

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos. 50-387/87-11; 50-388/87-11
Docket Nos. 50-387; 50-388
License Nos. NPF-14; NPF-22
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: May 19, 1987 - June 30, 1987

Inspectors: L. R. Plisco, Senior Resident Inspector
J. R. Stair, Resident Inspector

Approved By: J. T. Wiggins, Chief, Reactor Projects
Section 1B, DRP

7/16/87
Date

Inspection Summary:

Areas Inspected: Routine resident inspection of plant operations, radiation protection, physical security, plant events, previous inspection findings, surveillance and maintenance.

Results: Control of temporary modifications (bypasses) is satisfactory (Detail 2.3); two recirculation pump trip transients occurred on Unit 2 (Detail 3.3); containment isolation valves were identified which do not have the proper power supply (Detail 3.4); the turbocharger failed during post-maintenance testing on the 'A' diesel generator (Detail 5.2); the control room environment was found to be professional (Detail 6.0); and a management meeting was held in NRC Region I.

No violations were identified.

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DETAILS

1.0 Followup on Previous Inspection Findings

1.1 (Closed) Inspector Followup Item (387/84-22-05): Control of Bypasses

In July 1984, the inspector identified a number of deficiencies with the licensee's program for control of bypasses (i.e. jumpers, lifted leads). Among the deficiencies were Operations not performing reviews of the bypass log every month to ensure that bypasses greater than 180 days old were dispositioned, work groups not providing written response to the operations log review, and some bypasses greater than 180 days old had not been dispositioned.

In December 1985, in an update to the open item discussed in Inspection Report 50-387/85-35, the inspector re-audited the bypass log and found additional discrepancies. The inspector noted that several monthly reviews had not been performed, work groups were not consistently providing responses for bypasses greater than 180 days old, and independent verifications were not being performed as specified in ANSI N18.7. The inspector also noted that there was not an emphasis on permanently implementing or removing the older bypasses.

Administrative Procedure AD-QA-307, "Electrical and Mechanical Bypass Control" was revised in November 1986 to address the majority of the concerns. The revised procedure more clearly defines responsibilities in the control of bypasses, requires the responsible work group to update the status of all open bypasses and submit a report to PORC every three months, and requires independent verification of installation and removal.

As discussed in Detail 2.3 of this report, a thorough review of the bypass control system was conducted. The monthly reviews are now scheduled as a PM activity to ensure their completion. The requirement to disposition bypasses within 180 days has been deleted and bypasses now require a safety evaluation, and a quarterly review by the responsible section. The quarterly review updates the closure activity being pursued, scheduled target date for closure, and confirms tag installation. PORC reviews the quarterly update provided by the responsible work groups. The licensee also currently has a Department Performance Indicator concerning bypass status which is being monitored monthly by senior management. Currently there are 140 bypasses open, 34 of which are dated prior to 1985. None of the bypasses prior to 1985 are safety-related.

Based on review of the revised procedure, performance indicators, and implementation of the program this item is closed.



1.2 (Closed) Inspector Followup Item (387/84-37-01): Include Description of Notification System in E-Plan

In November 1984, the inspector noted that the SSES Emergency Response Plan did not discuss the means for providing prompt alerting and notification of response organizations and the population as discussed in NUREG-0654 Appendix 3.

In response to the item, the licensee has now included a description of the Alert Notification System (ANS) in Section 8.5 of the Emergency Plan. The inspector verified that the description is included in Revision 10 of the Emergency Plan dated December 1986.

1.3 (Closed) Inspector Followup Item (387/84-37-02): Interview Shift Supervisors and Revise Emergency Plan Training As Necessary

In November 1984 the inspector recommended, based on interviews, that all shift supervisors be interviewed to identify those areas where additional training would be desirable to assist them to be effective as an Emergency Director during all classes of emergencies.

In response, the licensee conducted interviews with the shift supervisors concerning Emergency Plan training. Based on the results of the interviews, the licensee now conducts emergency response drills during simulator training for the licensed operators once a year. These drills provide additional training and exercise for the shift supervisors in the use of the emergency plan.

1.4 (Closed) Unresolved Item (387/85-02-01): Configuration Control Problems With Class 2 Electrical Connection and Wiring Diagrams

In January 1985, during an allegation followup, the inspector noted evidence of configuration control problems with Class 2 connection and wiring diagrams for internal cabinet terminations. The licensee was requested to address the extent and significance of the discrepancies in a written response to the NRC.

The licensee responded to the unresolved item on June 24, 1985 (PLA-2453). The licensee concluded that the discrepancies identified during the inspection would have no significant impact with regard to the safe operation and maintenance of the plant or the modification design process, and were not indicative of a configuration control problem. The as-built discrepancies of the type found could lead to minor errors in design of modifications involving termination changes or additions in existing equipment, but the installation, inspection and testing process would identify and correct such errors before the system or equipment is returned to service.

With respect to plant operation and maintenance activities, the licensee determined that the known drawing discrepancies would not affect safe plant operation because plant procedures govern the majority of the daily work activities. The only area which provided exposure to the use of drawings with discrepancies was during investigation/troubleshooting activities. In these cases, the licensee would rely on their planners and foremen having an understanding of the plant drawing system to ensure safe operation and corrective action when appropriate. NPE determined that a 2% rate of "as-built" drawing errors existed on the Class 2 connection and wiring diagrams.

In summary, the licensee acknowledged that some discrepancies did exist in the Class 2 drawings, but that their safety significance and impact on plant operations is minimal. Further inspector review of the drawing changes submitted in three subsequent outages did not identify any safety significant drawing errors in the modification process. Based on the outage reviews, this item is closed. The inspectors will continue to monitor plant activities for operating problems resulting from drawing errors in normal inspection coverage.

1.5 (Closed) Deviation (387/85-16-03): No Control Room Indication for Unbypassing Thermal Overloads

In April 1985, the inspector identified that the thermal overloads for forty-five safety-related motor operated valves in the ESW and RHRSW systems could be unbypassed by test switches on Panel OC697 in the control room, but the unbypassing of these overloads was not indicated in the control room. This condition was considered to be contrary to FSAR Section 7.3.1 and Regulatory Guide (RG) 1.106.

As discussed in an update to the open item in Inspection Report 50-387/85-28, the specific condition was not in deviation with Regulatory Guide 1.106. In response to the FSAR discrepancy, the licensee revised paragraph 7.3.1.1b.8.1.2.3 to delete the statement concerning automatically indicated bypasses for the ESW valves in Revision 37 submitted to July 1986. The inspector verified that the FSAR has been updated to reflect the as-built condition.

1.6 (Closed) Violation (388/86-30-01): Failure to Meet Technical Specification LCO for 125 VDC Battery Bank

In December 1986, a Unit 1 battery bank was determined to be inoperable and the battery was not restored within two hours and the common loads were not transferred to the Unit 2 battery as required by Technical Specifications. The root cause was the failure of the Unit 1 Supervisor to recognize the impact of the inoperable battery bank on Unit 2 and inform the Unit 2 Supervisor. The event was also discussed in Unit 2 LER 86-018 dated January 20, 1987.

The licensee responded to the violation on March 11, 1987 (PLA-2813). The corrective actions taken included revisions to alarm response procedures AR-106-001, AR-015-001, and AR-016-00 to direct operator attention to the impact on the Technical Specifications for both units. The operator round sheets (OI-PL-0161 and OI-OL-0162) were also revised so that each notes the dependence of Unit 2 on the Unit 1 systems and directs notification of Shift Supervision. The licensee conducted operator training on the procedure revisions and the event.

The licensee considers the event an isolated case, since only the Unit 1 125 VDC and 4160 VAC systems are required for Unit 2 operability. The inspector noted that the licensee's response only addressed corrective actions related to failure of the buses during plant operation and not for normal maintenance and surveillance activities. The inspector reviewed several battery surveillance procedures, and all of the procedures verified that the common loads were transferred prior to starting the test. The licensee stated that the normal work planning process would ensure review of the Technical Specifications and the impact on common loads to prevent a similar occurrence.

The inspector reviewed the revised alarm response procedures and operator round sheets and records of the operator training. The inspector also discussed with the licensee the clarity of the current Technical Specification, and the licensee currently considers them adequate and no changes are planned. The inspector had no further questions.

2.0 Routine Periodic Inspections

2.1 Operational Safety Verification

The inspector toured the control room daily to verify proper manning, access control, adherence to approved procedures, and compliance with LCOs. Instrumentation and recorder traces were observed and the status of control room annunciators was reviewed. Nuclear Instrument panels and other reactor protection systems were examined. Effluent monitors were reviewed for indications of releases. Panel indications for onsite/offsite emergency power sources were examined for automatic operability. During entry to and egress from the protected area, the inspector observed access control, security boundary integrity, search activities, escorting and badging, and availability of radiation monitoring equipment.

The inspector reviewed shift supervisor, plant control operator and nuclear plant operator logs covering the inspection period. Sampling reviews were made of tagging requests, night orders, the bypass log, Significant Operating Occurrence Reports (SOORs), and QA nonconformance reports. The inspector observed several shift

turnovers during the period and routinely attended work planning meetings. In addition, the inspector conducted midnight shift inspections on May 22 and June 19, 1987, and weekend/holiday coverage on May 25 and June 14, 1987.

No unacceptable conditions were identified.

2.2 Station Tours

The inspector toured accessible areas of the plant including the control room, relay rooms, switchgear rooms, cable spreading rooms, penetration areas, reactor and turbine buildings, diesel generator buildings, ESSW pumphouse, the security control center, and the plant perimeter. During these tours, observations were made relative to equipment condition, fire hazards, fire protection, adherence to procedures, radiological controls and conditions, housekeeping, security, tagging of equipment, ongoing maintenance and surveillance and availability of redundant equipment.

No unacceptable conditions were identified.

2.3 Temporary Modifications (Bypasses)

The inspector performed a review of the licensee's program for controlling temporary modifications or bypasses (i.e. jumpers, lifted leads, etc.) to determine that:

- sufficient controls are applied to ensure that bypasses are correctly installed and removed, including independent verification and functional testing;
- a program exists to periodically review active bypasses;
- bypasses are evaluated in accordance with 10 CFR 50.59 to determine if they involve an unreviewed safety question;
- formal records to account for active bypasses are maintained and reviewed to determine the impact on system operability.

The inspector reviewed AD-QA-307, "Electrical and Mechanical Bypass Control", Revision 7, the Bypass Log, the System Status File, and the Technical Section computer listing of outstanding bypasses. In addition, the inspector checked several active bypass forms to verify the licensee's conclusions regarding applicability to Technical Specifications and verified that bypass tags were in place on the equipment.

The inspectors review indicated that the licensee is satisfactorily controlling the use of bypasses. The administrative controls for bypasses has significantly improved since the last review of this area. (See Detail 1.1) No discrepancies were found with Technical

Specification related bypasses. The inspector checked several bypasses to ensure tags on equipment were in place and legible and all were satisfactory. The following discrepancies were found during the review:

- During a random check of relay room panels, the inspector identified a bypass tag (Tag #1-83-037) dated March 27, 1983 in upper relay room panel 1C644 for a bypass which was closed. The bypass was to open States link FF-84, in order to defeat the Refuel Water Storage Tank Hi-Lo alarm, and the link was still open.
- Bypass 2-83-141, was listed as open in the Bypass Log and was inserted in the System Status File, but this bypass was not being tracked for closure in the Technical Section computer listing. The computer listing stated that the bypass was closed, therefore, the quarterly review of the bypass was not being conducted in accordance with the procedure.
- The incorrect revision of the Bypass Log sheet was being utilized in the control room Bypass Log (both units).
- A random sampling of bypass tags in the plant determined that the bypass tags are not always completed in accordance with the administrative procedures. Reviewed tags were incomplete, with information such as the tag number, date and WA number not filled in the provided blanks.
- Two open bypasses, 1-87-021 and 1-85-095, exist for the same component, Transient Monitoring Point No. 184. Although bypass installation form 1-87-021 documents the fact that the other bypass exists, this method invalidates the administrative controls for the bypasses.

These items are unresolved and licensee actions to correct these discrepancies will be reviewed in a subsequent inspection (387/87-11-01).

3.0 Summary of Facility Activities

3.1 Unit 1 Summary

Unit 1 operated at or near full power for most of the inspection period. Scheduled power reductions were conducted throughout the period for control rod pattern adjustments, surveillance testing and scheduled maintenance. On June 6, the Fifth Diesel Generator was declared operational.

On June 8, power was reduced to approximately 60 percent in order to replace the 'A' Reactor Feed Pump couplings. Following replacement, the feed pump was returned to service and power restored to rated.

3.2 Unit 2 Summary

Unit 2 operated at or near full power for most of the inspection period. Scheduled power reductions were conducted throughout the period for control rod pattern adjustments, surveillance testing and scheduled maintenance.

On June 11 and 12, the 'A' Recirculation Pump tripped on field undervoltage, and the unit operated in single loop at 60 percent power. Following repairs to the recirculation MG set control circuit, power was returned to rated. (See Detail 3.3)

3.3 Recirculation Pump Trip (Unit 2)

At 4:10 a.m. on June 11, while at 100 percent power, the Unit 2 'A' Reactor Recirculation Pump Motor Generator (MG) set tripped on generator field undervoltage. Reactor power decreased to approximately 61 percent as a result of the pump trip. Troubleshooting could not determine the cause of the trip and the licensee began a controlled power reduction at 10:00 a.m. on June 11 in accordance with the requirements of the Technical Specification LCO action statement for single loop operation which requires the unit to be in hot shutdown within 12 hours. Technical Specification 3.4.1.1.1 requires that two reactor coolant system recirculation loops be in operation. The power decrease was halted at 53 percent power and at 1:32 p.m. an attempt was made to restart the recirculation pump. The MG set tripped again on field undervoltage. Power was reduced to 21 percent by 3:00 p.m. in preparation for a manual shutdown. The licensee subsequently determined the cause of the trip to be a failure in the voltage regulator circuitry which resulted in a power transformer failure and caused the associated fuses to blow. The voltage regulator, power transformer, and fuses were replaced and the Recirculation Pump was restarted at 3:20 p.m. The LCO was cleared at 3:50 p.m. and power escalation commenced.

At 9:51 a.m. on June 12, while at 84 percent power the 'A' Reactor Recirculation Pump again tripped on field undervoltage. Power decreased to approximately 62 percent. Initially, the licensee concluded that the voltage regulator control circuit was in need of adjustment and restarted the pump at 2:15 p.m. After speed was increased to approximately 50 percent to perform gain adjustments to the control circuitry, the pump had to be tripped from the control room at 2:43 p.m. due to undamped oscillations in the control circuit. Further troubleshooting found that the stability potentiometer on the new voltage regulator board was not the proper component. The circuit drawings called for a 10K ohm potentiometer, but a 500 ohm potentiometer was installed. The correct component was installed and the pump was restarted successfully at 4:48 p.m. After final adjustments to the control circuit, power ascension commenced, and the recirculation loop was declared operable.

The inspectors observed the troubleshooting activities and the post-maintenance testing with no unacceptable conditions noted.

3.4 Improper Power Supply to Containment Isolation Valve Position Indication (Units 1 & 2)

Two Nonconformance Reports (NCRs 87-0084 and 87-0085) and subsequent Significant Operating Occurrence Reports (SOORS 1-87-080 and 2-87-042) were issued on March 10 and March 20, 1987 respectively, to identify position indicators on the reactor recirculation sample line Containment Isolation Valves (CIVs) F019 and F020, which are not powered from Class 1E station standby power sources.

The licensee's commitment to Regulatory Guide 1.97 Revision 2, as stated by the licensee in a letter to the NRC, dated May 31, 1984, (PLA-2222) requires that position indication be continuously available and powered by Class 1E standby power sources. Contrary to the above, the position indication to F019 and F020 is powered from the RPS supply which is not Class 1E and will trip during a power transient longer than one second in duration. In addition, the licensee discovered that the power source for F019 and F020 valves, as listed in FSAR Table 6.2-12, is incorrect in that the valves themselves are powered by the RPS power supply and not Division I and II standby power. However, F019 and F020 are normally closed valves which are opened only when RWCU is out-of-service and which fail-close on loss of power.

The licensee has conducted a review of the power sources for the other CIVs which are a part of the Nuclear Steam Supply Shutoff System (NSSSS) for similar nonconformances and determined that all other CIVs have emergency, battery or diesel backed sources powering their position indicating lights.

Two Minor Modification Changes (MMCs), 87-188 and 87-189, have been written to switch the power sources to Class 1E vital power, so that position indication will be available post-accident. The licensee expects to have the modifications installed during the Unit 1 Fourth Refueling and Inspection Outage (RIO) and the Unit 2 Third RIO.

Additionally, an FSAR Change Request has been initiated which corrects the listed power source for valves F019 and F020 to RPS 'A' and RPS 'B' respectively.

The licensee has prepared a Justification for Interim Operation which states that the valves will close during a design basis accident on a loss of power, and only the position indication will be lost. This item remains unresolved pending review of the licensee's corrective action (387/87-11-02; 388/87-11-01).

4.0 Licensee Reports

4.1 In-Office Review of Licensee Event Reports

The inspector reviewed LERs submitted to the NRC:RI office to verify that details of the event were clearly reported, including the accuracy of description of the cause and adequacy of corrective action. The inspector determined whether further information was required from the licensee, whether generic implications were involved, and whether the event warranted onsite followup. The following LERs were reviewed:

Unit 1

- *87-015, Loss of Power to Unit 2 Startup Transformer T-20
- 87-016, Reactor Building Zone III Isolation Damper Actuation
- 87-017, SGTS Banana Jack Replacement Causes Unplanned ESF Actuation
- 87-018, Entry Into LCO 3.0.3 for 4KV ESS Bus Degraded Voltage Relay Surveillance
- *87-019, HPCI Declared Inoperable Due to Improper Torque Switch Setting
- 87-020, Loss of Startup Transformer T-10 Due to Lightning Strike

Unit 2

None

*Previously discussed in Inspection Report 50-387/87-09;
50-388/87-09.

4.2 Review of Periodic and Special Reports

Upon receipt, periodic and special reports submitted by the licensee were reviewed by the inspector. The reports were reviewed to determine that they included the required information; that test results and/or supporting information were consistent with design predictions and performance specifications; that planned corrective action was adequate for resolution of identified problems; and whether any information in the report should be classified as an abnormal occurrence.

The following periodic and special reports were reviewed:

-- Monthly Operating Report - May, 1987, dated June 10, 1987.

The above report was found acceptable.

5.0 Surveillance and Maintenance Activities

5.1 Monthly Surveillance Observations

The inspector observed the performance of surveillance tests to determine that: the surveillance test procedure conformed to Technical Specification requirements; administrative approvals and tagouts were obtained before initiating the test; testing was accomplished by qualified personnel in accordance with an approved surveillance procedure; test instrumentation was calibrated; limiting conditions for operations were met; test data was accurate and complete; removal and restoration of the affected components were properly accomplished; test results met Technical Specification and procedural requirements; deficiencies noted were reviewed and appropriately resolved; and the surveillance was completed at the required frequency.

These observations included:

- Surveillance Procedure SO-013-006, 12-Month Fire Protection System Flush and Hydrant Flow Check, performed on June 16, 1987.

No unacceptable conditions were identified.

5.2 Monthly Maintenance Observation

The inspector observed portions of selected maintenance activities to determine that the work was conducted in accordance with approved procedures, regulatory guides, Technical Specifications, and industry codes or standards. The following items were considered during this review: Limiting Conditions for Operation were met while components or systems were removed from service; required administrative approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and QC hold points were established where required; functional testing was performed prior to declaring the particular component operable; activities were accomplished by qualified personnel; radiological controls were implemented; fire protection controls were implemented; and the equipment was verified to be properly returned to service.

These observations included:

- Troubleshooting and Repair of the Unit 2 'A' Recirculation MG Set Controller performed on June 12, 1987. (See Detail 3.3)
- Five Year Overhaul of the 'A' Diesel Generator performed from June 8 to June 30, 1987.

On June 8, 1987, the 'A' diesel generator (D/G) was removed from service for its first 5-year overhaul, being replaced by the 'E' Diesel Generator (D/G) which had been declared operable on June 6, 1987.

As the diesel generator exhaust manifold was being removed a crack in one of the rigid exhaust ports was discovered. The manifold was shipped to the vendor, Cooper-Bessemer, for examination and evaluation, where two additional cracks were discovered in another exhaust port and in the flange to the turbocharger. The vendor was not able to perform the repairs due to not having a certified welder and the manifold was returned to the site for repairs. The root cause of the cracks has not been determined, however, the 'C' diesel generator (D/G) also is suspected of having a crack on one exhaust port as evidenced by a puff of smoke noted during diesel startups.

Scheduled work performed included turbocharger removal and replacement; head removal, inspection and reinstallation; auxiliary and main drive inspections; ESW check and throttle valve inspection; heat exchanger inspection/eddy current testing; motor cleaning; generator inspection; I&C calibrations; rocker arm inspection; and timing check/adjustments. In addition, both the right and left intercoolers were replaced, due to crud buildup, which was not originally scheduled. The intercoolers are supplied by Emergency Service Water which takes water from the station spray pond with makeup from river water.

A two week outage was initially scheduled, which due to complications extended to three weeks before the first test run took place, on June 28, 1987.

During the first test run on June 28, 1987, load swings occurred which caused the diesel to be declared inoperable. In addition, the turbocharger coast down time was noted to be less than normal.

The turbocharger was visually inspected, with no discrepancies found. The diesel governor system was also checked with no discrepancies identified. The operators stated that the load swings occurred when the fuel oil booster pump turned on, but no electrical or hydraulic connection between the two events could be established.

When a second test run took place on June 30, 1987, loads swings appeared to be stabilized, but the diesel tripped on high vibrations caused by a turbocharger failure after approximately eight hours run time. The 'E' diesel generator (D/G) was again substituted for the 'A' diesel generator (D/G), the 'A' diesel generator (D/G) taken out of service and the turbocharger removed for examination.

Initial inspection discovered a damaged blower end radial bearing on the new turbocharger. The licensee is presently evaluating using a turbocharger which was recently returned from Cooper-Bessemer after an overhaul. Two apparent inadequacies exist with the rebuilt turbocharger; insufficient thrust clearance and excessive radial bearing clearance. Both of these concerns must be resolved prior to installation. The licensee will continue to inspect the damaged turbocharger and discuss the problems with the vendor.

The cause of the turbocharger failure and exhaust manifold cracking will be reviewed in a subsequent report (387/87-11-03).

6.0 Control Room Environment

As a result of continuing NRC concerns related to control room environment, at other plants the inspector conducted an assessment of the control room to determine that a satisfactory environment exists in the control room so that the conduct of duty by licensee personnel is not adversely affected.

IE Circular No. 81-02, "Performance of NRC-Licensed Individuals While on Duty", states that the NRC believes that a relationship exists between the professional attitude of a nuclear plant's operating and management personnel and the degree to which the health and safety of the public is protected. The professional attitude is reflected in high standards of performance including pride in the facility as demonstrated by the nuclear power plant staff. Factors making up this professional attitude include knowledge of all aspects of plant status by licensed control room operators, maintaining an orderly and clean working environment, aggressiveness of the operating staff toward preventing operational problems, and correcting observed deficiencies.

In addition, Regulatory Guide 1.114, "Guidance on Being Operator at the Controls of a Nuclear Power Plant", states that in order for the operator at the controls of a nuclear power plant to be able to carry out these and other responsibilities in a timely fashion, he must give his attention to the condition of the plant at all times. He must be alert to ensure that the plant is operating safely and must be capable of taking action to prevent any progress toward a condition that might be unsafe.

6.1 Licensed Operator Professionalism

The licensed operators at Susquehanna exhibit a high level of professionalism during their normal shift routine. The operators are knowledgeable of plant status and have a good questioning safety attitude. They carry out their duties in a business-like manner and maintain good controls over the plant systems. The shift turnover process is thorough, and clearly defined by plant procedures and the turnover checkoff list.

The licensed operators maintain a professional appearance. The operators have a dress code (shirt, tie and slacks). The uniform has enhanced the professional attitude and atmosphere in the control room and also aids less familiar individuals to easily recognize the control room operators.

The shift turnover process described in Administrative Procedure AD-QA-303, Shift Routine, is generally followed. Turnover sheets are utilized for each watch station. The control room turnover normally consists of review of the turnover sheet and the unit log, discussion of evolutions in progress and problems, and a panel walkdown with the offgoing operators. Shortly after assuming the shift, the operator makes another panel tour and completes the system and equipment status sheets. Shift briefings are also conducted by the Shift Supervisor prior to taking the shift. It has been noted by the inspector on several occasions and during periodic NSAG reviews that, although panel walkdowns are being conducted by the Unit Supervisors, they are not always being performed in accordance with the timing and method requirements of station procedures.

The communications practices used by the operating staff are generally good. Administrative Procedure AD-00-116, Station Communication Practices and Guidelines, describes the standard practices that ensure information is effectively transmitted and received. The procedure requires use of the phonetic alphabet and repeat backs. The communications have improved significantly, but the guidance is not consistently followed, especially in the repeat back area. Practices do vary between different shifts.

6.2 Noise Control and Distractions

Potentially distracting activities such as radios, TV, games, and horseplay are prohibited in the control room. Administrative Procedure AD-QA-303, Shift Routine, prohibits these activities and requires all on-shift operators and supervisors to remain alert and aware of the status of their assigned areas at all times. Reading of material that is not directly job related is also prohibited.

Improvements have been made recently in the area of nuisance alarms. The number of alarms received in the control room has been reduced, mainly by modifications or operating practice, which has decreased the background noise and distractions in the control room. The program is ongoing, with more modifications scheduled. The number of sealed-in alarms (constantly lit) has decreased from 35 in 1984 to approximately 10 currently.

The inspector has not noted any distracting activities during control room tours, and has only noted several instances where there was some reading material present which could be considered not directly job related. Some evidence of extraneous reading material



not related directly to plant operation (i.e. technical journals, industry literature) has been identified during inspector tours and NSAG reviews.

Previously, there was a large amount of background noise in the control room caused by the ventilation system, but modifications have significantly reduced the noise level. In addition, changes to the phone system have reduced the background noise caused by incessant phone ringing.

6.3 Control Room Access

Access to the control room is limited to those persons on official business only and loitering in this area is prohibited. The control room access is effectively controlled by administrative means. A positive physical means such as a door, chain, or gate is not utilized. There are no administrative controls on the number of people in the control room, but access is limited at the discretion of the Unit Supervisor. The inspector did not note any evidence of loitering. Permission is required from the control room operators to enter the inner ring panel area, designated "at the controls".

Administrative Procedure AD-QA-300, Conduct of Operations, describes the administrative controls for Control Room access. During normal plant conditions, each Unit Supervisor is responsible for controlling access and conduct of personnel in the control room. Access is to be limited to those individuals having a legitimate reason for being in the control room. The area designated "at the controls" is not to be used to conduct business that can be conducted elsewhere, and permission to enter this area must be received from the plant control operator or Unit Supervisor. During other than normal conditions, access is controlled by the Shift Supervisor.

All necessary plant-related technical/administrative control room business is conducted at a location and in such a manner that neither licensed control room operator attentiveness nor the professional atmosphere is compromised. The licensee recently made a change during an outage to conduct preliminary equipment release activities, tagout and system alignment, at an office adjacent to the control room. This change also significantly reduced the noise level and distractions.

The control room has been recently rearranged such that the Unit Supervisor's desks now face the control room panels and are located closer to the control room "proper". Also, the Unit Supervisor can easily scan the SPDS and DCS displays on his console. This change has made a noted improvement in the Unit Supervisors interface with the shift and monitoring of activities.

6.4 Control Room Housekeeping

The control room appearance is consistently clean and orderly. There is an absence of extraneous materials, and the procedures and materials are appropriately stored and conveniently located. Desk tops are normally clear and routine paperwork does not accumulate.

The control room panels are kept clear of clutter by use of special tag identification devices. Plexiglass covers are used as an operator aid in denoting permits applied or special equipment precautions. Tags are permitted if they can be affixed such that they do not obscure indicating lights or other instrumentation or controls.

Administrative Procedure AD-QA-303, Shift Routine, states that all shifts are responsible for Control Room cleanliness. On a day-to-day basis, the night shift is responsible to ensure the Control Room is clean and orderly.

6.5 Management Oversight

Plant management routinely tours the control room. Daily meetings are held at 7:30 a.m. in the Shift Supervisor's Office with all of the Section Heads. Administrative Procedures require that the Operations Supervisor and Day Shift Supervisor review the shift logs on a daily basis. The inspector noted the Operations Supervisor and/or his staff frequently tour the control room.

The Site Duty Manager is also required to make plant tours and report the results to the Plant Superintendent.

6.6 NSAG Review

Each year, for the last four years, the Nuclear Safety Assessment Group (NSAG) has conducted a surveillance of plant operations. Operations activities are observed around-the-clock for a one week period. The observations are conducted in the control room and in the plant and cover specific topics such as shift turnovers, logs, operator rounds, alarms and alarm response, conduct of evolutions, and response to casualties.

The inspector reviewed the last two NSAG reports to determine if any findings were identified relating to control room environment.

The annual surveillance of plant operations conducted in April 1986 concluded that operations were being conducted safely and competently. Significant improvements were noted in the areas of: professional atmosphere in the control room; control room noise reduction; reduced distractions; and reduction of sealed in control room alarms. NSAG did note some weaknesses in procedure adherence;

operational communications, Unit Supervisors turnover process, and Senior Management Oversight. Management was visible frequently in the control room, but few panels walkdowns were observed.

The annual surveillance of plant operations conducted in April 1987, NSAG was "favorably impressed with the professional competence and responsible attitude" of the operators. Improvements were observed in the areas of nuisance alarms, control room noise levels, physical arrangement of the control room, and repeat back of operational communications. Recommendations for improvement included the areas of operational communications guidance, procedural adherence, shift turnover process, and reading material.

6.7 Summary

As stated in Information Notice 87-21, Shutdown Order Issued Due to Licensed Operators Asleep While On Duty, the NRC expects licensees to maintain high standards of control room professionalism. Reactor operators must give their full attention to the condition of the plant at all times, and be alert to ensure that the plant is operating safely and must be capable of taking timely action in response to plant conditions. All control room business must be conducted in such a way that neither control room operator attentiveness nor the professional atmosphere will be compromised.

The licensee was observed to have a professional attitude toward their control room duties. The practices recommended by IE Circular 81-02 have been incorporated into their Administrative Procedures.

The licensee's ongoing Operational Enhancement Program has made significant improvements in the professional performance and appearance of the control room and reduced the distractions to the operators.

7.0 Management Meetings

A Management Meeting was held at NRC Region I at the request of PP&L on June 30, 1987 to discuss the licensee's current initiatives and to discuss topics of mutual interest. The discussions primarily focused on the licensee initiated Maintenance Enhancement Program (MEP). The meeting participants are listed in Attachment 1. The licensee's presentation material is included in Attachment 2.

On July 7, 1987 the inspector discussed the findings of this inspection with station management. Based on NRC Region I review of this report and discussions held with licensee representatives, it was determined that this report does not contain information subject to 10 CFR 2.790 restrictions.

MANAGEMENT MEETING PARTICIPANTS

Pennsylvania Power and Light Company (PP&L) :

W. E. Barberich, Supervisor - Licensing & Planning Services
J. A. Blakeslee, Jr., Assistant Superintendent of Plant
R. G. Byram, Superintendent of Plant
S. H. Cantone, Manager - Nuclear Support
H. W. Keiser, Vice President - Nuclear Operation
B. D. Kenyon, Senior Vice President - Nuclear
W. H. Lowthert, Manager - Nuclear Training
J. R. Miltenberger, Manager - Nuclear Safety Assessment
C. A. Myers, Manager - Nuclear Plant Engineering
K. M. Roush, Supervisor - Nuclear Instruction
A. R. Sabol, Manager - Nuclear Quality Assurance
H. G. Stanley, Assistant Superintendent - Outages

Nuclear Regulatory Commission

S. J. Collins, Deputy Director, DRP
P. K. Eapen, Chief, Quality Assurance Section, DRS
M. G. Evans, Reactor Engineer, DRS
D. Florek, Acting Chief, Testing Programs Section, DRS
W. V. Johnston, Acting Director, DRS
J. H. Joyner, Chief, Nuclear Materials, Safety & Safeguards Branch, DRSS
D. P. LeQuia, Radiation Specialist, DRSS
L. R. Plisco, Senior Resident Inspector
J. T. Wiggins, Chief, Reactor Projects Section 1B, DRP

PEOPLE

ARE THE



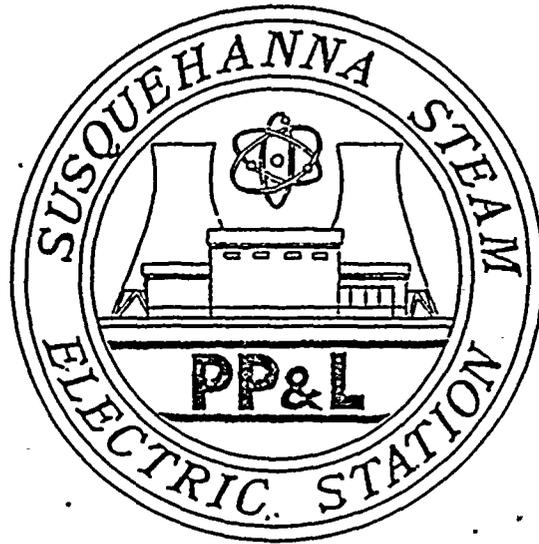
TO

EXCELLENCE

TRAINING

DEVELOPS

PEOPLE



PENNSYLVANIA POWER AND LIGHT COMPANY

BELIEVES

IN MAINTENANCE TRAINING

TRAINING

FOR MAINTENANCE AT SUSQUEHANNA

STARTED IN 1979

PLANT MAINTENANCE

AND

NUCLEAR TRAINING

**DEVELOPED AND MAINTAIN THE
CURRICULUM TOGETHER**

CURRICULUM COMMITTEES

- **FOREMAN**
- **TRAINING COORDINATOR FROM
WORK GROUP**
- **TRAINING SUPERVISOR**
- **TRAINING INSTRUCTOR**
- **CURRICULUM DEVELOPMENT
SUPERVISOR**

PLANT MAINTENANCE

REVIEWS and APPROVES ALL

TRAINING MATERIAL

1982-MAINTENANCE TRAINING FACILITY

TEMPORARY LABS in TRAILERS

- **MECHANICAL/ELECTRICAL**
- **ELECTRICAL/INSTRUMENT & CONTROLS**

1984 BUILDING EXPANSION

PERMENANT LABS

- **ELECTRICAL**
- **INSTRUMENT & CONTROLS**
- **MECHANICAL**
- **CHEMISTRY/HEALTH PHYSICS**

ELECTRICAL LAB

- 4160V BREAKER
- 480V MOTOR CONTROL CENTER
- LIMITORQUE VALVE ACTUATORS
- LAB VOLT ELECTRICAL TRAINERS
- D.C. MOTOR CONTROLLER

INSTRUMENT and CONTROLS LAB

- *I&C PROCESS CONTROL TRAINER*
- *HPC/RCIC SPEED CONTROLLER*
- *ELECTRONICS TRAINERS*
- *SOLDERING STATIONS*
- *BAILEY 7000 INSTRUMENT SYSTEM*

MECHANICAL LAB

- *AIR CONDITIONING and REFRIGERATION*
- *CONTROL ROD DRIVE (CRD) MAINTENANCE*
 - *UNDER VESSEL MOCKUP FOR CRD EXCHANGE*
 - *VALVES*
 - *PUMPS*
 - *SNUBBERS*

CERTIFICATION PROGRAMS

- **INSTRUMENT and CONTROLS (1982)**

- **ELECTRICAL (1985)**

- **MECHANICAL (1985)**

CERTIFICATION PROGRAM CONTENTS

- **FORMAL TRAINING**
- **PROCEDURE TRAINING**
- **TASK CERTIFICATION**
 - **GENERAL (ALL)**
 - **SPECIALTY (SELECTED INDIVIDUALS)**
- **OVERALL EVALUATION BY FOREMAN**
- **APPROVAL-MAINTENANCE MANAGEMENT**

MAINTENANCE SUPPORT

- **PP&L MOBILE CONSTRUCTION
DEPARTMENT**
- **CRAFT WORKERS (CATALYTIC)**

MAINTENANCE SUPPORT TRAINING

- PROACTIVE

- REACTIVE

MAINTENANCE SUPPORT

TRAINING

- **SNUBBERS (1983)**
- **VALVE PACKING (1983)**
- **CONTROL ROD DRIVE EXCHANGE (1984)**
- **LIMITORQUE VALVE ACTUATORS (1984)**
- **VALVE REPAIR (1985)**
- **SOLENOID VALVE ACTUATOR MAINTENANCE**
(U1 3RIO - 1987)

STAYING CURRENT

- **CURRICULUM COMMITTEES**
- **FOLLOW-UP EVALUATIONS**
- **MECHANICAL ASSISTANT FOREMEN
ASSIGNED AS AN INSTRUCTOR**

MANAGING

FOR

EXCELLENCE

PROGRAM

MANAGING FOR EXCELLENCE PROGRAM

REVIEW and UPGRADE

MAINTENANCE TRAINING

MANAGING FOR EXCELLENCE PROGRAM

**IDENTIFY ADDITIONAL SPECIALIZED
TRAINING REQUIREMENTS**

- DEVELOP TRAINING**
- PROCURE EQUIPMENT
and MOCKUPS**

MANAGING FOR EXCELLENCE PROGRAM

DEVELOP PP&L IN-HOUSE EXPERTISE

- JOB SPECIALISTS**
- SPECIALTY TEAMS**
- JOB EXPERTS**

MANAGING FOR EXCELLENCE PROGRAM

DEVELOP and IMPLEMENT A TASK

CERTIFICATION PROGRAM FOR

MAINTENANCE SUPPORT PERSONNEL

(PP&L CONSTRUCTION DEPT. and CATALYTIC CRAFT)



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SUMMARY

PP&L

- TRAINING ORIENTED
- COMMITTED TO TRAINING EXCELLENCE
- TRAINING IS LINE MANAGEMENT'S RESPONSIBILITY
- TRAINED PERSONNEL ARE OUR KEY TO SUCCESS