

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos. 50-387/90-20; 50-388/90-20

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: September 2, 1990 - October 6, 1990

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Approved By:

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for P. D. Swetland, Chief  
Reactor Projects Section No. 2A,

*11/8/90*  
Date

Inspection Summary:

Areas Inspected: Routine inspections were conducted in the following areas: operations, radiological controls, maintenance/surveillance testing, emergency preparedness, security, engineering/technical support, safety assessment/quality verification, and Licensee Event Reports (LER), Significant Operating Occurrence Reports, and Open Item Followup.

Results: During this inspection period, the inspectors found that the licensee's activities were directed toward nuclear and radiation safety. One violation and no deviations were identified. An Executive Summary is included and provides an overview of specific inspection findings.



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## EXECUTIVE SUMMARY

### Susquehanna Inspection Reports

50-387/90-20; 50-388/90-20

September 2, 1990 - October 6, 1990

#### Operations (30703, 71707)

Operators effectively controlled plant evolutions and identified plant problems. An inadvertent start of the "C" Diesel Generator was appropriately responded to by plant operators.

#### Radiological Controls (71707)

Individual workers and Health Physics personnel implemented radiological protection program requirements. Periodic inspector observation noted no inadequacies in the licensee's implementation of the radiological protection program.

#### Maintenance/Surveillance (61726, 62703)

Inadequate cleanliness control of DG intercooler cleaning resulted in intrusion of sandblast in the "B" and "D" DGs air intake and combustion chambers. In addition, one safety system actuation was attributable to surveillance activities. This occurred when the "C" DG inadvertently started during performance of a 4160V ESS bus undervoltage channel calibration.

#### Emergency Preparedness

No emergency preparedness issues emerged during the period.

#### Security (71707)

Routine observation of protected area access and egress control showed good control by the licensee.

#### Engineering/Technical Support (71707, 92720, 93702, 35702)

The effects of intrusion of sandblast grit into the "B" and "D" DGs was evaluated and repairs were performed to return the DGs to operable status. Your lack of procedures to direct sandblasting of these intercoolers along with poor control of the work activity was a significant weakness. One violation was identified.

#### Safety Assessment/Assurance of Quality (90712, 92700, 92701, 92720)

A total of 75 Significant Operating Occurrence Reports were reviewed during the period, 2 of which were followed up in this report.





## Details

### 1. SUMMARY OF OPERATIONS

#### 1.1 Inspection Activities

The purpose of this inspection was to assess licensee activities at Susquehanna Steam Electric Station (SSES) as they related to reactor safety and worker radiation protection. Within each inspection area, the inspectors documented the specific purpose of the area under review, the scope of inspection activities and findings, along with appropriate conclusions. This assessment is based on actual observation of licensee activities, interviews with licensee personnel, measurement of radiation levels, independent calculation, and selective review of applicable documents. Abbreviations are used throughout the text. Attachment 1 provides a listing of these abbreviations.

#### 1.2 Susquehanna Unit 1 Summary

Unit 1 entered the inspection period at 99 percent full power, commencing coastdown at approximately one-half percent per day until beginning the unit's fifth refueling outage. Shutdown began on September 11, and the turbine generator was taken off line at 3:46 a.m. on September 12. Cold shutdown was achieved on September 14 at 12:05 a.m. During the period, a full core offload was completed and major work on ECCS and ESF systems was performed. On October 4, an inadvertent start of the "C" Emergency Diesel Generator occurred while performing a surveillance. See Section 2.2.1 for details.

#### 1.3 Susquehanna Unit 2 Summary

Unit 2 operated at or near full power for the entire inspection period. Scheduled power reductions were conducted during the period for control rod pattern adjustments, surveillance testing, and maintenance. No ESF actuations or scrams occurred during the period.

### 2. OPERATIONS

#### 2.1 Inspection Activities

The inspectors verified that the facility was operated safely and in conformance with regulatory requirements. Pennsylvania Power and Light (PP&L) Company management control was evaluated by direct observation of activities, tours of the facility, interviews and discussions with personnel, independent verification of safety system status and Limiting Conditions for Operation, and review of facility records. These inspection activities were conducted in accordance with NRC inspection procedure 71707.

The inspectors performed 177 hours of normal and back shift inspections including deep backshift inspections on September 7, from 1:45 a.m. to 6:00 a.m.; September 22, from 7:00 a.m. to 2:00 p.m.; and, September 28, from 4:00 a.m. to 6:00 a.m.



## 2.2 Inspection Findings and Review of Events

### 2.2.1 "C" Diesel Generator Inadvertent Start

At 8:40 a.m. on October 4, an inadvertent start of the "C" DG occurred. The start occurred during performance of the 18 month undervoltage channel calibration on 4160 VAC ESS bus 1A203 when the DC knife switch supplying control power to the bus was reclosed. To prevent the DG from starting during the surveillance, the DC knife switch is to be opened, the fuses labeled "Sequence Start" are to be removed and the DC knife switch then reclosed to restore control power to the bus. Due to labeling and permit wording problems, incorrect fuses labeled "Diesel Generator Start" were pulled leaving the DG start logic intact. When the DC knife switch was then reclosed and the undervoltage sensed, the DG started per design. The licensee determined the root cause to be due to inconsistencies between design drawing nomenclature and labeling of the fuses to the DG start logic in conjunction with wording on the permit which was not precisely in accordance with the labeling.

The "C" DG was shut down 22 minutes later and work was temporarily stopped to determine why the DG started. The permit was then changed to more clearly reflect the labeling wording for the correct fuses. The appropriate ENS call per 10 CFR 50.72 was made within the required time period. An interim Operational Instruction was issued which dictates that there shall be absolute agreement between Equipment Release Forms, Permits, and field labeling. If there are differences between field labeling and the permit, permit tags shall not be applied. Other actions being evaluated to prevent a recurrence are to develop a switchgear inspection plan for fuse identification, labeling and drawings for potential improvements and for electrical maintenance to address switching error actions.

The inspector discussed the event and the corrective actions taken and being evaluated with plant personnel. The inspector considered the licensee's actions in response to the event appropriate. However, this event was significant because it had the potential to cause severe personnel injury and/or damage safety related equipment.

## 3. RADIOLOGICAL CONTROLS

### 3.1 Inspection Activities

PP&L's compliance with the radiological protection program was verified on a periodic basis. These inspection activities were conducted in accordance with NRC inspection procedure 71707.

### 3.2 Inspection Findings

Observations of radiological controls during maintenance activities and plant tours indicated that workers generally obeyed postings and Radiation Work Permit requirements. No inadequacies were noted.



#### 4. MAINTENANCE/SURVEILLANCE

##### 4.1 Maintenance and Surveillance Inspection Activity

On a sampling basis, the inspector observed and/or reviewed selected surveillance and maintenance activities to ensure that specific programmatic elements described below were being met. Details of this review are documented in the following sections.

##### 4.2 Maintenance Observations

The inspector observed and/or reviewed 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, as applicable, 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 quality control hold points were established where required; functional testing was performed prior to declaring the involved component(s) 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 and/or reviews included:

- "B" DG inspection of damaged cylinder liners, pistons, etc. on September 5, 1990.
- VOTES - MOV Diagnostic Test of HPCI F002 Valve per WA S00691 on September 27, 1990.
- "D" DG removal inspection and installation of cylinder heads per WA S04803 on September 28, 1990.
- Removal and capping of 1 inch HRC 108/1 inch JRD 128 pipe section for ESW modification per WA C03543 on September 28, 1990.
- Installation of Unit 1 ESW Loop "A" Supply and Return Lines Building Freeze Seal Spools and Valves per WA C03581 on September 28, 1990.
- Installation of new RHRSW Loop "A" Heat Exchanger Inlet Outboard Isolation Butterfly Valve per WA C03430 on September 28, 1990.



#### 4.3 Surveillance Observations

The inspector observed and/or reviewed the following surveillance tests to determine that the following criteria, if applicable to the specific test, were met: the test conformed to Technical Specification requirements; administrative approvals and tagouts were obtained before initiating the surveillance; testing was accomplished by qualified personnel in accordance with an approved procedure; test instrumentation was calibrated; Limiting Conditions for Operations were met; test data was accurate and complete; removal and restoration of the affected components was 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 and/or reviews included:

- SO-024-013 "Offsite Power Source and Onsite Class 1E Operability Test" performed on September 7.
- SO-251-002 "Quarterly Core Spray Flow Verification," - Unit 2, performed on September 21.
- SI-180-303 "18 Month Calibration of Reactor Vessel Water Level Channels LIS-B21-1N031A,B,C,D," - Unit 1, performed on September 27.
- SO-151-002 "Quarterly Core Spray Flow Verification," LOOP "A" - Unit 1, performed on October 5.

#### 4.4 Inspection Findings

The inspector reviewed the listed maintenance and surveillance activities. The review noted that work was properly released before its commencement; that systems and components were properly tested before being returned to service and that surveillance and maintenance activities were conducted properly by qualified personnel. Where questionable issues arose, the inspector verified that the licensee took the appropriate action before system/component operability was declared. No unacceptable conditions were identified.

### 5. EMERGENCY PREPAREDNESS

#### 5.1 Inspection Activity

The inspector reviewed licensee event notifications and reporting requirements for events that could have required entry into the emergency plan.

## 5.2 Inspection Findings

No events were identified that required emergency plan entry. No inadequacies were identified.

## 6. SECURITY

### 6.1 Inspection Activity

PP&L's implementation of the physical security program was verified on a periodic basis, including the adequacy of staffing, entry control, alarm stations, and physical boundaries. These inspection activities were conducted in accordance with NRC inspection procedure 71707.

### 6.2 Inspection Findings

The inspector reviewed access and egress controls throughout the period. No unacceptable conditions were noted.

## 7. ENGINEERING/TECHNICAL SUPPORT

### 7.1 Inspection Activity

The inspector periodically reviewed engineering and technical support activities during this inspection period. The on-site Technical (Tech) section, along with Nuclear Plant Engineering (NPE) in Allentown, provided engineering resolution for problems during the inspection period. The Tech section generally addressed the short term resolution of problems while NPE scheduled modifications and design changes, as appropriate, to provide long lasting problem correction. The inspector verified that problem resolutions were thorough and addressed at preventing recurrences. In addition, the inspector reviewed short term actions to ensure that the licensee's actions provided reasonable assurance that safe operation could be maintained.

### 7.2 Inspection Findings

#### 7.2.1 Diesel Generator Damage Due to Sandblast Grit

As previously discussed by NRC Inspection Report 50-387/90-15, the "B" and "D" EDG units' engines were extensively damaged by grit which was introduced into the engines by means of residual sandblast grit from the maintenance cleaning of the cooling water tubes of the turbocharger intercoolers.

The licensee removed the air intake manifolds and the intercoolers from the EDG units. The intercoolers were purged of entrained sandblast grit within the cooling fin assembly by means of an agitated hot water solvent bath over a period of several hours in which the solvent was replaced with new solvent several times until the coolers were considered to be adequately cleaned. The coolers were then





subjected to high velocity air purging in order to assure that combustion air through the coolers would not transport any additional material from the finned intercoolers. During this cleaning process the licensee removed more than a cup of sandblast grit from each intercooler. The licensee's cleaning procedures appeared to be adequate for the removal of the grit from the intercoolers.

With the aid of the EDG manufacturer's field service personnel, the licensee conducted detailed degradation evaluation inspections of the engine parts which may have been subjected to the sandblast grit. Engine components examined include pistons, cylinder liners, cylinder heads, valve components, crankshaft journals, connecting rod bearings, and engine driven oil pumps. The licensee found it necessary to replace several pistons, piston wrist pins, and cylinder liners on each of the EDG units. Examination of selected crankshaft journals and connecting rod bearings did not reveal evidence of abrasive grit inclusion in the bearings or scoring of the crankshaft journals. Examination of oil pump lobes revealed no degradation. Intake and exhaust valves and valve guides were undamaged. Valve seats were refurbished where necessary. The camshaft, cams and bearings revealed no degradation.

The inspector reviewed the licensee's acceptance/rejection criteria for the pistons, wrist pins and cylinder liners and performed an independent visual inspection of these parts. Based upon these inspection observations, it appeared that the licensee's inspection criteria was adequate to ensure the detection and replacement of defective components.

Sand/grit in the cylinders which abrades the piston and cylinder liner surfaces can fall into the lubricating oil. The licensee performed sampling and analysis to determine the lubricating oil system had been contaminated with abrasive particulate materials. Findings were as follows:

- Four main lube oil filter elements - The filters contained what "appears to be very small metallic particles with a few glassy particles" which were 1-2 mils in size.
- Oil sample downstream of the oil filter - Analysis of this sample revealed no abrasive contaminants.
- Oil strainer (downstream of oil filter) - The strainer was found to be contaminated with what "appears to be construction debris - brass particles, rust, glassy spheres and angular particles.
- Two oily rags with oil wiped from the inside of oil delivery hoses to main bearings. Each of these rags had a small quantity of fine black and glassy particles 1-2 mils in size. (Bearing to crank clearances are 7-8 mils.)
- Turbocharger filter element. This filter contained "a very small



quantity of fine black and glassy particles 1-2 mils in size. The glassy particles were described as "ground up white, clear particles."

From these analyses and the directly observable good condition of the engine bearing surfaces (which were not exposed to direct impingement of the sandblast grit), it appeared that the oil filters provided effective removal of any of the grit which did not settle to the bottom of the crankcase. In order to remove any residual sand from the oil system, the licensee flushed the oil system, hand wiped the crankcase, replaced the engine oil with fresh oil and installed new oil filters.

The inspector reviewed the licensee's evaluation of the potential root causes. The licensee considered procedural deficiencies and poor work practices to be the primary root causes why the cleaning sand was permitted to enter and become lodged within the finned assembly of the air side of the coolers. Combustion air through the intercoolers then transported the grit directly into the cylinders' combustion chambers which resulted in the internal engine damage. The inspector agreed with the licensee's root cause assessment. The failure of the licensee to establish and implement documented instructions, procedures, and controls for this critical sandblast operation of class 1E equipment is considered a violation of 10 CFR 50 Appendix B Criterion V. (NV4 50-387/90-20-01 (Common))

## 8. SAFETY ASSESSMENT/QUALITY VERIFICATION

### 8.1 Licensee Event Reports (LER), Significant Operating Occurrence Report (SOORs), and Open Item (OI) Followup (90712, 92700)

#### 8.1.1 Licensee Event Reports

The inspector reviewed LERs submitted to the NRC to verify that details of the event were clearly reported, including the accuracy of the description of the cause and the 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

90-018-00 Sand Intrusion Resulted in Two Diesel Generators Becoming Inoperable. This event was reviewed in Inspection Report 50-387/90-15; 50-388/90-15 and in Section 7.2.1 of this report.



### 8.1.2 Significant Operating Occurrence Reports

SOORs are provided for problem identification and tracking, short and long term corrective actions, and reportability evaluations. The licensee uses SOORs to document and bring to closure problems identified that may not warrant an LER.

The inspectors reviewed the following SOORs during the period to ascertain whether: additional followup inspection effort or other NRC response was warranted; corrective action discussed in the licensee's report appears appropriate; generic issues are assessed; and, prompt notification was made, if required:

#### Unit 1

61 SOORs inclusive of 1-90-237 through 1-90-298

#### Unit 2

14 SOORs inclusive of 2-90-113 through 2-90-127

The following SOORs required inspector followup:

1-90-294 documented the inadvertent start of the "C" DG. This event is discussed in Section 2.2.1.

1-90-242 documented high chromium concentration in the "B" DG lube oil. This event was reviewed in Inspection Report 50-387/90-15; 50-388/90-15 and in Section 7.2.1 of this report.

### 8.1.3 Open Items

#### 8.1.3.1 (Closed) (NC4 387/85-28-03; 388/85-23-02), Failure to Test Entire Channel During Channel Functional Tests of HPCI Isolation and Actuation Channels

During Routine Resident Inspection 50-387/85-28; 50-388/85-23, which covered the period August 26, 1985 through September 29, 1985, one violation concerning HPCI monthly channel functional tests was identified. The inspector determined that the monthly channel Functional Tests on the HPCI isolation and actuation channels did not test the entire channel as required by the unit's TS. Specifically, surveillance procedures SI-152-203, SI-152-201, SI-152-211, and SI-180-205, which implemented this requirement on the HPCI steamline delta pressure channels, steam supply pressure channels, turbine exhaust diaphragm pressure channels, and the high reactor vessel level trip channels, respectively, failed to test the entire channel since it did not test the last relay in the actuating logic. The corresponding Unit 2 surveillance procedures also failed to test the entire channel.

The response by P.P. & L., dated November 15, 1985, requested that the Notice of Violation be withdrawn, since their position was that testing in accordance with their referenced surveillance procedures represented a valid interpretation of TS requirements, rather than a noncompliance. More specifically, P.P. & L. disagreed with the use of "channel" as defined in IEEE Std. 603-1977 in the context of the Channel Functional Test required by TS. The SSES TSs refer to an instrumentation channel when requiring Channel Checks, Channel Functional Tests, and Channel Calibrations. P.P. & L. noted that the IEEE standards do not utilize the word instrumentation in their definition because their use of the channel concept is not limited to instrumentation. In addition, P.P. & L. stated that the associated relays and contacts referred to in the inspection report are what is included in a Logic System Functional Test which is performed on an 18 month frequency. P.P. & L. addressed IE Information Notice 84-37 which discussed mitigation of the potentially adverse safety impact of using jumpers and lifting leads in support of surveillance testing to note the potential adverse impact of performing, as defined, Channel Functional Tests, in this case, since they would require lifted leads on booted contacts and could lead to system isolations. Finally, P.P. & L. addressed ANSI/IEEE Std. 338-1977 in support of their position to note that the additional burden on plant resources would be significant. The licensee believes that these factors provide sufficient justification for defining the end of an instrument channel. Their definition specifies the instrument channel endpoint for the purpose of channel functional testing as being the input node(s) of the coil of the actuated relay(s) which enter into combinational logic with logic provided by other channels. P.P. & L. believes this definition satisfies the requirements of their TS in that it tests all alarm and/or trip functions of the channel and at the same time minimizes equipment, personnel, and time in test status. Their position was established to prevent the degradation of the safe operation of SSES.

Following the November 15, 1985 letter, NRC Region 1 in conjunction with NRR reviewed P.P. & L.'s response. This review resulted in the initial determination that P.P. & L.'s methods were not acceptable because certain components in the channel upstream of the combinatorial logic are excluded from the CFT. A CFT must test to the point where single action signals are combined. An entire channel includes all contacts, relays, indications, and alarms which precede the combinatorial logic. In addition, P.P. & L.'s contention that "channel" may be defined other than as in the industry standards because the TSs use the modifier "instrumentation" is unacceptable.

On March 5, 1986, NRC Region I responded to P.P. & L.'s November 15, 1985 letter. This letter informed P.P. & L. that Region I in conjunction with NRR reviewed and found P.P. & L.'s response to the





violation unacceptable. It was noted that CFTs for instrumentation channels must test all components up to the point where single action signals are combined and that P.P.& L.'s methodology for CFTs for HPCI and other ECCS and Isolation actuation systems excludes certain components (e.g., relays) in the channel upstream of the combinatorial logic. A meeting was held on March 14, 1986 at the Region I office in King of Prussia, PA, to discuss P.P.& L.'s plans and schedule to correct the testing deficiencies in the CFTs for instrumentation channels.

On April 22, 1986, a letter from P.P.& L. was sent to the NRC Region I to supplement information provided in the November 15, 1985 letter and the meeting on March 14, 1986. Information requested in the March meeting was provided in addition to commitments by P.P.& L. to further enhance the effectiveness of their channel functional tests. Information provided included: (1) A statement of P.P.& L. philosophy for Conduct of Instrument Channel Functional Testing, (2) Description of the Channel Functional Tests which do not conform to existing NRC criteria, (3) Example of the potential benefits of extending the scope of the monthly channel functional tests, and (4) P.P.& L.'s experience with relay failures. P.P.& L. noted that there are 28 monthly channel functional tests which do not conform to the NRC criteria and these represent approximately 10 percent of required tests.

Following the March 14, 1986 meeting and P.P.& L.'s submittal of the additional information requested, P.P.& L.'s failure to test the entire HPCI isolation and actuation channels during functional testing was revisited. NRR found from this review that the design of the 28 instrument channels affected did not provide the same degree of testability of the function of the channel to initiate the actuation logic as originally intended by the station's TSs. Additionally, NRR determined that testing performed up to the last relay may damage plant equipment or disrupt reactor operation and that implementation of R.G. 1.22 recommendations would require an excessive number of lifted leads, jumpers, or placing the actuated equipment in an inoperable status. As indicated by the licensee, these relays are the same type that get exercised monthly in other safety systems and have a demonstrated reliability. NRR therefore determined that the program for instrument channel functional testing at Susquehanna was adequate.

In conclusion, the NRC found that the referenced instrument channels failed to provide the intended degree of testability. This constitutes a deviation from design basis commitments and therefore should have been highlighted for staff review prior to plant licensing, rather than after the 1985 NRC inspection. The additional information PP&L provided following the March 1986 meeting regarding the HPCI instrumentation's design was sufficient to allow NRC staff to determine that PP&L CFT methodology was acceptable for these items. Since the original lack of full testability was a failure to meet industry standards rather than a failure to meet a regulatory requirement, the 1985 Notice of Violation is withdrawn. This item is closed.



NRC acceptance of P.P.& L.'s methodology applies, of course only to those limited cases explicitly addressed during NRC review of this item. Any future additions and/or modifications to channel logic shall conform to all requirements applicable to Susquehanna.

8.1.3.2 (Closed) UNR 50-387/89-28-04 (Common), Operability Requirements for Control Structure Ventilation Fans

During a routine inspection, an NRC inspector noted that six Control Structure Heating, Ventilating and Air Conditioning (CSHVAC) fans (OV-103A and B, OV-115A and B, OV-117A and B) were not included in TS. The inspector also noted that these fans provided direct support to the operability function of CREOASS and was concerned when no TS could be found to address their operability. The licensee agreed to review this concern. Two additional concerns were also noted with transient equipment control and the proper latching of the suction plenum doors during a tour of the area.

The licensee addressed the inspector's operability concern (PLIS-34529) by writing a Technical Specification Interpretation (TSI) 1-90-001 to be used by control room operators that requires plant shutdown if one division of CSHVAC is inoperable for greater than 30 days. If both divisions of CSHVAC are inoperable, plant shutdown is required in 24 hours. In addition, the licensee is completing their evaluation of the CSHVAC safety functions. After it's completed, the licensee has agreed to consider requesting a TS amendment to address the results of their evaluation.

The transient equipment control issue was discussed with the licensee and the licensee discussed it with the work crew and agreed to write a transient equipment control procedure by December 31, 1990. Poor control of transient equipment and tools was also noted in previous inspections and unresolved items were written to document these findings and follow the corrective actions. The transient equipment control procedure will be reviewed under unresolved items 50-387/87-12-004 and 89-81-002.

The inspector had noted during inspection 89-28 that only three of nine latches were secured on the suction plenum door. The licensee classified this as an undesirable work practice and its correction was emphasized with maintenance personnel. The safety significance of the concern was minimized since the fan suction plenums are maintained at a slightly negative pressure which tends to hold the doors closed.

The inspector reviewed the licensee's response and noted that the TSI adequately address the operability support function of CSHVAC along with the licensee agreement to consider a TS amendment. The transient equipment and tools were secured and long term corrective action was provided. The fan doors were secured and the licensee noted this as an undesirable work practice. Based on the above, this item is closed.



8.1.3.3 (Closed) UNR 50-387/85-09-01, Corrective Actions to Enhance the Vent Stack Monitoring System

In May 1983, the licensee identified a number of deficiencies with the vent stack monitoring system (SPING) operator interface and system design. Thus, the licensee developed a SPING enhancement project intended to improve the design of the vent stack monitoring system and its operator interaction. The SPING enhancement project was divided into five phases, each consisting of various Design Change Packages (DCP's) to install modifications to resolve the identified deficiencies. These improvement modifications can be accomplished without affecting the system's operation and without an outage. Scope and funding is complete for phases 1, 2, and 4. Some of the DCP's/modifications within phase 1 and 4 have been installed and implemented (i.e., low point drain installation on the Post Accident Vent Stack Sampling Station sample tubing and installation of shut-off quick disconnects on the sentry cart isolation valve sample tubing). Phase 1 includes the installation of a new improved control terminal insert to be supplied by Eberline and the redesign of the Susquehanna Terrain-Incorporating Regional Effluent Assessment Model (STREAM) interface and is scheduled for installation in December 1990.

The inspector determined that the licensee has developed a thorough an extensive program to improve the performance of the vent stack monitoring system. Some of the planned improvements have already been implemented, and the remaining system upgrades are identified and accurately tracked on the licensee's Plant Problem List. Therefore, this issue is considered closed.

Even though this issue is closed, the inspector considers the licensee's actions untimely. This item has been in process for greater than seven years with little or no modification to the power plant. The inspector has noted that licensee actions in resolving technical problem that require plant modification are generally protracted. The need to implement timely reviews in resolving technical concerns has been emphasized to the licensee on numerous occasions. Greater management involvement is necessary in resolving technical issues in a timely fashion, especially where modifications are concerned.

The licensee established corrective actions to ensure that this problem does not recur. The air distribution in the radwaste building will be controlled by installing portable hatch covers over the north and south access shafts in the radwaste carwash area per Engineering Work Request EWR-M-70187. When the covers are installed in January 1991, the estimated ventilation supply will be approximately 400 scfm and the exhaust air will be approximately 800 scfm. This distribution of normal ventilation will maintain the carwash area slightly negative, relative to the rest of the radwaste building.



Based on this approach, the inspector has reasonable assurance that the covers will eliminate the transport of contamination throughout the radwaste building. Therefore, this item is closed.

9. MANAGEMENT AND EXIT MEETINGS

9.1 Routine Resident Exit and Periodic Meetings

The inspector discussed the findings of this inspection with station management throughout and at the conclusion of the inspection period. 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.

9.2 Attendance at Management Meetings Conducted By Region Based Inspectors

<u>Dates(s)</u>	<u>Subject</u>	<u>Inspection Report No.</u>	<u>Reporting Inspector</u>
9/14	Emergency Planning	90-18;90-18	E. Fox

Abbreviation List

AP	- Administrative Procedure
ADS	- Automatic Depressurization System
ANSI	- American Nuclear Standards Institute
CAC	- Containment Atmosphere Control
CFR	- Code of Federal Regulations
CREOASS	- Control Room Emergency Outside Air Supply System
DG	- Diesel Generator
DX	- Direct Expansion
ECCS	- Emergency Core Cooling System
EDR	- Engineering Discrepancy Report
EP	- Emergency Preparedness
EPA	- Electrical Protection Assembly
ERT	- Event Review Team
ESF	- Engineered Safety Features
ESW	- Engineering Service Water
EWR	- Engineering Work Request
FO	- Fuel Oil
FSAR	- Final Safety Analysis Report
ILRT	- Integrated Leak Rate Test
JIO	- Justifications for Interim Operation
LCO	- Limiting Condition for Operation
LER	- Licensee Event Report
LLRT	- Local Leak Rate Test
LOCA	- Loss of Coolant Accident
LOOP	- Loss of Offsite Power
MOV	- Motor Operated Valve
NCR	- Non Conformance Report
NDI	- Nuclear Department Instruction
NPE	- Nuclear Plant Engineering
NPO	- Nuclear Plant Operator
NRC	- Nuclear Regulatory Commission
OI	- Open Item
PC	- Protective Clothing
PCIS	- Primary Containment Isolation System
PMR	- Plant Modification Request
QA	- Quality Assurance
RCIC	- Reactor Core Isolation Cooling
RG	- Regulatory Guide
RHR	- Residual Heat Removal
RHRSW	- Residual Heat Removal Service Water
RPS	- Reactor Protection System
RWCU	- Reactor Water Cleanup
SGTS	- Standby Gas Treatment System
SI	- Surveillance Procedure, Instrumentation and Control
SO	- Surveillance Procedure, Operations
SOOR	- Significant Operating Occurrence Report
SPING	- Sample Particulate, Iodine, and Noble Gas





SSES - Susquehanna Steam Electric Station  
TS - Technical Specifications  
TSC - Technical Support Center  
VOTES - Valve operator test and evaluation system  
WA - Work Authorization



NRC Form 766  
(Substitute)

U. S. NUCLEAR REGULATORY COMMISSION

Principal Inspector: S. BARBER

Reviewer: P. SWETLAND

INSPECTOR'S REPORT

Inspectors: BARBER/STAIR

Docket #/Inspection #/Seq. #:

50-387/90-20

(A)

50-388/90-20

(B)

Licensee/Vendor:

Transaction Type:

Pennsylvania Power & Light Co.  
2 North Ninth Street  
Allentown, Pa. 18101

X I - Insert  
   M - Modify  
   D - Delete  
   R - Release

Period of Inspection: Inspection Performed By:

Organization Code  
of Region

From To  
09/02/90 10/06/90

   Region Office Staff  
X Resident Inspector(s)  
   Performance Appr. Team  
   Other

Region Division Branch  
I B C

Regional Action: Type of Activity Conducted (One Only)

<u>  </u> <u>NRC Form 591</u>	<u>X</u> <u>02-Safety</u>	<u>  </u> <u>07-Special</u>	<u>  </u> <u>12-Shipment/Export</u>
<u>X</u> <u>Regional</u>	<u>  </u> <u>03-Incident</u>	<u>  </u> <u>08-Vendor</u>	<u>  </u> <u>13-Import</u>
<u>  </u> <u>Office Letter</u>	<u>  </u> <u>04-Enf.</u>	<u>  </u> <u>09-Mat.Acct.</u>	<u>  </u> <u>14-Inquiry</u>
	<u>  </u> <u>05-Mgmt.</u>	<u>  </u> <u>10-Plt.Sec.</u>	<u>  </u> <u>15-Investigation</u>
	<u>  </u> <u>Audit</u>		

Inspection Findings:

Letter of Report Transmittal Date

A B C D

NRC Form 591 or  
Reg.Ltr. Issued

Report Sent to  
HQ for Action

         - Clear  
X X    - Violation  
         - Deviation  
         - Violation & Deviation

Total No. of  
Violations and  
Deviations:

1

Enforcement  
Conference  
Held

NA

Report Contains  
2.790 Information

NO

Inspection Report (Cont.):

Docket No./Report No.

Seq.

05000387/90-20.

05000388/90-20.

A

B

C

**D**

Module No.

10 CFR 2 App C  
Supplement No.

Severity/Deviation  
1/2/3/4/5/6/D \_

Site  
Related

5/35702

I.

4

     X      A

     X      B

**C**

                     **D**

**Violation or Deviation (\$2400 characters):**

10 CFR Part 50 Appendix B, Criterion V, Corrective Action, requires that the activities affecting quality shall be prescribed by documented instructions, procedures, or drawings appropriate to the circumstance and shall be accomplished in accordance with these instructions . . .

Contrary to the above, commencing on August 29, 1990 the licensee's examinations disclosed extensive internal damage of the "B" and "D" emergency diesel generators units disclosed extensive internal damage which was caused by the licensee's failure to provide adequate procedures. This damage could have led to the early traumatic failure of both of these diesel generators had they been called upon to operate for accident conditions.

This is a Severity Level IV Violation (Supplement I).



NRC Form 766 (Cont.)  
(Substitute)

MODULE INFORMATION - A

<u>Phase/ Module No.</u>	<u>Direct Insp. Hrs.</u>	<u>Percent Complete</u>	<u>Status</u>	<u>Phase/ Module No.</u>	<u>Direct Insp. Hrs.</u>	<u>Percent Complete</u>	<u>Status</u>
5/30703	1			5/71707	36.5		
5/30702				5/92701 (71707)	11		
5/61726	6			5/35702	12	60%	C
5/62703	16.5			5/93702	2		
5/90712	6			5/92720	39.5		

MODULE INFORMATION - B

<u>Phase/ Module No.</u>	<u>Direct Insp. Hrs.</u>	<u>Percent Complete</u>	<u>Status</u>	<u>Phase/ Module No.</u>	<u>Direct Insp. Hrs.</u>	<u>Percent Complete</u>	<u>Status</u>
5/71707	36			5/61726	3		
5/90712	4			5/92701 (71707)	9		
5/62703	3.5			5/92700			
5/92720	33			5/30702	12	60%	C