U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-387/85-02

Docket No. 50-387 (CAT C)

License No. NPF-14

Licensee: Pennsylvania Power and Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Facility Name: Susquehanna Steam Electric Station

Inspection At: Salem Township, Pennsylvania

Inspection Conducted: January 11-16, 1985

Inspectors: Eugene M. Kelly — March 21, 1985
E. Kelly, Project Engineer — Date

Approved by: Jack Strosnider — March 27, 1985
J. Strosnider, Chief, Reactor Projects Section 1C, DRP — Date

Inspection Summary: Inspection on January 11-16, 1985 (Report No. 50-387/85-02)

Areas Inspected: A special region-based inspection (29 hours) of Unit 1 design change packages (DCPs) for eight modifications to be installed at the first refueling outage, and DCP-82-174C associated with the addition of Safety Parameter Display System (SPDS) interface circuits was conducted. Plant Change Notices (PCNs) issued against the above DCPs were categorized and compared with a similar critique conducted by PP&L's Resident Engineering Group. Details and disposition of NCR 83-152 related to the upgrade of the Transient Monitoring System (TMS) were reviewed.

Results: PCNs associated with eight DCPs to be implemented at the upcoming outage were found to be primarily generated to document conduit and cable routing, clarify installation instructions or editorial errors, correct tolerances and interferences, and address material/procurement problems. The modifications for SPDS and TMS contained evidence of discrepancies between as-built internal cabinet terminations and Class 2 connection/wiring diagrams. Drawing E-503, Sheet 30 (Rev. 1, 11/29/83), for wiring and terminations within Unit 1 Operating Benchboard Cabinet 1C651, was found to not reflect as-built plant conditions. Unresolved item 85-02-01 was initiated to address the extent and significance of as-built discrepancies with Class 2 internal panel wiring diagrams.

DETAILS

1. Principals Contacted

C. Ballard, Senior Project Engineer - NPE
R. Byram, Technical Supervisor
R. Saccone, Senior Project Engineer, Resident Engineering
T. Delpiaz, Installation Engineering Supervisor
R. Prego, NQA Operations Supervisor
J. Todd, Compliance Engineer
A. Derckas, Senior Quality Engineer - NPE
G. Butler, I&C - Computer Supervisor

Also, interviews and discussions were conducted with additional licensee personnel to obtain information pertinent to this inspection.

2. Scope

Ten design change packages (DCPs) to be implemented at the Unit 1 refueling outage beginning in February 1985 were reviewed with the responsible NPE (Allentown) engineer and a cognizant onsite Installation Engineering Group (IEG) representative. Work on packages for which installation has already been started (and accessible) was observed in progress.

Each DCP was reviewed for completeness (conformance to NDI-15.2-1), technical adequacy, thoroughness of the safety evaluation, and the number/type of design documents affected. Particular note was made of the number of Plant Change Notices (PCNs) issued against those drawings affected by a design package. When a DCP is approved and issued by NPE to the field, each affected drawing has an associated Interim Drawing Change Notice (IDCN) which details the change(s). The IDCN is a design output document, and it is not revised. If changes to the approved DCP are required, then PCNs are issued against the IDCNs. PCNs in the nine packages reviewed were classified according to number and reason, and compared against the results of a March 7, 1984 study conducted by NPE Resident Engineering Group. That review was in general agreement with the results of the NPE study. This inspection then focused upon those PCNs generated to correct as-built discrepancies between the physical plant configuration and the drawings. Evidence was found that there exists configuration control problems with class 2 connection and wiring diagrams.

Also reviewed was the disposition and details associated with NCR 83-152 issued on February 28, 1983. This NCR concerned the as-built documentation of the Transient Monitoring System, which monitors data utilized for Technical Specification surveillances and post-scram evaluations.

3. Resident Engineering Critique

The results of a study conducted by NPE Resident Engineering after the inter-tie outage were documented in a March 7, 1984 memorandum (RE-921) to the Manager - NPE. Excluding work done on SPDS, a total of 599 PCNs (associated with 100 DCPs) were classified into 16 categories in order to assess the root cause behind each change. The study concluded that no one major cause could be attributed to the number of PCNs issued, nor could any obvious corrective action be proposed.

The principle problem cited by the study was the delay experienced in processing PCNs - this was expected to be corrected by changes to NPE procedures, as well as experience gained from the outage by Installation Engineering. None of the 16 categories contained more than 12 percent of the total, except for drafting errors (14½%) which were attributed to the priority associated with updating drawings. The category of minor design errors had 11% (66 PCNs) of the total and were judged to be minor and already adequately controlled by procedures. More than half of the total were accounted for by: administrative reasons or clarification (12%); ease of construction (11½%); interferences (10%); materials or procurement constraints (7%); intentional documentation of field-routed conduit or cable (7%); and minor details (5%). As-built discrepancies were found to account for about 5% (32 PCNs) of the total and were encountered usually with internal cabinet terminations and/or non-Q systems.

The Resident Engineering survey recommended some reduction in the number of PCNs by use of an advanced constructibility walkdown and other measures. The number of PCNs for any particular DCP was a function of the type and complexity of the modification, and could not be correlated to any major trend or problem.

4. Modifications

4.1 DCP-82-0578, Scram Discharge Volume

This design change completed a partially-implemented package (DCP456.1) to enhance the scram discharge instrument volume in accordance with IE Bulletin 80-17 by adding diverse and redundant level instrumentation (and alarms) and vent/drain line isolation valves.

This modification affected over 150 design documents; 32 of these were Class 1 drawings and 96 were Class 2 drawings. At the time of this inspection (since installation is continuing), there were 28 PCNs issued against various affected drawings. The majority of these (nine) PCNs were associated with the Bill of Materials - none were explicitly related to as-built discrepancies. One PCN (84-5276) was against a GE wire list, drawing number M1-H12-543, to depict a spare eighth contact not shown on the drawing.

IDCN-1 against drawing E503, Sheet 30, for wiring and terminations within the Unit 1 Operating Bench Board Cabinet 1C651, was found to depict a wiring condition that does not currently exist. Cables 1C635 and 636 are shown to be terminated on strip TBQQ at contacts 49 through 60; yet, these connections have not been made, and the drawing is dated Revision 1, November 29, 1983. Further, this condition has been recognized for some time, since the Senior Design Review Board's May 30, 1984 review of DCP 82-0578 recommended that the installer confirm all existing wiring conditions prior to initiation of work. The turnover of this partially-completed modification, from Bechtel to PP&L, had apparently included a number of as-built drawings which would only be representative of the as-built wiring terminations upon implementation of the modification.

The extent and significance of Class 2 electrical wiring and termination drawings of this type, indicative of configuration control problems, is unresolved (85-02-01).

4.2 DCP-82-761, Diesel Air Dryers

This design change provides two compressor air-receiver trains per emergency diesel generator set for long-term air start reliability by minimizing corrosion products in the starting air subsystem. The modification is in response to an FSAR commitment and license condition.

The modification affects approximately 100 design documents; however, the package is being installed as a non-Q item. There were 30 PCN's issued against these drawings, none being related to as-built discrepancies. This installation was observed by the inspector, with no discrepancies noted.

4.3 DCP 83-267, RHR Heat Exchanger

This design change installs temperature indicators in the main control room for RHR heat exchanger outlet temperature to fulfill a Regulatory Guide 1.97 commitment.

The modification affects 50 drawings and has 15 PCN's issued. One PCN, affecting drawing E-502, Sheet 24, corrected a typographical error in control room panel 1C601. None of the PCN's were found to represent configuration control problems, and installation details were observed to be accurately represented on design drawings. The safety evaluation associated with this modification was clear and thorough, and the Safety Impact Item (SII) review was based on a prior system walkdown.

4.4 DCP 83-064, Reactor Vessel Level and Pressure

This design change installs new wide range level and pressure instrumentation (and extended range level), including control room indicators and recorders (with computer input signals), in accordance with Regulatory Guide 1.97 commitments.

The modification affects 194 drawings, 22 of which are Class 1. There were approximately 74 PCNs issued against these drawings, most (37) of which relate to material availability constraints affecting the Bill of Materials. The rest were indicative of welding/installation details, conduit and support routing, interferences and conduit and penetration clarifications. Two of those PCNs were written to correct nomenclature errors, but none were indicative of configuration control problems.

4.5 DCP 83-331A, Drywell Spray Flow Indication

This design change installs flow measuring instrumentation for drywell and wetwell spray systems, in accordance with Regulatory Guide 1.97 commitments:

The modification affects 60 drawings, 10 of which are Class 1, with 32 PCNs issued to date. None of those PCNs were indicative of configuration control problems. Wiring details were observed at Upper & Lower Relay Room cabinets 1C661-A2 and B1, and found to be in conformance with their respective Class 2 termination drawings.

4.6 Other Design Packages

The following DCPs were reviewed, with particular note of drawings affected and PCNs issued. No instances of configuration control problems were found:

DCP	Title	Drawings Affected	PCNs
83-187	New ARMs	60	42
83-266	Containment Instrument Gas Pressure	55	22
82-648	125VDC Trouble Alarm	13	8

4.7 DCP 82-174C, Safety Parameter Display System (SPDS) Interface Circuits

This design change is one of approximately 22 packages, originally begun in July 1982 by Bechtel, as part of the installation of SPDS. DCP 82-174C effects the tie-in from existing field sensors to the SPDS cabinets in the Upper & Lower Relay Rooms, of 108 analog points on each Unit (and 12 common points). The package was completed and closed out on December 31, 1983.

The modification was extensive, affecting 250-300 drawings which were principally electrical loop schematics or connection diagrams. Approximately 104 PCNs were issued against these drawings, and many (estimated to be at least 30) were indicative of discrepancies between wiring in the field and existing termination drawings. These included: 3 or more wires on a terminal, spare terminals already found used, disagreement between wire list and computer points, and termination point discrepancies.

This modification has been completed, however, the agreement between as-built wiring conditions and affected termination drawings had not been ascertained as of this inspection. The status of configuration control, with regard to this modification, will be followed as part of unresolved item 85-02-01.

5.0 Nonconformance Report (NCR) No. 83-152

This NCR was issued on February 28, 1983, for a procedural violation involving issuance of an Interim Drawing Change Notice (IDCN), affecting the Transient Monitoring System (TMS), without an approved Plant Modification Record (PMR). Plant modifications were being performed (i.e. drawing changes to reflect as-built), using unapproved or incomplete IDCNs to wire the TMS. without having developed the proper design package (PMR, DCP etc.).

The original disposition of this NCR was to prepare drawing change notices (DCNs) to rectify the as-built discrepancies. However, this solution was revised by an April 26, 1984 NPE memorandum (PLI-32623) which initiated a request for modification that became approved as PMR 85-3011 (Unit 1) and PMR 85-3013 (Unit 2). These packages are still in development, and a walkdown of TMS is planned to update the as-built drawings and upgrade the TMS into a permanent plant system. The TMS is not a safety-related system, but is used to monitor plant performance, including evaluating operating and shutdown transients, as well as for Technical Specification surveillances and post-scram evaluations.

A review of the documentation associated with this NCR indicated that a number of differences are recognized between the TMS panel internal wiring and plant drawings and, yet, are currently uncorrected. The NCR contained an estimated 40 Class 1 drawings such as connection diagrams (E395), schematic and block diagrams (E303), and instrument location sketches. Another estimated 25 Class 2 drawings were included as part of the NCR, these including wire routing (J72) and connection diagrams (E345).

Class 1 drawings at Susquehanna are defined by NDI Procedure QA-15-2.4 (Revision 1) to be those required to support routine, abnormal, or emergency plant operations. There are approximately 5,000 Class 1 drawings. Class 2 drawings are those other than Class 1 (listed in QA-15.2.4) and are defined as necessary to perform maintenance or support plant modifications. There are approximately 53,000 Class 2 drawings at Susquehanna.

The status of this modification, particularly with respect to recognized as-built wiring discrepancies, will also be followed as part of unresolved item 85-02-01.

6.0 QA/QC Interface

The inspector reviewed the results of the licensee's NQA audit of the plant modification program on July 31 - September 7, 1984. Audit IA-84-13 was summarized in an October 26, 1984 memorandum (PLI-36100), and detailed 15 findings (requiring corrective action) and 14 recommendations. The audit assessed General Office and plant modification activities, including: (1) processing of RFM's; (2) control of design process by NPE; (3) installation in the field; and (4) closeout of packages and drawing updates. The audit found the current program to be well-defined and effectively implemented; however, the close-out process was found to be not timely in the updating (as-building) of design documents affected by modification, in that there existed, at that time, a backlog of 300 packages awaiting closeout. Discussions with the licensee indicated that the backlog was as a result of: (1) recent turnover of drawings to PP&L from Bechtel; (2) large amount of design work during the February 1984 inter-tie outage; and (3) the priority applied to updating Class 1 drawings.

The NPE response to the audit findings was provided on December 4, 1984. The audit had no findings related to configuration control programs, and the inspector had no further questions.

7.0 Management Meeting

The scope and findings of this inspection were discussed with licensee representatives at an exit interview conducted on January 16, 1985.