

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-387/91-17
50-388/91-17

NOV 15 1991

Docket Nos. 50-387
50-388

License Nos. NPF-14
NPF-22

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

Facility Name: Susquehanna Steam Electric Station, Units 1 and 2

Inspection At: Allentown, Pennsylvania and Berwick, Pennsylvania

Inspection Conducted: August 5-9, 1991 and August 26-September 6, 1991

Inspectors: R. Mathew, Reactor Engineer, RI
R. Paolino, Sr. Reactor Engineer, RI
R. Skokowski, Reactor Engineer, RI

Prepared by: Roy Mathew 10/25/91
Roy Mathew, Reactor Engineer, Electrical date
Section, Engineering Branch, DRS

Approved by: C. J. Anderson 10/28/91
C. J. Anderson, Chief, Electrical Section, date
Engineering Branch, DRS

Areas Inspected: Announced inspection by region personnel to review the status of previously identified open items and to determine the adequacy of the licensee's actions to resolve them. This inspection also reviewed engineering activities related to the electrical system area to determine the effectiveness of engineering support for the plant.

Results: The inspectors determined that the licensee's technical evaluations, corrective actions and design modifications were adequate to resolve 15 of the 16 previously identified issues. However, some of the issues needed hardware modifications in accordance with design change modification packages. The licensee has committed to complete the installation of these modifications as referenced in Section 1.0 of this report. One non-cited violation (NCV) was identified pertaining to the lack of adequate review of cable tray overfills as specified by design drawing. One item remained unresolved pertaining to the adequacy of the revised degraded bus voltage set points based on worst case relay drifting and other scenarios identified in the licensee's Engineering Discrepancy Report No. EDR No. G10091. The inspectors determined that continued effort is required for the timely resolution of this issue. A review of recent EQ related NCRs confirm that the licensee's discrepancy management program is working. The licensee has implemented an EQ binder upgrade program to identify deficiencies in the EQ program.

1.0 Status of Previously Identified Items

The purpose of this inspection was to review the status of previously identified items and to determine the adequacy of the licensee's corrective actions in resolving each issue.

- 1.1 (Closed) Violation No. 50-387/388-90-17-01 pertaining to the unqualified polyurethane damper actuator seals of the ITT NH90 dampers for the Standby Gas Treatment Systems and the direct expansion switchgear room cooling system when the post-LOCA reactor building temperatures were changed by the licensee in 1989, by calculation No. M-RAF-032. The equipment that needed to be requalified was identified in the Equipment Qualification Index. This index contained a field which was intended to identify temperature for which the component was qualified. The entry in that field was incorrect and led to erroneous conclusions on the qualification of the NH-90 actuators. The licensee reported this deficiency in LER 90-016-00.

Immediate corrective action was taken to replace the polyurethane seals with qualified Viton seals. The licensee determined that replacement of the seals results in the actuators being in a qualified configuration. The licensee reviewed EQ binders to assure that similar errors had not affected the qualification of other equipment. Similar occurrences were identified. The affected equipment for these similar occurrences was evaluated and the information in the binders was found to support qualification. To preclude future similar occurrences, the licensee has issued instructions to limit the use of the data in the temperature field of the Equipment Qualification Index pending verification of the data. Personnel have been counselled regarding the use of qualified controlled data.

This item is closed.

- 1.2 (Closed) Violation No. 50-387/388-90-17-02 pertaining to the licensee's failure to promptly report and correct conditions adverse to quality. Licensee Procedure No. EPM-QA-122 requires prompt identification and documentation of engineering discrepancies. Licensee Procedure No. OPS-5 also requires prompt reporting and correction of conditions adverse to quality.

The licensee indicated that the violation resulted from engineering judgement on the level of certainty required prior to generating engineering discrepancy reports. To avoid further occurrences with respect to deficiency reporting, the licensee has procedurally lowered the threshold at which engineering discrepancy reports are generated. Engineering personnel received training on these procedural changes. In addition, engineering personnel have been counselled on the importance of prompt reporting of conditions adverse to quality and the need to recognize and promptly document deficiencies through the engineering discrepancy reporting program or nonconformance reporting program.

This item is closed.

- 1.3 (Closed) Violation No. 50-387/388-90-17-03 pertaining to the licensee's lack of prompt corrective actions for suspect Limitorque EQ deficiencies. NCR 88-0181, dated March 24, 1988, and NCR 88-0520, dated July 11, 1988, were not closed until November 15, 1990. The licensee indicated that this violation resulted from inadequate programmatic controls. In their presentation to the NRC on October 26, 1990, the licensee had indicated that steps to ensure that timely corrective actions consistent with the potential safety significance of deficiencies had been taken. A copy of the analysis qualifying the 250 Vdc Limitorque Motor Operators for the full range of dc system voltages including the peak system voltage of 288 vdc was provided to the NRC at the October 26, 1990 meeting. The analysis resolved the Nonconformance Report Nos. 88-181, 88-182, 88-520 and 88-521. Concurrent with the analysis, the licensee prepared new calculations (SE-B-NA-104) superseding the Bechtel calculation Nos. 18-72, Revision 2 and 200-281, Revision 1, which were used as input to the analysis.

To prevent recurrence, the licensee has indicated that all safety significant issues will: 1) receive a prompt operability/reportability determination, and 2) develop an action plan and schedule for closure. In addition, those issues confirmed to affect installed plant equipment will be reviewed by the Plant Operations Review Committee (PORC) on a monthly basis and prior to any start up. The licensee's goal is closure of all safety significant deficiencies within one fuel cycle. Based on a review, the actuators were determined to be environmentally qualified for 250 Vdc operation in their outside containment application.

This item is closed.

- 1.4 (Closed) Unresolved Item No. 50-387/388-90-17-04 pertaining to the licensee's commitment to provide the NRC with a plan and scheduled completion date for upgrading the EQ Binders in accordance with the PP&L EQ Binder prototype. The licensee has prepared an EQ Program Upgrade Project Plan, Revision 0, dated May 6, 1991. The plan issued via licensee document PLI-68381 provides the plan and schedule for upgrading all EQ Binders.

The scope of the EQ Program Upgrade Project includes:

- upgrade of 68 EQ Binders;
- documentation of the basis for the EQ program and program requirements;
- revision/preparation of EQ PM activities required by the EQ Program and the binder upgrades;
- collection of required data to support binder upgrades;
- development of relational EQ database to house the EQ data collected.



The completion target date for this activity is December 31, 1992.

This item is closed.

- 1.5 (Closed) Unresolved Item No. 50-387/388-90-200-04 regarding spare breakers in the 250/125 Vdc control centers and the 480V motor control centers that were left in the drawn-out position as a permanent arrangement. PP&L reviewed the generic implication of the NRC concern. They determined that the only breakers being left out in the open position were the spare circuit breakers on the buses.

The spare load center circuit breakers were racked back into the bus during the EDSFI. PP&L performed a formal calculation (No. KC-C-JDV-150) to demonstrate the acceptability of racking out circuit breakers for maintenance. New check lists have been developed and issued for the 480 Vac, 125 Vdc and 250 Vdc systems to verify the normal circuit breaker racked in position.

This item is closed.

- 1.6 (Closed) Unresolved Item No. 50-387/388-90-200-09 regarding diesel fuel oil storage tank level indicators and low level annunciators that are not continuously monitored as stated in FSAR Section 9-5.4.4. The licensee has been checking the five diesel fuel oil storage tanks level using the dip-stick method. Level was monitored monthly and following each diesel start. However, using this current method for monitoring, a fuel oil leak between diesel starts would go undetected.

Since the EDSFI, PP&L has implemented a schedule that requires fuel oil storage tank level checks every seven days by the dip-stick method pending the installation of new instruments that continuously monitor the tank level. PP&L has completed installation of new instrumentation for fuel oil storage tank level indication. Instrumentation for Tanks A through D was operational as of December 12, 1990. Tank E level instrumentation became operational on January 31, 1991. Meter indications were revised to read in percent per PCAF No. 91-0738 dated, August 9, 1991.

This item is closed.

- 1.7 (Closed) Violation No. 50-387/388-90-200-12 regarding installed relay (27A) for which the drop-out setting was outside the manufacturer's setpoint range (36-45 Volts). During the EDSFI, the licensee presented calibration data and test documentation demonstrating that the installed relay (27A) performed its function satisfactorily. Test records of this relay (27A) indicated the accuracy and repeatability, at the prescribed setpoint, was comparable to other relays on the other seven buses. In response to the NRC's concern, PP&L decided to replace the installed relay with one with an appropriate band of 18-30 Volts to envelope the required drop-out setpoint of 24 Volts.



The EDSFI report indicates this item is closed, however, to satisfy NRC concerns, PP&L performed a walkdown of 46 relays in the 13.8kV, 480V load centers, and the 250 Vdc motor center for similar discrepancies. None were found.

This item is closed.

- 1.8 (Closed) Violation No. 50-387/388-90-200-13 regarding the use of an ac test current source to test dc circuit breakers. The adequacy of testing low voltage air circuit breakers used in dc applications with an ac test current was not established. Preliminary tests performed by PP&L during the EDSFI inspection indicated significant time-current characteristics differences between the ac and dc tests. In addition, the test procedure in use (MT-GE-006) did not provide specific information relative to testing dc breakers. The licensee has revised the procedure (MT-GE-006, revision 7) to clarify which forms, curves and setting change information are to be used when testing dc breakers.

PP&L performed an evaluation (SEA-EE-271) to determine the acceptability of using an ac source to test dc breakers. The evaluation concluded that using the ac source to test dc breakers was an acceptable method. It was determined that no problems with either the protection or coordination would result from the application of a shift in the response curve.

The preliminary tests were followed by controlled tests that showed the dc circuit breakers installed at Susquehanna will operate within the published time current characteristics curves when tested with either ac or dc currents. The acceptance criteria for primary current testing of ac breakers is dependent on: 1) long time, short time and instantaneous pickups specified in the Relay Setting Change Notices (RSCN) for the particular breaker, and 2) that the setpoint is achievable within the band limits provided on the time/current curves supplied by the vendor. Not meeting either of these criteria renders the breaker unacceptable. PP&L procedure MT-GE-006 provides acceptance criteria by requiring entry of both curve numbers and the RSCN information and the yes/no determination of acceptability by the reviewer.

This item is closed.

- 1.9 (Closed) Open Item No. 50-387/388-90-200-01 pertaining to the lack of calculation index or other system for controlling the use of non-valid or superseded calculations. As a result, three short circuit calculations were found to be in effect for assessing the short circuit rating of class 1E switchgear with different assumptions and results. Furthermore, the emergency diesel general loading calculation did not account for any cable losses.



During this inspection, the inspectors noted that all previous (13 kv and 4 kv) short circuit calculations have been superseded by the new short circuit calculation, GP-23. The new calculation results showed that the 13 kv and 4 kv circuit breaker interrupting capability margins are 2% and 3% respectively.

The review of the emergency diesel generator loading calculation indicated that the cable losses had been accounted for in the loading study. The FSAR tables were revised to reflect this change. The inspectors noted that the licensee has a computerized tracking mechanism to control calculations. No unacceptable conditions were noted during this review.

This item is closed.

- 1.10 (Closed) Unresolved Item No. 50-387/388-90-200-02 regarding the emergency diesel generator overload relay setting and drift. During the previous inspection, the team found that the overcurrent relay settings were not adequate for diesel generator E (set at 105% above the maximum generator rating) and that all diesel overload relays exhibited excessive drifting.

During this inspection, the inspectors noted that the overload alarm setting for the "E" emergency diesel generator (EDG) is set at 100% of continuous rating instead of 105% of maximum generator rating as stated in the EDSFI report. Furthermore, diesel generator "E" uses a more sensitive and accurate solid state "Near Full Load" definite time relay. The licensee's review of relay drifting indicated that the overload alarms on the four (A-D) emergency diesel generators were not correctly applied. Engineering Discrepancy Report, EDR00157 was issued by the licensee to address this issue. The inspectors reviewed design change packages DCPs 90-3083A,B,C, and D that replaces the existing induction disk alarm relays with "Near full load" solid state relays to obtain an accurate and reliable overload alarm. The design packages and associated safety evaluation were determined to be adequate to conclude that the modifications did not involve an unreviewed safety question. The licensee committed to install these relays prior to startup following the fifth refueling and inspection outage for Unit 2. The existing alarm relays are considered acceptable by the licensee based on the fact that the EDG worst case loading is within the continuous rating of the machine, the loading is controlled by sequence timers and plant procedures and the operators are trained and provided with specific guidance regarding the EDG design limits and overload ratings to prevent overloading of EDGs. The inspectors determined that the above actions are adequate to resolve this issue and no safety concerns exist regarding this issue.

This item is closed.

- 1.11 (Closed) Open Item No. 50-387/388-90-200-03 This item pertains to the acceptability of DC fuses at voltages higher than 250 Volts when the batteries are subjected to float/equalize conditions.

The inspectors reviewed design change packages DCPS 90-3084 and 90-3085 that replaces the existing undersized fuses (250 Vdc) in various dc distribution panels with a minimum voltage rating of 300 Vdc. The design change packages addressed all the fuses that are affected by the over voltage conditions. The modification packages and associate safety evaluations were determined to be adequate to conclude that the modifications did not involve an unreviewed safety question. The licensee has committed to implement these modifications for Unit 1 by March 1992 and for Unit 2 by September 1992. The inspectors determined that the above actions are adequate to resolve this issue.

This item is closed.

- 1.12 (Closed) Unresolved Item No. 50-387/388-90-200-11 pertaining to the instrument drift and lack of trending of electrical distribution protective relays and timing relays. During the previous inspection, the team identified several relays and timers that were found to be out of calibration during testing. These relays were reset to within acceptable range with no formal program to evaluate "as-found" data which was outside the tolerance band or to trend the instrument drift.

During this inspection, the team reviewed the new program for trending relays and the actions the licensee had taken if the relays were found out of tolerance during testing.

The inspectors also reviewed sample test data for the relays identified in the previous EDSFI report. The review indicated that the relays were found to be within the acceptable tolerance band.

This item is closed.

- 1.13 (Closed) Unresolved Item No. 50-387/388-90-200-10 This item pertains to the adequacy of fire protection piping supports in the diesel generator building.

During the previous EDSFI, the inspection team found that the physical installation of many pipe supports exceeded the allowable spans given in the original specification. Also, there is a potential for impacting the operation of EDGs if the fire suppression system fails during a seismic event due to lack of seismic qualification of fire protection systems.

During this inspection, the inspectors reviewed calculation PLS-9235, EDRS G00154 and G00131 that provide resolution to the above issues. The review indicated that existing supports were adequate to withstand a seismic force. The inspector also reviewed calculation SEA-CE-014 which provided documentation to demonstrate that actuation or rupture of fire suppression systems neither disable any safe shutdown systems nor impact the operation of diesel generators.

This item is closed.

1.14 (Update) Unresolved Item No. 50-387/388-90-200-05 regarding the adequacy of the degraded grid relay setpoints.

During the EDSFI review, the NRC inspectors determined that the setpoints for the undervoltage relays to actuate under degraded grid conditions did not provide adequate protection for safe operation of all Class 1E loads at the 480 Vac and 120 Vac voltage levels. However, there was a degraded voltage alarm at 96.5 percent of the rated voltage for the 4160 Vac buses and operator actions were specified to maintain adequate voltages to all loads. The licensee committed to submit a technical specification change request for raising the degraded grid relay setpoints from 84 percent of rated bus voltage for the 4160 Vac buses to 93 percent. Following the EDSFI, the technical specification change request was approved and the licensee changed the degraded grid relay setpoint to 93 percent.

During the current inspection, the NRC inspectors reviewed the licensee's technical specification change request "Susquehanna SES Proposed Amendment No. 136 to License No. NPF-14 and Proposed Amendment No. 89 to License No. NPF-22, Degraded Voltage Setpoints", the low voltage response procedures AR-015-001 and AR-016-001, and the Setpoint Change Packages E90-1041 and E90-1042. The technical specification change request was approved by NRR and revealed, that even with the degraded grid relay setpoint set at 93 percent, if calibration error, relay drift and potential transformer accuracy are considered, the worst case degraded grid relay condition could be as low as 91.2 percent of rated voltage for 4160 Vac buses. The licensee has completed an evaluation to verify adequate voltage at the equipment terminals for the 4160 Vac and 120 Vac loads for the worst case condition. Based on the evaluation, no modifications were required on the 4160 Vac level. Moreover, the licensee has committed to implement plant modifications to certain 120 Vac circuits, to assure adequate voltage. These modifications will be implemented prior to the next refueling outage. However, the licensee had not completed a similar evaluation for the 480 Vac loads. The inspectors reviewed a preliminary calculation for the voltage available to the 480 Vac loads (except Motor Operated Valves), and through discussions with the licensee determined that two buses, OB136 and OB146, have less than the minimum required voltage of 80 percent at the motor terminals. Although the terminal voltage for worst case degraded grid condition is less than the minimum required at the motor terminals for buses OB136 and OB146, preliminary justification calculations based on the minimum required motor torque appear acceptable. Also, the existing low voltage alarm response procedure ensures adequate administrative control to maintain the required voltage to all loads.

The licensee's review of voltage to 480 Vac MOV loads, revealed that for the worst case condition, several motor operated valves (MOV's) have less than 80 percent of rated voltage at the motor terminals. The evaluation of these valves is documented in Engineering Discrepancy Report (EDR) G10010. Preliminary calculations determined that four Reactor Building Closed Cooling Outboard Isolation Valves (HV-11313, HV-11314, HV-21313 and HV-21314) have inadequate voltage to operate due to excessive voltage drop across the MOV's overload heaters if the 4160 Vac voltage is degraded to a range of 94.1 to 91.2 percent. The licensee's operability determination concluded that there is no operability issue based on the administrative controls in place. The inspectors noted that the existing 96.5% low voltage alarm and associated response ensures adequate voltage to the MOV's. In addition, for the MOV's in question, the licensee committed to replace the overload heaters with heaters of the same rating, but with a lower resistance. This modification will increase the voltage at the terminals of these MOV's providing adequate voltage and protection.

The inspectors noted that during the licensee's evaluation of the degraded grid and related relay setpoint determination, the licensee documented a number of electrical concerns in engineering discrepancy report No. EDR G10091. The licensee addressed some of the concerns by installing the low voltage alarm to identify degraded voltage conditions and subsequent degraded grid relay setpoint changes and technical specification amendment. Discussions with the licensee indicated that EDR G10091 is still being evaluated and a preliminary evaluation performed by the licensee indicated that there are no impending safety issues.

The inspectors also reviewed SEA No. EE-83001, Revision 2, dated February 8, 1991, "Susquehanna SES Units 1&2 Voltage Study - Class IE Distribution System". The model used for this study has only been updated to reflect the 1987 plant configuration, and only evaluated four specific cases. However, the licensee is developing a new electric plant model to be used with the commercially available computer program CYME. This new program should allow for flexibility in the cases to be analyzed, and should allow the licensee to evaluate the electrical concerns identified in EDR G10091. The licensee has committed to complete the electric plant model and update the voltage study to reflect the current plant configuration by June 1992.

This item remains open pending completion of the licensee's evaluation and the NRC review of the following: (1) the voltage at the terminals for the 480 Vac loads for the worst case condition of 91.2 percent; (2) resolution of the issues identified in EDRs G10091 and G10010; and (3) the modifications to establish adequate voltage at the 120 Vac level.

- 1.15 (Closed) Unresolved Item No. 50-387/388-90-200-07 regarding the capacity of the heat transfer equipment serviced by the emergency service water (ESW) system.

Due to excessive fouling of the heat transfer area in the ESW system condenser, the fouling factor has been increased from $.002 \text{ hr-ft}^2\text{-}^\circ\text{F}/\text{BTU}$ to $.003 \text{ hr-ft}^2\text{-}^\circ\text{F}/\text{BTU}$. In addition, approximately five percent of the tubes in the control structure chilled water (CSCW) system condenser are plugged, and four percent of the tubes in the direct expansion unit condenser for the Unit 2 emergency switchgear room (ESWGR) HVAC system are plugged.

In response to the NRC concern, the licensee performed an evaluation of the CSCW system condenser to determine if it is capable of providing adequate cooling. This evaluation, EDR G00167 and associated calculation No. M-CAF-21 "Transient Temperature Response of Control Structure & Emergency Switchgear Rooms With HVAC", indicates that the capacity of the control structure chiller with a fouling factor of $.003 \text{ hr-ft}^2\text{-}^\circ\text{F}/\text{BTU}$ and five percent of the condenser tubes plugged is approximately 184 Tons. This is down rated from the design capacity of 230 Tons. However, the evaluation concluded that the total heat load to the control structure chiller is less than 184 Tons, and the room temperatures would remain within the limits specified in the FSAR. As a result of the CSCW evaluation, it was determined that no evaluation is required for the less limiting ESWGR HVAC.

This item is closed.

- 1.16 (Closed) Unresolved Item No. 50-387/388-90-200-08 regarding the lack of overpressure protection for the ESW side of the diesel generator heat exchangers.

The plant has five diesel generators, four of which are aligned to Class 1E buses while the fifth is on standby. The ESW system has sufficient capacity to provide cooling to only four diesel generators at one time. Therefore, the isolation valves in the ESW line to the standby diesel generator are normally closed, which allows for a potential overpressure condition.

In response to the NRC concern, the licensee performed an evaluation of the ESW side of the diesel generator heat exchangers for possible overpressure conditions. The licensee determined that diesel generators A, B, C and D met the ASME requirements for overpressure protection. However, diesel generator E has the potential for overpressurization of the heat exchangers on the ESW side, as result of the isolation of diesel generator E during A LOCA/LOOP signal. The licensee has issued Design Change Package (DCP) 90-3088 to install a pressure relief valve for the ESW piping on the E Diesel generator side of the ESW isolation

valves. The inspectors reviewed this DCP and associated calculations M-ESW-054, "E Diesel Overpressure Protection Calculation" and M-ESW-054 "Set pressure for PSV 01126E" and found them thorough and technically adequate. The licensee has committed to complete the installation of the modification by May 6, 1992.

This item is closed.

2.0 Review of Engineering Activities Related to the Electrical System Area

The inspectors reviewed licensee's organization, modification packages and work control process to determine the effectiveness of engineering support for the plant. The inspectors also reviewed the licensee's long term and short term plans to improve the functionality of the electrical distribution system.

2.1 Agastat Relay Failures

The inspectors reviewed the Engineering Discrepancy Report EDR No. G0070 regarding seven agastat 'EGP' relay failures due to overheating in panel OC876A. The relays were used in non-safety applications and provide only annunciator functions. The licensee's preliminary evaluation showed that the relay cover discoloration and embrittlement are due to the possible heat build up due to the existing mounting configuration. The licensee stated that no additional failures or similar conditions are known to exist in any SSES application. However, further review and resolution of this EDR is in process. The relays that were found degraded were replaced with new ones. The inspectors noted that a reportable evaluation was in process during this inspection. The licensee is also trying to determine the generic implication of this problem.

The inspectors reviewed EDR No. G10089 which identifies the discrepancy in the environment and dynamic qualification for the continuously energized Agastat EGPI series relays. The Agastat qualification tests are established by Southwest Research Institute Report. The licensee's review of the report associated with the EQ binder update program, revealed that EGPI series relay tested failed to change state when energized during the seismic portion of the qualification test. These Agastats have a qualified life of 6 years. The licensee took prompt corrective action by replacing the affected relays on May 17, 1991. The licensee later determined that the qualification life of these relays was 4 years based on other qualification reports. The licensee's evaluation indicated that the relays were qualifiable for a design basis event at the time of removal from the panels. The team noted that the licensee had not completed the reportability/operability evaluation during the inspection. Subsequent to the inspection, the licensee completed the evaluation which indicated that there is no operability/reportability concern. Further testing/analysis to assure the functionality of the relays and implications on all applications are being reviewed by the EDR group.



The inspectors determined that the licensee has properly addressed the Agastat failures and appropriate corrective actions are being taken in accordance with plant procedures.

- 2.2 Appendix R Compliance The inspectors reviewed licensee's programs to maintain App. R compliance. The Fire Protection Review Report and about one hundred safety analyses form the design basis for App. R compliance. Design Standard EDS-01 provides the requirements which are applied to cable routing, component modifications, and circuit modifications to ensure compliance with the requirements of 10 CFR50, Appendix R. Also, PP&L Specification E-1012 and Drawing E-49 provide guidelines for separation and raceway and cable details. The inspectors reviewed the licensee's App. R Cable Data Management System (ARCDMS) in accordance with design drawing specification E-671. This computerized database was developed to maintain the Appendix R Safe Shutdown data and the relationships necessary to perform the analysis. The inspectors randomly selected a few App. R related cables and raceways to verify design information such as routing, fire zones, affected documents, and fire wrap requirements. No unacceptable conditions were noted during this review. Also, the inspectors reviewed several modification packages to determine whether the modifications were performed without violating the Appendix R requirements. The modifications reviewed had properly considered Appendix R requirements. The inspectors noted that several individual SEA's are needed to be reviewed to determine the impact of App. R for any modification.

The inspectors determined that even though the existing review process to determine App. R compliance is complex, the licensee is maintaining Appendix R compliance. The licensee stated that PP&L will develop a comprehensive long term Appendix R compliance plan by December 1991 to provide a better and more effective method of meeting App. R requirements.

- 2.3 Electrical Separation The inspectors reviewed this area to determine whether the licensee has adequate procedures and documentations to maintain electrical separation for redundant class 1E systems. The inspectors interviewed several engineers to determine their understanding of the electrical separation requirements. Also, several modifications were reviewed to determine whether the modifications were performed with appropriate considerations for electrical separations. The review indicated that the modifications are performed with adequate design input to review the electrical separation area and the design engineers are knowledgeable of the separation requirements. The inspectors noted that the licensee has updated FSAR, Design Criteria, and separation specification E-1012 to reflect the recommendations and changes developed during the separation evaluations and modifications performed by the licensee to date.

2.4 Cable Tray and Raceway Fill The licensee's need for a more efficient means of tracking cable and raceway configuration, and the need for verifying the justification calculations for all raceway filled beyond the 30 percent limit was identified in Quality Assurance (QA) Deficiency Report (DR) 89-001. In response to DR 89-001, the licensee established a process which captures and controls changes to cable and raceway configuration. This process consists of the following three components:

- (1) Bechtel EE553 database, reflecting the original cable and raceway configuration.
- (2) CABRAC database, reflecting the as engineered cable and raceway configuration.
- (3) CARTS software, reflecting the current, as built cable and raceway configuration, by calculating it from the Bechtel EE553 and CABRAC data.

The inspectors reviewed the licensee's process for tracking cable and raceway configuration, and found it adequate.

DR 89-001 described the need to verify the justification calculations for all raceway filled beyond 30 percent. The licensee stated that due to a large number of modifications to the cable and raceway configuration, and difficulties in updating the Bechtel EE553 database, there was a need to verify the existing raceway overfill justification calculations. In response to DR 89-001, the licensee has committed to analyze and document the acceptability of raceways that exceed 30 percent fill. This analysis will be completed by October 1991, and will evaluate mechanical loading for all raceway and the thermal loading for power cable trays. The licensee has completed the analysis of raceway that exceed 35 percent fill. The inspectors reviewed this study, E-AAA-634, "Cable Tray Fill Justification Trays: E1PH42, E1PH43, E1PY01, F1PY01" and found it acceptable. However, during the review of Drawing E-49, "Conduit & Cable Tray Notes & Details", the inspectors noted the Design Criteria 3.1.3.4 required particular types of control cable trays having more than 25 percent fill to be analyzed for mechanical loading. Discussion with licensee indicated that no formal analysis of these control cable trays has been completed, and the licensee immediately initiated a study to perform the required analysis. The study revealed that two Non-Class 1E control cable trays, 2KTK13 and 2KTL13, exceeded the acceptance guidelines for mechanical loading. However, preliminary justification calculations indicate that the trays in question have adequate structural support. This finding would normally be classified as a Severity Level V violation. However, the violation is not being cited because the criteria specified in 10CFR 2, Appendix C, Section V.A. of the Enforcement Policy was satisfied. Specifically, this violation is a Severity Level V and the licensee initiated prompt corrective actions prior to the end of the inspection. Therefore, this violation constitutes a non-cited violation. (50-387/91-17-01, 50-388/91-17-01)

The inspectors also reviewed the licensee's list of conduit fill and found no examples of overfill. The licensee stated that it is PP&L's practice not to install overfilled conduit. In addition, cables are only added to existing conduits in special cases.

The inspectors had no further questions.

- 2.5 RCIC Inverter Replacement The licensee recently replaced DC to AC static inverters B21B-K801A & B. These inverters supply power to the leak detection ambient and differential temperature switches for the Reactor Core Isolation Cooling (RCIC) system. The new inverters are electrically comparable to the original inverters, except the original inverters were rated at 250VA, and the new inverters are rated at 500VA. The inspectors reviewed the Design Input for design change package DCP 90-9074, "Inverter Replacement in Panel 2C614". The design input was prepared and reviewed on February 7, 1991, and approved on February 12, 1991. During the inspectors review, it was noted, that the Design Input Checklist was initially marked with HVAC and Station Blackout as not applicable for requiring design considerations. However, these items were changed to applicable, on February 12, 1991, by the engineer preparing the design input. Discussions with the licensee revealed that due to the equipment involved in the modification, and the increased rating of the new inverter, Station Blackout and HVAC considerations were applicable. The inspectors questioned as to why the correction was made five days after the design input was reviewed. Based on the reviews of the controlling document for Design Inputs, EPM-QA-208, and discussions with the licensee, it was determined that this correction was performed within the licensee's procedures. The NRC inspectors found the design input review process to be acceptable. Review of the DCP 90-9074, "Inverter Replacement in Panel 2C614" and associated safety evaluation found them thorough and technically adequate. In addition, the licensee committed to prepare a document that further defines the duties of preparers, reviewers, verifiers, and approvers. This document will be issued and training will be conducted by December 1991.

The inspectors had no further questions.

2.6 Nuclear Engineering Organization

As a result of the licensee's Organizational Effectiveness Review (OER), the Nuclear Plant Engineering Department is being reorganized to improve plant engineering support. As of November 1991, the Nuclear Plant Engineering will be divided into three sections: (1) Systems Engineering Group to handle daily engineering activities; (2) Modifications Group to handle plant modifications; (3) Nuclear Technology Group to handle long term engineering issues, including system analysis, modification and maintenance support, and the resolution of EDRs. This department reorganization is intended to increase the effectiveness of the Engineering Department by dedicating sufficient resources for daily engineering activities, therefore, allowing resources to be dedicated to long term engineering issues and modifications.

2.7 Closeout of EQ-NCR's

As presented to the NRC at the Management Meeting of October 26, 1990, the licensee has taken steps to ensure that future equipment qualification issues receive prompt operability/reportability determinations followed by timely corrective action and closure consistent with the potential safety significance. As of September 20, 1990, there were 32 open items which documented deficiencies associated with EQ. Twenty of these were closed as of December 21, 1990. The remaining 12 were closed prior to startup following the Unit 2 outage in May 1991. A review of recent EQ related NCR's confirm that the licensee's program in discrepancy management is working. Issues confirmed to affect installed plant equipment were generally resolved within one month following identification and documentation. One item, NCR 91-104 (Unit 1), was written on March 21, 1991. Closure for this item occurred on August 3, 1991.

3.0 Exit Meeting

The inspector met with licensee corporate personnel and licensee representatives (denoted in Attachment 1) at the conclusion of the inspection on September 5, 1991. The inspector summarized the scope of the inspection and the inspection findings.

ATTACHMENT 1

PERSONS CONTACTED

Pennsylvania Power and Light Company

J. Agnew, EDMG Supervisor
J. Akus, Project Engineer
K. Backenstoe, Senior Project Engineer
*P. Brady, Project Engineer
B. Brown, Nuclear Quality Assurance
B. Brunner, Engineer, Engineering Science Applications Group
*G. Butler, Manager Nuclear Design
C. Coddington, Senior Project Engineer
D. Filchner, Project Engineer
*J. Kenny, Licensing Group Supervisor
M. Khen, EDMG Program Advisor
*G. Kuczynski, Technical Supervisor, SSES
*A. Male, Manager, Nuclear Plant Engineering
*G. Miller, Supervising Engineer
D. Nudge, Project Engineer
J. Rothe, Supervising Engineer
J. Schleicher, Senior Project Engineer
*M. Simpson, Manager, Nuclear Technology
A. White, EDMG Project Engineer

* Denotes personnel present at the exit meeting on August 5, 1991