of Bus Power Test," consisting of testing similar to the testing of division 2 as mentioned previously.

- b. TP 1C71-P001, "Reactor Protection System (RPS)," Revision 2. The inspector witnessed portions of Sections 6.1 and 6.2 consisting of test prerequisite lineup verifications and testing of reactor vessel high level trips. Upon review of the test procedure, the inspector noted prerequisite step 5.2 had been completed and signed-off on August 12, 1985. This step consists of a verification "that the Main Steam Isolation Valves (MSIV) open limit switches are installed and the accumulators are depressurized so the MSIV accumulator solenoids can be energized during RPS system testing." However, the inspector discovered that the open limit switch for MSIV 1B21-F022B had been unbolted and electrically disconnected by Work Authorization NTS-85-9357 since August 6, 1985, such that it was incapable of supporting the test. Although the System Test Engineer (STE) was aware of the system configuration and adverse effect on subsequent test performance, prerequisite step 5.2 was still improperly verified and signed-off as completed. The inspector also observed that the STE had later improperly changed Attachment 5 of the test procedure without processing a Test Change Form per the requirements of TPI-28, "Conduct of Preoperational, Special and Acceptance Tests," Section 4.5. This change consisted of simulating an open MSIV (1B21-F022B) by installing a test switch at the MSIV junction box in the drywell instead of the previously prescribed method of tying the limit switch in position. After further inquiries by the inspector, the STE changed the procedure

back to its original form. However, the inspector then noted that the step had been completed by installation of a test switch and thus the procedure no longer reflected what was actually done. This could have additional consequences during the review process. If the procedure contained testing steps that had actually been completed by a different means than are signed for, a false record may be produced and thus preclude identification of any problems.

Subsequently, the MSIV was reassembled and the test completed by removing the test switch and simulating an open MSIV by tying back the limit switch in accordance with the original procedure. These examples of improperly verifying a prerequisite and changing a procedure contrary to administrative procedure requirements are considered examples of a violation in conjunction with those occurrences described in Paragraphs 5.a and 5.e (440/85053-03b(DRS)). The inspector also witnessed portions of Section 6.7.2 consisting of testing of turbine stop valve closure trips.

- c. TP 1N27B-P001, "Feedwater Leakage Control System (FWLCS)," Revision 1. The inspector witnessed Section 6.5, "LPCS and RHR A (1E21-C002) and RHR B & C (1E12-C003) Waterleg Pump Seal Water Flow Verification." This testing was conducted to demonstrate that waterleg pump 1E21-C002 can provide seal water to the outboard feedwater check valves and 1E12-C003 can provide seal water to the inboard feedwater check valves using the suppression pool as their source. The test procedure requires that subsequent to system initiation the water level (as measured by tygon tubing attached to the drain piping) is to be verified to rise to near the top of the feedwater headers in order to verify that seal water is provided. However, upon system initiation the water level in the tygon tubing rose almost immediately to near the top of the feedwater headers although previous estimates indicated that this should take approximately 30 minutes. Furthermore, as time progressed water level in the tygon tubing increased to several feet above the top of the feedwater headers and was still increasing when the test was terminated by closing the FWLCS Isolation Valves. Upon closure of these valves, the water level in the tygon tubing dropped to below the bottom of the feedwater headers. These occurrences show that the level in the tygon tubing was not indicative of the water level in the feedwater headers, and thus the testing failed to show, as required in the test procedure, that water level will rise to near the top of the feedwater headers. A preliminary explanation is that this occurrence may be the result of injecting into a closed system and thus water level in the tygon tubing was pushed higher due to the increased system pressure. Although this testing demonstrated that some water was injected into the system, the amount of water or the corresponding level in the feedwater headers was not verified. Therefore, this testing failed to show that sufficient seal water could be supplied to the inboard and outboard feedwater check valves as was intended. A test exception and field question were generated for engineering resolution. A possible change in testing method may be required to provide the proper demonstration.

- d. TP 1M15-P001, "Annulus Exhaust Gas Treatment (AEGT) System," Revision 2. The inspector witnessed portions of reperformance #4 consisting of steps 6.1.3 and 6.1.4 and Sections 6.9 and 6.10 which tested Electric Heating Coils 1M15-D001A and 1M15-D001B low flow and high temperature interlocks. The inspector observed that when the electrical technician was instructed to perform step 6.10.6, he incorrectly opened the disconnect switch at the motor control center for the Train B, instead of Train A, AEGT Fan and Heating Coils. However, the System Test Engineer immediately identified the error and had it corrected such that the test was not affected.
- e. TP 1M51-P001, "Combustible Gas Control System," Revision 1. The inspector witnessed portions of Section 6.3 consisting of testing of various system alarms. In step 6.3.6 while removing fuses for Valve 1M51-F020A at MCC EF1B07 Compartment XL, the "DW MIX SYS A OUT OF SERVICE" light did not illuminate as indicated per step 6.3.7.a. A test exception was written and testing continued with step 6.3.10. Following completion of this step, it was determined that the previous failure was attributed to the improper removal of the control fuses instead of the power fuses. Therefore, reperformance #1 was conducted for steps 6.3.5 through 6.3.10 with the correct fuses removed as required. However, the reperformance was not conducted in accordance with Test Program Instruction (TPI)-28, "Conduct of Preoperational, Special, and Acceptance Tests," steps 4.10.1.3 and 4.10.1.4. The System Test Engineer (STE) did not specify to the Lead Test Engineer (LTE) the particular steps to be reperformed and have the LTE sign the chronological log entry depicting these steps to show his approval prior to the reperformance. This is considered a violation in conjunction with those occurrences described in Paragraphs 5.a and 5.b in that it represents a failure to adequately follow procedure administrative requirements pertaining to test reperformances (440/85053-03c(DRS)).

No additional violations or deviations were identified.

6. 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 completed as required, results were evaluated and met the acceptance criteria, and the results were reviewed and approved as required.

TP 1E32-P001, "Main Steam Isolation Valve Leakage Control System,"
Revision 1

No violations or deviations were identified.

7. Overall Startup Test Program

- a. The inspector verified that the licensee has described the startup test program in administrative documents and procedures. This includes identifying the general areas of testing and the assignment of responsibilities for test performance and results evaluation for the following in accordance with applicable regulatory requirements:
- Core loading
 - Initial criticality test
 - Low power tests
 - Power ascension tests

The inspector has also reviewed the licensee's test program to ensure it includes requirements for testing consistent with FSAR commitments per the following:

- Tests to be performed have been identified and sequenced.
- For each of the identified tests, the test objectives, summary of the test, necessary prerequisites, and acceptance criteria have been identified.
- The licensee appears to have satisfied FSAR test program commitments and Regulatory Guide 1.68 commitments as evidenced by a review of test titles and objectives of appropriate procedures.

In addition, the inspector has verified that the licensee has specified the format and content of startup test procedures consistent with regulatory requirements.

During the test program review, the inspector noted that there was no existing or planned startup test procedure for the Main Steam Isolation Valve Leakage Control System to correspond to testing commitments contained in FSAR Section 14.2.12.2.5.9, Regulatory Guide 1.68, Revision 2, Appendix A, Section 4.m which prescribes that low power testing should include "demonstration of the operability of main steam line isolation valve leakage control system (BWR - during hot standby conditions)." Further inquiries indicated that the licensee intends to delete this testing commitment from the FSAR in Amendment 21 which has not yet been submitted to NRR (Office of Nuclear Reactor Regulation). This is to remain an open item pending NRR action on the submittal (440/85053-04(DRS)).

- b. The inspector verified that the startup test organization has been identified and responsibilities described in administrative documents and procedures. In addition, the interface between testing personnel and the operating organization has been specified.

Organizational responsibilities have been clearly established where interfaces exist between organizations involved in the test program.

c. The inspector verified that measures have been established in administrative documents and procedures to govern the conduct of testing including:

- Method for verifying a test procedure is current prior to its use.
- Methods to assure personnel involved in the conduct of a test are knowledgeable of the test procedures.
- Methods to change (both major and minor) a test procedure during the conduct of testing.
- Criteria for interruption of a test and continuation of an interrupted test.
- Methods to coordinate the conduct of testing.
- Methods to document significant events, unusual conditions, or interruptions to testing.
- Methods for identifying deficiencies, documenting their resolutions, and documenting retesting.

In addition, the inspector verified that formal methods have been established to control scheduling of testing activities.

Furthermore, a formal program for evaluation of test results has been established which provides for the following:

- The test data are properly reduced to meaningful and understandable form.
- The test results are checked and compared to previously determined performance standards or limits.
- Deficiencies are clearly identified and appropriate corrective actions are proposed, reviewed, and completed.
- After corrective actions or modifications have been completed, tests or portions of tests are rerun as necessary to assure that performance of the system is adequate.

- The results of the evaluations are reviewed by appropriate licensee personnel and/or contractor personnel, including the persons responsible for approving the original test procedure.
 - Management approval is obtained prior to proceeding to the next testing plateau.
- d. The inspector verified that measures have been established in administrative documents and procedures which control test procedure processes for review, approval, and issuance. In addition, measures have been established in administrative documents and procedures which control the revision of approved procedures and specify the following:
- Review by same persons and/or groups as the original procedure.
 - Approval by same person and/or groups as the original procedure.
 - Issuance of revisions and control of obsolete procedures.

Furthermore, operating procedures used during testing must have been approved in accordance with technical specifications.

- e. The inspector verified by review of administrative procedures that controls have been established for special test equipment that include:
- A listing of controlled test equipment, the calibration requirements, and the calibration history.
 - Controls for storage and issuance to preclude use of equipment which has not been calibrated within the specified interval.
 - Requirements for recording test equipment identity and calibration date in test procedures to permit retest if equipment is subsequently found out of calibration.

The inspector also selected four pieces of measuring and test equipment and reviewed the calibration records to verify that the above controls have been implemented.

- f. In conjunction with this inspection, the inspector reviewed PAP-1104, "Startup Test Program," Revision 0. During this review, Revision 1 to this procedure was in the process of development which is to contain numerous changes (both licensee

initiated and inspector recommendations). Therefore, since this inspection was based on these changes, upon approval of the new revision, the inspector needs to perform an additional review to ensure the indicated changes have been incorporated and any additional changes meet regulatory requirements. This additional review is to be tracked as an open item 440/85053-05(DRS).

The inspector also noted several discrepancies between the intended startup test program and the FSAR as follows:

- The licensee's intended startup test program requires that only members of the Startup Test Organization fulfilling functions of Test Director or Test Engineer or above be able to meet qualification requirements of ANSI N18.1-1971. However, FSAR Section 14.2.2 requires that "plant staff members of the Startup Test Element will meet the requirements of ANSI N18.1-1971 as endorsed by Regulatory Guide 1.8. Other project personnel who become members of the Startup Test Organization will meet the requirements of ANSI N45.2.6-1978. GE personnel, under the direction of the GE Site Operations Manager, will meet the requirements of either ANSI N18.1-1971 or ANSI N45.2.6-1978 as appropriate to their assignments." Therefore, personnel just taking data and not signing-off actual test steps need not be qualified to ANSI N18.1-1971 per the licensee's program contrary to the FSAR commitment. Furthermore, the licensee's program would not require GE personnel acting in only an advisory capacity (i.e., not performing testing functions) to be qualified to any particular standards contrary to the FSAR commitment which would require them to be qualified to either ANSI N18.1-1971 or ANSI N45.2.6-1978.
- The licensee's intended startup test program in reference to failures to meet acceptance criteria indicates that "depending on resolution, the applicable test portion may or may not be repeated to verify that the Level 2 requirement is satisfied." However, per FSAR Section 14.2.12.2 "following resolution, the applicable test portion must be repeated to verify that the Level 2 requirements are satisfied."
- FSAR Section 14.2.5 requires that the Startup Test Results Package receive an initial review by the Shift Test Director prior to going to the Startup Element Supervisor. The licensee's

intended Startup Test program requires this initial review by either the Test Director or Test Engineer.

- FSAR Section 14.2.2.14 requires the Shift Supervisor's concurrence prior to beginning a test while the licensee's intended Startup Test program requires only the unit supervisor's approval instead of that of the Shift Supervisor.

The licensee has indicated that depending on the individual case these discrepancies will be corrected by either program changes or by submitting an FSAR amendment. These discrepancies are to remain an open item until corrected (440/85053-06(DRS)).

- g. The licensee has indicated that they do not at this time intend to defer any preoperational testing to beyond fuel load. However, in case this later becomes necessary, they are currently developing contingency plans on how to administratively conduct this testing. Once these plans are complete and incorporated into appropriate procedures, the inspector will need to review this area and thus this is considered an open item (440/85053-07(DRS)).

No violations or deviations were identified.

8. Startup Test Procedure Verification

The inspector verified that the following Startup Test Instructions were prepared, reviewed, and approved in accordance with the requirements of Regulatory Guide 1.68, the FSAR, the SER, the QA program and appropriate administrative procedures and found them satisfactory.

STI C51-0006, "SRM Performance and Control Rod Sequence," Revision 0
STI C11-0008, "Control Rod Sequence Exchange," Revision 0
STI C51-0010, "IRM Performance," Revision 0
STI E51-0014, "Reactor Core Isolation Cooling," Revision 0
STI B21-0016A, "Selected Process Temperatures," Revision 0
STI B21-0016B, "Water Level Reference Leg Temperatures," Revision 0
STI B21-0017, "System Expansion," Revision 0
STI B21-0020, "Steam Production," Revision 0
STI C85-0022, "Pressure Regulator," Revision 0
STI N27-0023A, "Feedwater Control," Revision 0
STI N27-0023B, "Loss of Feedwater Heating," Revision 0
STI N27-0023C, "Feedwater Pump Trip," Revision 0
STI N27-0023D, "Maximum Feedwater System Runout Capability," Revision 0
STI N31-0024, "Turbine Valve Surveillance," Revision 0
STI B21-0025B, "MSIV Fuel Isolation," Revision 0
STI B21-0025C, "MSL Flow Venturi Calibration," Revision 0
STI B33-0029A, "Recirculation Flow Control - Valve Position Loop,"
Revision 0
STI B33-0029B, "Recirculation Flow Control - Flow Loop," Revision 0
STI B33-0030A, "Recirculation System - Trip One Pump," Revision 0

STI B33-0030B, "Recirculation System - Trip Two Pumps," Revision 0
 STI B33-0030C, "Recirculation System Performance," Revision 0
 STI B33-0030D, "Recirculation FCV Runback," Revision 0
 STI B33-0030E, "Recirculation System - Cavitation," Revision 0
 STI B21-0033, "Drywell Piping Vibration," Revision 0
 STI F41-0034, "Reactor Internals Vibration," Revision 0
 STI B33-0035, "Recirculation System Flow Calibration," Revision 0
 STI G33-0070, "Reactor Water Cleanup System," Revision 0
 STI E12-0071, "Residual Heat Removal System," Revision 0
 STI N64-0074, "Off-Gas System," Revision 0
 STI C95-0099, "Emergency Response Information System," Revision 0
 STI M99-0100, "Integrated HVAC," Revision 0
 STI P41-0113, "Service Water," Revision 0
 STI P42-0114, "Emergency Closed Cooling Water," Revision 0
 STI P43-0115, "Nuclear Closed Cooling Water," Revision 0
 STI P44-0116, "Turbine Building Closed Cooling Water," Revision 0
 STI P45-0117, "Emergency Service Water," Revision 0
 STI N71-0118, "Circulating Water," Revision 0
 STI G42-0119, "Suppression Pool Cleanup," Revision 0
 STI N27-0120, "Feedwater," Revision 0
 STI N36-0121, "Extraction Steam System," Revision 0
 STI P99-0122, "Piping Expansion and Vibration," Revision 0
 STI T23-0123, "Concrete Temperature Survey," Revision 0
 STI N11-0124, "Main and Reheat Steam," Revision 0
 STI N21-0125, "Condensate," Revision 0
 STI N22-0126, "Main, Reheat, Extraction and Miscellaneous Drains,"
 Revision 0
 STI N25-0127, "Low Pressure/High Pressure Heater Drains and Vents,"
 Revision 0
 STI N24-0128, "Condensate Filter/Demineralizers," Revision 0
 STI N33-0129, "Steam Seal," Revision 0
 STI N62-0130, "Condenser Air Removal," Revision 0
 STI N64-0131, "Off-Gas Vault Refrigeration," Revision 0
 STI P33-0132, "Turbine Plant Sampling," Revision 0
 STI R63-0133, "Loose Parts Monitoring System," Revision 0
 STI M99-0134, "Equipment Area Cooling," Revision 0
 STI P35-0001, "Chemical Radiochemical Monitoring," Revision 0
 STI D21-0002, "Radiation Measurements," Revision 0

No violations or deviations were identified.

9. 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, 7.a, 7.f, and 7.g.

10. Exit Interview

The inspector met with licensee representatives denoted in Paragraph 1 on September 13, 1985. The inspector summarized the scope and findings of the inspection and discussed the likely content of the 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 violations in Paragraphs 4, 5.a, 5.b, and 5.e.