U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-387/82-10

Docket No. 50-387

License No. CPPR-101 Priority -- Category B

Licensee: Pennsylvania Power and Light Company

2 North Ninth Street

Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station, Unit 1

Inspection at: Salem Township, Pennsylvania

Inspection conducted: March 23-26, 1982

Inspectors: H. H. Nicholas 4/23/82
H. H. Nicholas, Reactor Inspector date signed

Approved by: L. H. Bettenhausen 4/23/82
L. H. Bettenhausen, Chief, Test Program Section date signed

Inspection Summary: Inspection on March 23-26, 1982 (Report No. 50-387/82-10)
Areas Inspected: Routine unannounced inspection of the preoperational test program implementation including review of program status; preoperational test procedure review, verification and test results evaluation; and emergency diesel generators and supporting systems. The inspection involved 35 inspector-hours on site by one NRC region-based inspector.
Results: Three violations were identified; failure to incorporate all test requirements in a preoperational test, failure to conduct surveillance tests of battery systems, and failure to follow housekeeping/cleanliness procedure.

DETAILS

1. Persons Contacted

Pennsylvania Power and Light Company

* J. Amant, Personnel and Administration
* M. Buring, H. P. Supervisor
* F. Butler, IC Supervisor
* M. Detamore, Plant Engineering Supervisor
* F. Eisenhuth, Senior Compliance Engineer
* J. Graham, Staff Assistant
* J. Green, QA Supervisor of Operations
* C. Jaffee, ISG Coordinator
* H. Keiser, Superintendent of Plant
  G. Kuzynski, Maintenance Supervisor
  C. Myers, Outage Supervisor
* R. Stotler, Supervisor of Security

Bechtel Power Corporation

  N. Covington, Assistant ISG Supervisor
* E. Figard, ISG Supervisor
  M. Fulkerson, Starting and Testing Engineer
  M. Johnson, Quality Engineer

General Electric Corporation

  K. Mertes, Startup Engineer
  D. Turner, STO Site Manager

U.S. Nuclear Regulatory Commission

* N. Blumberg, Reactor Inspector
* D. Caphton, Chief, Management Programs Section
* P. Eapen, Reactor Inspector
* S. Ebneter, Chief, Engineering Programs Branch
* J. McCann, Resident Inspector
* G. Meyer, Reactor Inspector
* G. Napuda, Reactor Inspector
* G. Rhoads, Senior Resident Inspector
* E. Shaub, Reactor Inspector

The inspector also interviewed other licensee personnel during the course of the inspection.

* denotes those present at the exit interview on March 26, 1982.

2. Preoperational Test Program

References:

-- SSES Final Safety Analysis Report.

-- SSES Safety Evaluation Report, NUREG-0776, and Supplement 1

-- SSES Startup Work List, March 23, 1982.

-- Engineered Safety Features (ESF) Reset Controls, IEB 80-06, March 13, 1980

-- Housekeeping/Cleanliness Control, PPL AD-QA-503, Revision 1

-- IEEE 308-1974, Standard Criteria For Class IE Power Systems For Nuclear Power Generating Stations

-- IEEE 387-1972, Standard Criteria For Diesel Generator Units Applied as Standby Power Supplies For Nuclear Power Generating Stations.

-- IEEE 450-1975, Maintenance, Testing, and Replacement of Large Lead Storage Batteries For Generating Stations and Substations.

-- ANSI N 45.2.3 - 1973, Housekeeping During The Construction Phase of Nuclear Power Plants.

-- RG 1.6 March 1971, Independence Between Redundant Standby Power Sources And Between Their Distribution Systems

-- RG 1.9 March 1971, Selection Of Diesel Generator Set Capacity For Standby Power Supplies

-- RG 1.32 February 1977, Criteria For Safety Related Electric Power Systems For Nuclear Power Plants

-- RG 1.41 March 1973, Preoperational Testing of Redundant On Site Electric Power Systems To Verify Proper Load Group Assignments

-- RG 1.68 January 1977, Initial Test Programs For Water Cooled Reactor Power Plants

-- RG 1.75 January 1975, Physical Independence Of Electric Systems

-- RG 1.81 January 1975, Shared Emergency And Shutdown Electric Systems For Multi Unit Nuclear Power Plants

-- RG 1.93 December 1974, Availability Of Electric Power Sources

-- RG 1.108 August 1977, Periodic Testing of Diesel Generator Units Used As Onsite Electric Power Systems at Nuclear Power Plants

-- RG 1.118 June 1976, Periodic Testing of Electric Power And Protection Systems

-- RG 1.128 October 1978, Installation Design And Installation Of Large Load Storage Batteries For Nuclear Power Plants.

-- RG 1.129 April 1977, Maintenance, Testing, And Replacement of Large Load Storage Batteries For Nuclear Power Plants

-- RG 1.137 October 1979, Fuel Oil Systems For Standby Diesel Generators

2.1 Test Program Status and Implementation

The inspector met with the Integrated Startup Group (ISG) and other licensee representatives and held discussions on the status of construction; system turnovers; completed preoperational tests and remaining tests; test procedures approved for testing, awaiting results evaluation, and awaiting review and approval; and tests for which results have been evaluated and approved. The discussions included the interface between the preoperational test program and the startup test program. The inspector received the Startup Progress Report, a Test Matrix Status, the ISG NSSS Target Plan, and the Startup Work List Items.

As a result of these discussions and review of documents relative to test program status and implementation, no discrepancies were noted. The inspector had no further questions.

2.2 Test Procedure Review and Verification

The following procedures were reviewed in preparation for the preoperational cold functional test. They were reviewed for technical and administrative adequacy, and for verification that adequate testing is planned to satisfy regulatory guidance and licensee commitments.

-- TP-1.2 Revision 0, Diesel Testing

-- TP-2.29 Revision 0, Emergency Diesel Generator 300 Start Test

-- TP-3.59 Revision 0, ECCS Keep Fill System

-- P-23.1 Revision 1, Diesel Fuel Oil System

-- P-24.1 A,B,C,D Revision 1, Standby Diesel Generator

-- P-100.1 Revision 0, Cold Functional Test

The procedures were reviewed for the following:

-- Management review and approval,
-- Procedure format,
-- Test objectives clearly stated,
-- Prerequisites,
-- Environmental conditions,
-- Acceptance criteria,
-- References,
-- Initial conditions,
-- Test objectives are met,
-- Performance verification,
-- Recording conduct of test,
-- Restoration of system to normal after test,
-- Identification of personnel conducting and evaluating test data, and,
-- Independent verification of initial steps or parameters.

The inspector ascertained that the procedures are consistent with regulatory requirements, guidance and licensee commitments, with the following exceptions:

In review of P-100.1, Cold Functional Test, Revision 0, Approved March 8, 1982, the inspector noted that prior to start of the cold functional test, the RHR and Core Spray systems will be verified full and vented. The procedure does not specify or reference how or by what system this shall be accomplished. The diesel air start system is another system not mentioned or referenced in the test procedure, yet is required for the operation of the diesel generators. The licensees' representative acknowledged this and stated that required systems would be referenced in the procedure. This is an Inspector Followup Item (50-387/82-10-01).

Test procedure P-100.1 states that each diesel generator has a continuous load rating of 4000 KW. The procedure also states that each diesel generator can be loaded at 4700 KW for 2000 hours. The diesel generator vendor's manual states the continuous load rating is 4000 KW and has an overload capability of 10 percent for 2 hours in any 24 hour period. The inspector discussed these differences with the licensee's representative, who stated that this item will be resolved. The inspector will follow this resolution on a subsequent inspection. (50-387/82-10-02)

In reviewing test procedure P-100.1, the inspector noted that all of the electrical loads required for engineered safety features and for safe shutdown are not listed, such as control structure battery room exhaust fans, 125 VDC battery chargers, diesel generator room ventilation supply fans, diesel generator diesel fuel oil transfer pumps, diesel generator starting air compressors, standby liquid control tank heater, standby liquid control pumps, 250 VDC battery chargers as well as other heating, cooling, chiller, and pump loads.

-- SSES FSAR Section 8, Table 8.3.1, lists all required loads and load sequencing for each bus and associated diesel generator that should be included in the integrated test.

-- Regulatory Guide 1.9 March 1971, Selection of Diesel Generator Set Capacity For Standby Power Supplies states as Regulatory Positions,

"3. During preoperational testing, the predicted loads should be verified by tests.

4. Each diesel generator set should be capable of starting and accelerating to rated speed, in the required sequence, all the needed engineered safety feature and emergency shutdown loads."

-- Regulatory Guide 1.68, January 1977, Initial Test Programs For Water Cooled Reactor Power Plants states in Appendix A:

"1.g.(1) Tests should demonstrate that the integrated system will perform as designed to a simulated partial and full loss of offsite power.

1.g.(2) Tests should demonstrate that vital loads can start in proper sequence and operate under simulated accident conditions.

1.h The testing of engineered safety features should demonstrate that such features will perform satisfactorily in all expected operating configurations or modes."

-- P-100.1 March 1982, Cold Functional Test, states as two of the specific test objectives:

"(2)(b) The ability of the emergency diesel generators to start and when necessary, supply the power required to operate all safety related loads within the time requirements of the FSAR.

(2)(e) The ability of the necessary support systems to operate as required to support the operation of the diesel generators, the RHR systems and the core spray system."

The following also address the requirement for integrated system testing:

-- 10 CFR 50 Appendix B Criterion XI

-- 10 CFR 50 Appendix A Criterion 18

-- IEEE-387-1972 Section 6

The cold functional test is the only test performed during preoperational testing which brings together on an integrated basis those individually tested components and systems that now must function as an integrated plant. Vital ESF loads and safe shutdown loads should be included in the test in order to test the plant performance realistically for the prescribed conditions. Failure to include the required and necessary loads into the approved test procedure constitutes a Violation (50-387/82-10-03)

2.3 Test Results Evaluation

The following preoperational test procedures were reviewed to ascertain whether uniform criteria are being applied for evaluating completed preoperational tests, to assure their technical and administrative adequacy, and in preparation for test witnessing of P-100.1, Cold Functional Test.

-- P-75.1 Revision 1, 24 Vdc System, Division 1

-- P-75.1 Revision 1, 24 Vdc System, Division 2

-- P-2.1 Revision 2, 125 Vdc System, Channel A

-- P-2.1 Revision 2, 125 Vdc System, Channel B

-- P-2.1 Revision 2, 125 Vdc System, Channel C

-- P-2.1 Revision 2, 125 Vdc System, Channel D

-- P-88.1 Revision 1, 250 Vdc System, Division 1

-- P-88.2 Revision 1, 250 Vdc System, Division 2

The inspector reviewed the test results and verification of licensee evaluation of test results by the following methods:

-- Review of test charges;

-- Review of test exceptions;

-- Review of test deficiencies;

-- Review of "As-Run" copy of test procedure;

-- Review of QC inspection records; and,

-- Verifying that test results have been approved.

No discrepancies were noted in review of these procedures, with the following exceptions:

In review of the test procedure approval dates, test results evaluation review approval dates, and the test dates for the performance and service tests of these battery systems, the following was noted:

-- The 24 Vdc System, Division 1 and 2, were performance tested and service tested on October 8, 1980. Test results were evaluated and approved on November 4, 1980.

-- The 125 Vdc System, Channel A ID 610, was performance tested on May 2, 1980 and service tested on May 8, 1980. Test results were evaluated and approved on August 20, 1981.

-- The 125 Vdc System, Channel B ID 620, was performance tested on May 5, 1980 and service tested on May 12, 1980. Test results were evaluated and approved on August 20, 1981.

-- The 125 Vdc System, Channel C ID 630, was performance tested on May 6, 1980 and service tested on May 13, 1980. Test results were evaluated and approved on August 20, 1981.

-- The 125 Vdc System, Channel D ID 640, was performance tested on May 7, 1980 and service tested on May 14, 1980. Because of problems, both tests were redone on December 15, 1980. Test results were evaluated and approved on August 20, 1981.

-- The 250 Vdc System, Division 1, ID 650, was performance tested on April 30, 1980 and service tested on June 2, 1980. Test results were evaluated and approved on July 17, 1981.

-- The 250 Vdc System, Division 2 ID 660, was performance tested on April 30, 1980 and service tested on June 3, 1980. Test results were evaluated and approved on July 17, 1981.

10 CFR 50, Appendix B, Criterion XI requires a test program with written test procedures to demonstrate that a system will perform satisfactorily in service.

10 CFR 50, Appendix A, Criterion 18, requires that electrical power systems important to safety shall be tested periodically for operability and functional performance.

RG 1.32, Criteria For Safety Related Electric Power Systems For Nuclear Power Plants and RG 1.129, Maintenance, Testing, and Replacement of Large Lead Storage Batteries For Nuclear Power Plants, require performance tests to be performed every five years and service tests to be performed every eighteen months.

Contrary to the above, as of March 26, 1982, battery service testing has not been conducted in the past eighteen months on the following five battery systems:

-- 125 Vdc System, Channel A ID 610,

-- 125 Vdc System, Channel B ID 620,

-- 125 Vdc System, Channel C ID 630,

-- 250 Vdc System, Division 1 ID 650, and,

-- 250 Vdc System, Division 2 ID 660.

This item is a Violation (50-387/82-10-04).

2.4 Emergency Diesel Generators and Supporting Systems

The inspector toured the four diesel generator rooms and inspected the diesel engines, generators, fuel oil systems, service water systems, air start systems and electrical control panels. Observations included work in progress on hanger installations, electrical control panel work, diesel engine expansion joints, housekeeping and cleanliness, and safety and fire hazards.

The inspector noticed signs on the doors to the diesel generator rooms. The signs read "No Admittance, Access Controlled Area" and "No lines or cables of any kind to run through these doors." All of the doors were open; lines and cables were strung through them. The rooms had been turned back to construction, but the access control signs had not been removed or covered. The licensees' representative stated that the signs will be removed for the period of DG room turnover to construction. This is an inspector follow item (50-387/82-10-05).

SSES Administrative Procedure AD-QA-503 Revision 1, Housekeeping/ Cleanliness Control, Section 6.2, states that work areas shall be kept sufficiently clean and orderly to permit activities to proceed in an efficient manner that will produce and maintain quality. Waste and debris sufficient to form a health, safety or fire hazard, shall not be permitted.

Contrary to the above, on March 25, 1982 the inspector observed oil, dirt, and debris underneath the diesel engines and generators with oil leaking from the "C" diesel engine onto the floor. Welding was being performed in the "B" diesel generator room with no fire watch present and no fire extinguisher present in the vicinity of the welder.

This item is a Violation (50-387/82-10-06). This condition was immediately corrected by the licensees' representatives and correction verified by the inspector prior to completion of the inspection on March 26, 1982.

3. Exit [illegible]rview

At t[illegible]ion of the site inspection on March 26, 1982, an exit meeting was [illegible] with the licensees' senior site representatives (denoted in Par[illegible]). The inspector summarized the scope and findings of the ins[illegible]. Previous inspections in this area were discussed.