

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-387/80-20

Docket No. 50-387

License No. CPPR-101 Priority -- Category B

Licensee: Pennsylvania Power & Light Company

2 North Ninth Street

Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station

Inspection at: Salem Township, Pennsylvania

Inspection conducted: August 4 - September 5, 1980

Inspectors: H. H. Nicholas for
R. M. Gaklo, Senior Resident Inspector

10/6/80
date signed

H. H. Nicholas for
G. G. Rhoads, Resident Inspector

10/6/80
date signed

H. H. Nicholas
H. H. Nicholas, Reactor Inspector

10/6/80
date signed

Ebe C. McCabe
Chief, Reactor Projects, Section II

date signed

Approved by: Ebe C. McCabe
Ebe C. McCabe, Chief, Reactor Projects

10/7/80

Inspection Summary: Section II, RO&NS Branch

Inspection on August 4 - September 5, 1980 (Report No. 50-387/80-20)

Areas Inspected: Routine inspection by the resident inspectors of: preoperational test program implementation, comparison of FSAR to as-built plant and preoperational test witnessing. The inspectors also performed plant tours and reviewed licensee actions on previously identified items. The inspection involved 93 inspector-hours on site, including 6 hours during off shift, by the NRC Resident Inspectors, 11 hours by a NRC Region-based Inspector and 11 hours by a NRC Supervisor.

Results: Of the five areas inspected, no items of noncompliance were identified.

DETAILS

1. Persons Contacted

Pennsylvania Power and Light Company

L. Adams, Plant Supervisor of Operations
R. Byram, Plant Supervisor of Maintenance
S. H. Cantone, Superintendent of Plant
E. Carlson, Simulator Supervisor
T. Clymer, Site QAE
T. Dalpiaz, Startup and Test Group Supervisor
D. Dunn, Resident Engineer
J. Edwards, Plant Personnel and Administrative Supervisor
R. Featenby, Assistant Project Director
E. Figard, Assistant ISG Supervisor
M. Fulkerson, Startup and Test Field Engineer
E. Gorski, Plant Quality Supervisor
J. Graham, Plant Assistant
J. Green, Operations Quality Assurance Supervisor
P. Kyner, Resident QAE
G. Lazarowitz, Resident Engineer
W. Lowthert, Plant Training Supervisor
K. Mertes, Startup and Test Field Engineer
L. O'Neill, Plant Technical Supervisor
J. Rimsky, Plant I&C/Computer Supervisor
D. Thompson, Assistant Superintendent of Plant
R. Webster, ISG Supervisor

The inspectors also interviewed other PP&L employees, as well as employees of Bechtel, and General Electric Company.

2. Plant Tour

The inspector conducted periodic tours of accessible areas in the plant during normal and backshift hours. During these tours, the following items were evaluated:

- Hot Work: Adequacy of fire prevention/protection measures used.
- Fire Equipment: Operability and evidence of periodic inspection of fire suppression equipment.
- Housekeeping: Minimal accumulations of debris and maintenance of required cleanliness levels of systems under or following testing.
- Equipment Preservation: Maintenance of special precautionary measures for installed equipment, as applicable.

- Component Tagging: Implementation and observance of equipment tagging for safety, equipment protections and jurisdiction.
- Instrumentation: Adequate protection for installed instrumentation.
- Logs: Completeness of logs maintained.
- Security: Adequate site construction security.
- Cable Installation: Adequate precautions taken to prevent damage to installed cables.
- Communications: Adequate public address system.
- Equipment Maintenance and Controls: Corrective maintenance is performed in accordance with approved procedures, no unauthorized work activities on systems or equipment, no uncontrolled openings in previously cleaned or flushed systems or components.

Significant Items Examined and Results:

- a. Fire Equipment: The inspector verified on a sampling basis that licensee inspections of CO₂ and Ansul fire extinguishers had been performed on a monthly and annual basis as prescribed by National Fire Protection Association (NFPA) Code 10, 1978 Edition -- Standard for Portable Fire Extinguishers and that the locking wire and seal had not been tampered with. The following extinguishers were examined:

<u>Date</u>	<u>Extinguisher (Serial #)</u>	<u>Location</u>
September 5, 1980	R373232 (CO ₂)	Control Room
September 5, 1980	R855950 (CO ₂)	Control Room
September 5, 1980	R855748 (CO ₂)	Control Room

- b. Component Tagging: The inspector verified on a sampling basis that the licensee's implementation of the tag permit system was in accordance with AD-00-030 Revision 0, Protective Permit and Tag System. The following tags and tag permits were examined:

<u>Date</u>	<u>Permit Number</u>	<u>Equipment/Breaker Number</u>	<u>Location</u>
September 4, 1980	1-80-1664	Valve 1F007A	Containment El. 749
September 4, 1980	1-80-1664	Valve 1F007B	Containment El. 749
September 5, 1980	1-80-2038	Core Spray Pump A	Control Room El. 729
September 5, 1980	1-80-2038	Core Spray Pump B	Control Room El. 729
September 5, 1980	1-80-2038	Core Spray Pump C	Control Room El. 729
September 5, 1980	1-80-2038	Core Spray Pump D	Control Room El. 729

- c. Log Reviews: The following logs were reviewed for completeness on the dates indicated:

1. Startup Work List (SWL)
 - (a) Recirculation System (August 12, 1980)
2. Control Room Operator Log (August 13, August 18, 1980)
3. Shift Supervisor Log (August 2, August 3, August 11, August 12, August 18, August 25, August 28, September 1, September 2, September 3, 1980)
4. Temporary Modification Log - 24 VDC Battery

- d. Security: Temporary security measures were incorporated to restrict passage onto the refueling floor (818' elevation) of the Unit 1 Reactor Building while placing internals in Unit 1 Reactor Vessel. The inspector verified on August 14 and August 28, 1980 that security measures were in effect, and that no unauthorized personnel were in the areas.

No unacceptable conditions were identified.

3. Preoperational Test Review

- a. Standby Liquid Control System (SLCS)

1. References:

- (a) Preoperational Test P53.1 Revision 1 approved July 28, 1980
- (b) FSAR Section 7.4.1
- (c) FSAR Section 14.2.12.1
- (d) FSAR Section 9.3.5
- (e) Regulatory Guide 1.68 Revision 1

2. The inspector reviewed reference (a) to verify the procedure assured that the SLCS was designed to meet the requirements of references (b) through (d) and addressed all items identified in reference (e). The inspector noted that the name plate data for the system relief valves, and heat tracing capacity were not entered in applicable portions of the test. The General Electric STO Lead Engineer stated that this was due to writing the procedure prior to the information being available and that the data would be entered prior to performance of the test.

The inspector also noted that during performance of Sections 7.3.7 and 7.3.8 when water was actually being pumped into the reactor vessel by the SLCS, a verification of actual reactor pressure vessel level rise due to the SLCS was not performed.

The inspector also noted that Regulatory Guide 1.68 Revision 1, Appendix A, Paragraph 1.b (3) stated that a verification of the proper mixing of solutions for the SLCS should be performed as part of the preoperational test. P53.1 Revision 1 did not address this requirement, but stated that mixing would be done at a later time by Plant Operations using Procedure OP-53-001.

The General Electric STO Lead Engineer acknowledged the inspector's concerns and incorporated them all into Revision 2 of P53.1. This revision is being reviewed by the Test Review Board (TRB), and will be reviewed by the NRC during a subsequent inspection. (387/80-20-01)

b. 24 Volt DC System

1. References:

- (a) Preoperational Test P75.1 Revision 1 approved August 22, 1980
- (b) FSAR Section 8.3.2
- (c) FSAR Section 14.2.12.1
- (d) Regulatory Guides 1.6, 1.32, 1.41, 1.81, 1.93 and 1.129
- (e) Regulatory Guide 1.68 Revision 1

2. The inspector reviewed reference (a) to verify that the procedure assured that the 24 Volt DC System was designed to meet the requirements of references (b) through (d) and addressed all items identified in reference (e). The inspector verified, except as noted, that the following system functions were reflected in the test procedure:

- Operation of system components - chargers
- Review of design vs actual system load conditions
- Battery operation
- Proper setpoints for component protective functions
- Proper system configuration such as load distribution and breaker alignment

The inspector identified the following discrepancies relative to the aforementioned criteria.

The inspector noted that FSAR Section 14.2.12.1 Test Abstract for P75.1 contained similar discrepancies to those found in the Test Abstract for the 125 Volt DC System Test P2.1. The first discrepancy in the test abstract concerns the conduct of the battery charger test by recharging of the 24 Volt DC batteries after the Battery Service Test instead of after the battery performance test. The second discrepancy

in the test abstract concerns the lack of an installed Hydrogen Monitoring System as discussed in the test abstract. The licensee committed to submit an FSAR Revision request to correct the test abstract. The FSAR Revisions will be reviewed during a subsequent inspection. (387/80-20-02)

The inspector found that certain Regulatory Guides committed to in FSAR Section 8.3.2 were not incorporated as references in P75.1. The Regulatory Guides not addressed included 1.6, 1.32, 1.41, 1.81 and 1.93. The licensee committed to incorporate these Regulatory Guides in P75.1. The Test Procedure Revision will be reviewed during a future inspection. (387/80-20-03)

The inspector noted that P75.1 Test Abstract "Test Objective" section states that one test objective is to demonstrate that alarms operate and annunciate at their specified abnormal condition. Regulatory Guide 1.68 Appendix A Section 1.g.(4) states that preoperational testing should demonstrate operation of instrumentation and alarms used to monitor system availability. P75.1 Section 4.2.3 includes alarm verification as a test prerequisite. Appendix I to P75.1 lists the system alarms that are tested in accordance with Integrated Startup Group Technical Procedure TP 1.9. The inspector determined that the Plant Test Review Board (TRB) did not review TP 1.9 and did not normally review the results of TP 1.9 Alarm Testing. In addition the inspector determined that there was no Quality Control Inspection of the Alarm Testing activities. On September 5, 1980 at an NRC exit interview the inspector informed the Licensee Management, including the Acting Superintendent of Plant, and the Integrated Startup Group Supervisor of the apparent discrepancy between the FSAR commitment and actual practices regarding Alarm Testing. The licensee representative committed to a review of Technical Procedure 1.9 by the TRB and stated that FSAR Section 14.2.12.1 would be reviewed for possible revisions. The inspector stated that the discrepancy between the FSAR commitments regarding Alarm Testing and current practices was considered an unresolved item pending further review by the NRC. (387/80-20-04)

4. Preoperational System Implementation Controls

a. Recirculation System Turnover

1. References:

- (a) Turnover packages 164.A.0.1, 164.B.1.1, 164.B.2.2, 164.C.2.2, 164.D.2.2
- (b) FSAR Section 5.4.1
- (c) FSAR Section 3.6.2.2.2
- (d) Startup Manual Administrative Procedure AD6.1 Revision 6 - System/Component Turnover to PP&L
- (e) P&ID M-143 Revision 9, Scoped
- (f) Startup Work List (SWL) for Startup System 164 - Recirculation System

The inspector reviewed references (a) through (f) and conducted tours on August 12, 1980. The purpose of this inspection was to perform the following:

1. Verify that jurisdictional controls were observed for system turnover.
2. Verify turnover tagging was accomplished consistent with jurisdictional controls.
3. Verify by review of turnover logs, records and drawings that jurisdictional controls are observed.

The inspector noted that one subsystem 164.B.3 had not yet been turned over. The inspector questioned whether this subsystem, which included recirculation system suction and discharge piping would be turned over prior to the Integrated Hydrostatic Test. The NSSS Startup and Test Group Leader and the Integrated Startup Group Supervisor stated the subsystem will be turned over prior to the hydrostatic test. The turnover of subsystem 164.B.3 will be inspected during a subsequent NRC inspection. (387/80-20-05)

During the inspector's review of the turnover exception list for subsystem 164.A.0.1 it was noted that item number 6010 discussed a problem with the minimum bending radius being exceeded for safety-related cable EK1Q4102M at terminal box TB 1F009A and TB 1F009B. The turnover exception list did not indicate whether a Nonconformance Report (NCR) had been issued for this condition. The inspector inquired into whether an NCR had been issued. A NCR had not been issued. The inspector interviewed the Bechtel Quality Control (QC) Inspector who had originally discovered the discrepancy with the cable during turnover. The QC Inspector stated that two Field Engineers accompanying him on the system walkdown had corrected the minimum bending radius problem there at time of walkdown by adjusting cable, and he did not feel an NCR was justified. The NRC Inspector asked if personnel who performed adjustment were properly qualified to make engineering judgement that

cable was acceptable after minimum bending radius was exceeded. This item will remain unresolved pending further review. (387/80-20-06)

The inspector reviewed the Startup Work List (SWL) for the recirculation system and discovered many items listed on the subsystem turnover exception lists which had not been entered on the SWL. For example subsystem 164.B.2.2 had been turned over and accepted by the licensee on July 2, 1980 and no turnover exception items had been entered onto the SWL at the time of the inspection.

Startup Administrative Procedure AD6.2, Revision 6 states in part 5.1 that upon initial turnover of a particular system all outstanding exceptions, as identified on the Turnover Exception Form are entered on the SWL. This item was brought to the attention of the NSSS Start-up and Test Group Leader who had the SWL brought up-to-date.

b. Test Program Status

The inspector held discussions with the following Licensee Representatives:

- Assistant Project Director
- Project Construction Manager
- Plant Superintendent
- Assistant Plant Superintendent
- Resident NQA Engineer
- Operations QA Supervisor
- Operations Staff Assistant
- ISG Supervisor
- Assistant ISG Supervisor
- ISG Coordinator; and,
- Other Licensee Representatives including the G.E. Startup Supervisor and the Hydrostatic Test Director

Discussions were held, and visual observations made, of the following items and areas:

- Plant management and status
- Test Program status
- Test Procedure status
- Construction Program Status
- Preparations and status of vibration analysis and assessment of reactor pressure vessel internals

- Preparations for hydrostatic testing of reactor pressure vessel and main steam lines; and,
- Inspector followup items in the preoperational test area

Discussions also included such items as freeze protection, loose parts monitoring system and snubbers, hangers, pipe supports and restraints.

References:

References used for the discussions and visual observations included the following:

- Technical Procedure 2.16, Revision 2, July 29, 1980, Reactor Pressure Vessel Internals Vibration test;
- Final Safety Analysis Report;
- Regulatory Guide 1.68, Initial Test Program for Water Cooled Nuclear Power Plants;
- Regulatory Guide 1.20, Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing;
- G.E. Preoperational Test Program Specification 22A2271 AX Revision 0, G.E.-17, Reactor Vessel Flow Induced Vibration Test;
- G.E. Preoperational Specification 22A5703, Revision 0, Vibration Test and Inspection Program;
- Susquehanna Startup Administrative Manual;
- Susquehanna Startup Technical Manual;
- SSES Integrated Project Schedules;
- SSES Master Milestone Schedule;
- SSES Organization Charts;
- Test Procedure Listing and Status Schedules;
- Preoperational and Acceptance Test Matrix;
- SSES Reactor Vessel and Associated Piping Hydrostatic Test, Revision 0, FC1-M-169;
- G.E. Design Specification 22A2925, Revision 6, Nuclear Boiler System;
- Drawing FC1-M-169, Revision 0, Hydrostatic Test System Composite;
- Drawing M-141, Revision 11;
- Drawing M-142, Revision 8;
- Drawing M-101, Revision 11;
- Drawing M-139, Revision 4
- Drawing M-143, Revision 9
- Drawing M-144, Revision 9
- Drawing M-148, Revision 8



- Drawing M-149, Revision 13
- Drawing M-155, Revision 12
- Drawing M-152, Revision 13
- Drawing M-151, Revision 15
- NSSS Hydrostatic Test Organization Chart

Significant Items Examined and Results:

-- Management Organization and Status

The inspector discussed the licensee's organization plan with management, and the newly filled positions by key personnel including duties and responsibilities. No unacceptable conditions were identified.

-- Construction and Test Program Status

Discussions were held with construction and startup group representatives on status of construction and test program schedules including schedule projections, turnovers, milestones, testing program requirements and implementation. Also included in the discussions were items of preoperational and acceptance tests, test scheduling and test sequencing.

-- Test Procedure Status

The inspector discussed the status of preoperational and acceptance test procedures using the latest test matrix. Included in the discussions were test procedure reviews, approvals, scheduling and sequencing. The inspector emphasized the need to ensure that the procedures are received in time to allow timely review and development of NRC comments and concerns.

-- Vibration Testing

The inspector discussed the reactor vessel flow induced vibration test for the preoperational vibration inspection and flow excitation of reactor internals. The discussions included preflow vessel internal inspection (after flush and before hydro) and postflow vessel internal inspection (after hydro and flow testing). The discussions resolved the inspector's questions and concerns.

-- Hydrostatic Testing

The inspection held discussions with the Hydro Test Director on the scope and conduct of the hydrostatic test of the reactor pressure vessel and main steam lines. The inspector's questions, concerns and items of discussion were adequately addressed by the licensee's representative.

In the above discussions, the inspector expressed his questions and concerns to the licensee in each of the areas covered. No unacceptable conditions were identified.

5. FSAR Comparison to As-Built

a. Control Rod Drive System

The inspector reviewed the Control Rod Drive (CRD) scram discharge volume system and compared it with FSAR Section 4.6.1.1.2.4.2.5. The FSAR describes the scram discharge instrument volume as being one volume with six level sensors attached to it. The inspector reviewed the system and found the system is comprised of two instrument volumes connected via a 2" vent line and a 2" drain line. The North instrument volume has four level sensors attached to it: a low level alarm sensor, a Rod Block Monitor (RBM) sensor and two sensors for input to the Reactor Protection System (RPS). The South instrument volume has only the two RPS level sensors. If this South discharge instrument volume began filling up at a greater rate than the drain line could drain, or a blockage in the drain line occurred, no low level alarm, and no Rod Block would occur. The inspector questioned the adequacy of this design. The General Electric ST0 Lead Engineer stated a review of the system in response to IE Bulletin 80-17 was in progress and recommendations on how to upgrade the system would be given to the licensee. The NRC will evaluate the adequacy of this design and any modifications to the system in a future inspection. (387/80-20-07)

b. Core Spray System

1. References:

- (a) FSAR Section 6.3.2.2.2
- (b) FSAR Section 7.3.1a.1.5
- (c) P&ID M-152 Revision 13

2. FSAR Comparison

(a) On September 3, 1980 the inspector reviewed references a, b, and c, and compared reference c to Figure 6.3-4 in the FSAR. The inspector noted that Figure 6.3-4 had not been updated with recent revisions to the P&ID. This lead to minor discrepancies between the two drawings. The Licensing Supervisor stated he intended to update this FSAR drawing. This item will remain unresolved pending review of the updated FSAR drawing. (387/80-20-08)

(b) Section 7.3.1a.1.5.10 of the FSAR states:

There are no control and instrumentation components for the CS system that are located inside the primary containment that must operate in the environment resulting from a LOCA.

The inspector determined that there are six valves located inside containment which have valve position indication transmitted to the Control Room. The six valves are the following:

- (1) 1F006A
- (2) 1F006B
- (3) 1F007A
- (4) 1F007B
- (5) 1F037A
- (6) 1F037B

The NRC position on environmental qualification of stem mounted limit switches and valve position indication switches was discussed in IE Inspection Report 50-387/79-08. The inspector questioned whether these valve position indication switches are environmentally qualified. This item will remain unresolved pending review of proper documentation of environmental qualification of these switches. (387/80-20-09)

6. Startup Field Reports

The inspector reviewed the licensee's system for identifying and documenting problems identified by Integrated Startup Group Personnel which require engineering resolution. This review was conducted to verify compliance with commitments in the PSAR Appendix D, the FSAR and NRC Requirements. The inspector reviewed Startup Administrative Procedure AD6.3, Revision 4, Startup Field Report.

AD6.3 provides a method for documenting and resolving design deficiencies. The inspector identified the following discrepancies.

The inspector noted that Section 3.0 of AD6.3 states that design change requests that constitute a change or addition to the original design intent are reported to Bechtel Engineering through PP&L Engineering by submitting a Design Modification Request in accordance with Power Production Department Instruction (PPDI) 2.3. The inspector was informed that the PPDI's were being superseded by Nuclear Department Instructions. The inspector stated that AD6.3 needed to be revised to include reference to the NDI when issued. (387/80-20-10)

The inspector reviewed a sample of open and closed SFR's to verify compliance with AD6.3. SFR's reviewed included Nos: 900, 901, 906, 909, 969, 970, 981 - 984, 990, 996, 999, 1008 - 1010, 1012, 1014, 1016, 1017, 1020, 1023 - 1025, 1027, 1028, 1034, 1048, 1049, 1058, 1059, 1063, 1065, 1279, 1288, 1294, 1308, and 1330.

The inspector determined that certain SFR's addressed problems that appeared to meet the definition of a nonconformance found in Plant Administrative Procedure AD-00-033 Nonconformance Control. The SFR's were Nos. 970, 1020, 1034, 1059, 1308 and 1320. The inspector stated that the use of the SFR in lieu of a Nonconformance Report appeared to be a misapplication of the licensee's QA Program similar to the Item of Noncompliance identified in Inspection Report 387/80-14 (Item 80-14-10). In addition work completion documented by an SFR only received no quality control inspection. The inspector stated that the use of SFR's in lieu of NCR's was considered unresolved. The inspector informed licensee management that this matter would be re-examined during followup on the aforementioned Item of Noncompliance. (387/80-20-11)

The inspector found that three of the SFR's reviewed described conditions that may be reportable in accordance with 10 CFR 50.55(e) or 10 CFR 21. These three SFR's were entered in the appropriate system Startup Work List in accordance with Administrative Procedure AD6.2 "Startup Work List." Form AD6.2-1 Item 8 requires a preliminary evaluation by Integrated Startup Group Personnel to determine if the item entered on the Startup Work List (SWL) is considered to be a reportable deficiency. The three SFR's identified by the inspector were:

<u>SFR NO.</u>	<u>SWL NO.</u>
970	45.269
1058	64.75
1320	64.498

The inspector inquired if the licensee had reviewed these items for reportability beyond that required by the Integrated Startup Group. This matter is unresolved pending the licensee's further review of these SFR's. (387/80-20-12)

7. Possible Contamination of Recreational Lake by Sodium Chromate - Susquehanna Unit 2

On August 19, 1980, the licensee reported to the NRC two measurements of chromate ion concentration of 1.4 and 0.38 parts per million (ppm) in settling basins onsite. The chromate contamination resulted when sodium chromate being used as a corrosion inhibitor in a Unit 2 residual heat removal heat exchanger entered the reactor building sump through an open drain valve and was subsequently pumped to the settling basins. The settling basins drain to a man-made recreational lake on the licensee property. The lake is open to the public for various activities including fishing. Lake overflow goes to the Susquehanna River, a source of drinking water for downstream communities. The EPA National Interim Primary Drinking Water Regulations establish 0.05 ppm as the maximum contaminant level for the chromium ion.

Samples of water taken from the recreational lake on August 18 indicated 0.07 ppm chromium ion concentration. Appendix A to the EPA National Interim Primary Drinking Water Regulation states that naturally occurring levels of chromium in drinking water range from 0 to 0.08 ppm. The level of the lake is below the breast of the dam which forms it and there has been no flow of lake water into the Susquehanna River. The licensee took samples of settling basins and lake silt on August 19 for chromium analysis. The recreational lake was closed to the public on August 19, 1980.

8. Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance, or deviation. Unresolved items disclosed during the inspection are discussed in paragraphs 3.b.2, 4.a, 5.b.2 (2 items), and 6.

9. Exit Interviews

At periodic intervals during the course of this inspection, meetings were held with facility management to discuss inspection scope and findings.