

December 17, 1999

Mr. Robert G. Byram  
Senior Vice President, Nuclear  
PP&L, Inc.  
2 North Ninth Street  
Allentown, PA 18101

**SUBJECT: NRC INTEGRATED INSPECTION REPORT 05000387/99011 and  
05000388/99011**

Dear Mr. Byram:

On November 20, 1999, the NRC completed an inspection at the Susquehanna Steam Electric Station (SSES) Unit 1& 2 reactor facilities. The enclosed report covered routine activities by the resident inspectors and announced inspections of your Radiological Waste Management, Radiological Materials Transportation, and Maintenance programs by Region I specialists. The inspectors discussed the findings of these inspections with Mr. R. Saunders, Vice President Nuclear Operations, Mr. B. Shriver, General Manager SSES, and other members of your staff, at an exit meeting at the completion of the inspections.

Overall, your staff safely operated the facility during this period. Nevertheless, we noted an additional occurrence where your staff was slow initiating suppression pool cooling when conditions warranted. This inspection report also documented an occurrence where your staff used informal means to accept a component's performance during a surveillance test when that performance did not satisfy the test's acceptance criteria. We understand that senior station management does not accept these informal means and, in this occurrence, the component was ultimately determined to be acceptable following supplemental testing. Nevertheless, we are concerned that use of informal means to resolve such problems circumvents your corrective action system. Your continued attention to this area is warranted.

In addition, based on the results of this inspection, the NRC has determined that one violation of NRC requirements occurred. The Severity Level IV violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1.a of the Enforcement Policy (November 9, 1999; (64 FR 61142)). The NCV is described in the enclosed inspection report and involved main steam isolation valve leak rate testing. If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region I, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001 and the NRC Resident Inspector at the Susquehanna Steam Electric Station.

Mr. Robert G. Byram

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be placed in the NRC Public Document Room.

Sincerely,

**Original Signed By**

Curtis J. Cowgill, Chief  
Projects Branch 4  
Division of Reactor Projects

Docket Nos: 50-387;50-388  
License Nos: NPF-14, NPF-22

Enclosure: Inspection Report 05000387/99011, 05000388/99011

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REGION I

Docket Nos: 05000387, 05000388  
License Nos: NPF-14, NPF-22

Report No. 05000387/99011, 05000388/99011

Licensee: PP&L, Inc.  
2 North Ninth Street  
Allentown, PA 19101

Facility: Susquehanna Steam Electric Station

Location: P.O. Box 35  
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Dates: October 17, 1999 through November 20, 1999

Inspectors: S. Hansell, Senior Resident Inspector  
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Approved by: Curtis J. Cowgill, Chief  
Projects Branch 4  
Division of Reactor Projects

## EXECUTIVE SUMMARY

### Susquehanna Steam Electric Station (SSES), Units 1 & 2 NRC Inspection Report 05000387/99011, 05000388/99011

This inspection included aspects of PP&L's operations, maintenance, engineering and plant support at SSES. The report covers a five-week period of routine resident inspection activities and announced inspections by regional specialists.

#### Operations

- PP&L delayed starting Unit 1 suppression pool cooling after the suppression pool water high temperature alarm had annunciated. Although this delay resulted in suppression pool water temperature exceeding the Technical Specification (TS) limit, temperature was restored within the allowed time. In addition, PP&L did not recognize that the suppression pool water temperature had exceeded the TS limit until after the water temperature had been restored. The NRC had previously identified a similar issue regarding delayed starting of suppression pool cooling in NRC Inspection Report 50-387, 388/99-06. (section O4.1)
- PP&L's initial response to the "A" emergency diesel generator toxic gas event was appropriate and ensured personnel safety throughout the event. Areas for improvement in the emergency preparedness area were captured in the corrective action program. (section O4.2)
- In a Licensee Event Report, PP&L identified that the "C" outboard main steam isolation valve did not meet the Technical Specification seat leakage specification. PP&L's corrective actions, including valve rebuild and re-test activities, were good. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with section VII.B.1.a of the NRC Enforcement Policy. This violation was documented in PP&L's corrective action program as condition report 187209. (section O8.2)

#### Maintenance

- PP&L inappropriately used an informal process to determine that a core spray relay met specified surveillance test acceptance criteria. Although the core spray relay did not meet the specified surveillance acceptance criteria, PP&L concluded that the relay was functional based on their previous experience. After the core spray technical specification surveillance test results were approved, PP&L recognized that their actions were informal and inappropriate and performed an alternate test which verified that the core spray relay was functional. (section M4.1)
- On November 5, and on November 17, contract maintenance workers caused unexpected reactor protection system actuations (half-scrams). The inspectors concluded that PP&L's corrective actions for the November 5 event were narrowly focused and as a result, not effective at preventing a similar event on November 17. (section M4.2)

- During observations of five pre-planned work activities, the inspectors identified two examples of informal work control. Maintenance workers did not follow PP&L procedures and did not obtain the required approvals for changes to pre-approved work instructions. PP&L concluded that unapproved changes to work instructions did not meet management expectations. (section M4.3)

#### Engineering

- Three safety evaluations, performed for the Independent Spent Fuel Storage Installation, were reviewed and met the requirements of 10 CFR 50.59 and 10 CFR 72.48. The inspectors noted that, in one case, the basis for some assumptions and conclusions were not documented within the evaluation. (section E4.1)

#### Plant Support

- PP&L's solid radioactive waste management program continued to be effective, based on proper implementation of the program, the use of documented procedures and controls, satisfactory record keeping, and the acceptable condition of facilities and equipment. Also, the Process Control Program was detailed and provided a description of the waste types generated, waste stream sampling and analyses performed, and waste processing methods used. (section R1.1)
- PP&L's program to transport low level radioactive waste and other radioactive materials was generally effective. (section R1.2)
- The assessment and corrective action programs, in the areas of radioactive waste and radioactive material transportation, were effective. The problem identification and corrective action program identified and adequately resolved Condition Reports. (section R7)

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## **Report Details**

### **Summary of Plant Status**

Susquehanna Steam Electric Station (SSES) Unit 1 operated at 100% power throughout the inspection period.

SSES Unit 2 operated at 99.7% power throughout the inspection period, due to reactor recirculation pump speed anomalies, with one exception. On November 20, power was reduced to 96% for planned maintenance then returned to 99.7% power.

## **I. Operations**

### **O1 Conduct of Operations <sup>1</sup>**

#### **O1.1 Unit Operations and Operator Activities (71707)**

The inspectors determined routine operator activities were satisfactorily established, communicated and conservatively performed in accordance with SSES procedures. One exception, relating to the control of suppression pool water temperature, was noted. Control room logs accurately reflected plant activities. The inspectors observed good turn-over briefings and formal communications during tours of the main control room.

The inspectors observed increased PP&L management presence in the plant and continued improvements in plant housekeeping during the inspection period.

### **O2 Operational Status of Facilities and Equipment**

#### **O2.1 Operational Safety System Alignment (71707)**

During routine plant tours, the proper alignment and operability of various safety systems, engineered safety features and on-site power sources were verified. Partial walkdowns were performed for the Unit 2 residual heat removal (RHR) system, the "A" and "E" emergency diesel generators (EDGs), and the Unit 1 reactor core isolation cooling (RCIC) system.

During this inspection period some problems occurred which challenged the plant staff. Most notable were two unexpected reactor protection system half-scrams and a flange leak on the minimum flow line for the Unit 2 "D" RHR pump.

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<sup>1</sup> Topical headings such as O1, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics.



## **O4 Operator Knowledge and Performance**

### **O4.1 Control of Suppression Pool Water Temperature**

#### **a. Inspection Scope (71707,40500)**

The inspectors assessed the Plant Control Operators' (PCOs) response to suppression pool water high temperature alarms to determine if PP&L activities were conducted in accordance with NRC requirements and PP&L procedures.

#### **b. Observations and Findings**

On November 19, 1999, at 6:07 a.m., the Unit 1 suppression pool water high temperature alarm annunciated at 88 degrees Fahrenheit (°F). The alarm response procedure directed the operators to start suppression pool cooling. The PCO was not directed to start suppression pool cooling until 8:40 a.m. (about 2-1/2 hours later). At 8:58 a.m., after suppression pool cooling had commenced, water temperature exceeded 90°F.

The operators did not recognize that Unit 1 suppression pool water temperature had exceeded the 90°F limit specified by Technical Specification (TS) 3.6.2.1, "Suppression Pool Average Temperature," until after the water temperature was restored to below 90°F. The operators did not log or document that Unit 1 had entered a TS limiting condition for operation (LCO) as required by operations department procedures. The suppression pool water temperature was restored to less than 90°F within 30 minutes after suppression pool cooling was started. Since Technical Specifications allow 24 hours to restore temperature to below the limit, no violation of TS 3.6.2.1 occurred. Nevertheless, the failure to log or document entry into a TS LCO, as required by PP&L procedures, constitutes a violation of minor significance that is not subject to formal enforcement action. This violation was documented in PP&L's corrective action program as condition report 216976.

The inspectors noted that Unit 1 had 7 safety relief valves with identified seat leakage. This valve leakage added heat directly into the suppression pool, resulting in frequent operation (every 1-2 days) of suppression pool cooling to maintain water temperature within limits. The inspectors also noted that the delay to start suppression pool cooling did not meet PP&L management's expectations. The NRC had previously identified a similar issue regarding delayed startup of suppression pool cooling in NRC Inspection Report 50-387,388/99-06.

#### **c. Conclusions**

PP&L delayed starting Unit 1 suppression pool cooling after the suppression pool water high temperature alarm had annunciated. Although this delay resulted in suppression pool water temperature exceeding the Technical Specification (TS) limit, temperature was restored within the allowed TS action time. In addition, PP&L did not recognize that the suppression pool water temperature had exceeded the TS limit until after the water temperature had been restored. The NRC had previously identified a similar issue

regarding delayed startup of suppression pool cooling in NRC Inspection Report 50-387,388/99-06.

#### O4.2 Toxic Gas in the "A" Emergency Diesel Generator Room

##### a. Inspection Scope (71707,71750)

The inspectors observed PP&L's response to a toxic gas event associated with a flush of the jacket water cooling system for the "A" emergency diesel generator (EDG). The review evaluated the initial organization response, procedure implementation, and emergency preparedness assessment.

##### b. Observations and Findings

On October 26, 1999, PP&L initiated a sulfuric acid flush of the "A" EDG to remove corrosion deposits in the jacket water cooling system. The sulfuric acid unexpectedly reacted with residual jacket water coolant and created an unknown gas. The gas was primarily confined to a 55 gallon drum in the "A" EDG room. The initial response included evacuating the EDG room, securing the sulfuric acid flow and room ventilation, and notifying the control room. The safety and chemistry departments responded to the scene, identified the unknown gas as nitric oxide, and evaluated the impact of the gas on personnel and equipment.

Fire brigade personnel entered the room in self contained breathing apparatus to monitor the conditions and sample the air. The room ventilation was started to remove any residual gas and allow entry without protective equipment. No personnel were harmed by the nitric oxide gas. The concentrations outside of the 55 gallon barrel were below the Occupational Safety and Health Administration (OSHA) safety limits.

The inspectors reviewed the PP&L emergency plan action levels (EALs) for toxic gases. EP-AD-000-200, "Toxic/Flammable Gases," contained generic guidance for the Unusual Event and Alert level classifications for toxic gas events. Although the specific actions for this event were properly executed, the unclear EAL guidance could result in an improper application of the emergency plan. Also, the EAL basis document was not available in the control room as a reference. PP&L initiated two condition reports, 210528 and 210799, to address the unexpected toxic gas generation and emergency preparedness issues.

##### c. Conclusions

PP&L's initial response to the "A" emergency diesel generator toxic gas event was appropriate and ensured personnel safety throughout the event. Areas for improvement in the emergency preparedness area were captured in the corrective action program.

## **O8 Miscellaneous Operations Issues**

### **O8.1 Licensee Event Report (LER) Review (71707,92700)**

#### (Closed) LER 50-387/92-015-04

##### Fire Barriers Not Surveilled and Not Installed per Specification

The original LER documented that certain Kaowool fire barriers had not been inspected as required by Technical Specifications (TS), and that identified installation discrepancies rendered certain fire barriers inoperable. LER revisions in 1992, 1993, and 1995 documented additional discrepancies. During this period, fire watch patrols in all of the affected areas performed compensatory actions as required TS. This issue was discussed in NRC Inspection Report (IR) 50-387,388/92-23 and IR 50-387,388/95-12, and violations of NRC requirements were cited (NOV 50-387,388/92-23-04, 06, 07, and 08).

This LER revision documented several additional fire barrier installation discrepancies recently identified during on-going thermo-lag modification work. The fire zones associated with the newly identified inoperable fire rated barriers have had compensatory fire watch patrols since the original issue was identified in 1992. No additional issues or violations of NRC requirements were identified. This LER is closed.

#### (Closed) LER 50-387/92-020-00

##### Secondary Containment Bypass Leakage (SCBL) Maximum Path Exceeded

On July 27, 1999, PP&L determined that the maximum allowed SCBL leakage, as analyzed in the FSAR, had been exceeded on 6 occasions from 1990 to 1992. This occurred when a spectacle flange on the primary containment nitrogen supply line was not installed in the closed position while the plant was at power.

In 1996, PP&L revised the analysis method for determining SCBL which resulted in raising the limit from 5 standard cubic feet per hour (scfh) to 9 scfh. PP&L determined that the bypass leakage for the time period from 1990 to 1992 did not exceed the revised 1996 limit and was bounded by the 1996 FSAR bypass leakage analysis. PP&L established appropriate administrative controls to ensure that potential SCBL leakage is evaluated prior to removal of the spectacle flange.

The inspectors concluded that the consequence of the spectacle flange left in the open position was of minor safety significance. The inspectors determined that the failure to translate design requirements into instructions and procedures is a violation of 10 CFR 50 Appendix B, Criterion III, "Design Control." Therefore, the failure to establish procedures to control the removal of the nitrogen supply line spectacle flange constitutes a violation of minor significance that is not subject to formal enforcement action. This LER is closed.

(Closed) LER 50-387/99-001-02Loss of Both Loops of Residual Heat Removal (RHR) Low Pressure Coolant Injection

On February 27, 1999, PP&L determined that a stem failure had occurred on RHR valve HV-151-F017B, which made the "B" loop of RHR low pressure coolant injection (LPCI) inoperable. PP&L subsequently determined that while the "B" loop was inoperable the "A" loop of RHR had been removed from service for maintenance, making both loops of RHR LPCI inoperable for a 17 hour period. This issue was discussed in NRC IR 50-387,388/99-03 and IR 50-387,388/99-04, and a violation of NRC requirements was cited (NCV 50-387,388/99-04-02).

This LER revision added additional details to the assessment of the consequences of the valve failure. The inspectors reviewed PP&L's detailed assessment report (part of CR 90971), and concluded that the LER revision accurately presented the event information and safety assessment. No additional issues or violations of NRC requirements were identified. This LER is closed.

08.2 PP&L Analysis of Main Steam Isolation Valve Failure and Closure of LER 50-387/99-003-00

a. Inspection Scope (92700,61726,37551,40500)

The inspectors observed and reviewed PP&L's root cause analysis of the Unit 1 "C" outboard main steam Isolation valve (MSIV) failure and automatic reactor shutdown. The inspectors also reviewed LER 50-387/99-003-00.

b. Observations and Findings

On July 1, 1999, the Unit 1 "C" outboard MSIV stem separated from the valve poppet, resulting in an automatic reactor shutdown. PP&L determined that the stop plate had not been properly installed in the valve poppet during valve maintenance performed in 1990. PP&L reviewed the maintenance history on all Unit 1 and Unit 2 MSIVs, inspected 3 additional Unit 1 MSIVs, and found no additional problems. The inspectors concluded that PP&L performed a thorough root cause analysis and a comprehensive extent of condition review. This event was discussed in NRC IR 50-387,388/99-06.

In addition, in LER 50-387/99-003-00, PP&L identified that the as-found seat leakage rate through the "C" outboard MSIV did not meet Technical Specification (TS) 3.6.1.3 local leak rate testing (LLRT) acceptance criteria. The excessive leakage for the MSIV was attributed to the valve stem separation from the valve poppet. The leakage was corrected prior to plant startup. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with section VII.B.1.a of the NRC Enforcement Policy. This violation was documented in PP&L's corrective action program as condition report 187209. **(NCV 50-388/99-11-01)**

The inspectors reviewed the MSIV leak rate history. The inspectors' in field review verified that the deficiencies were corrected, engineering is evaluating the historical leakage data, and the problem was entered into the corrective action program for

additional review. The inspectors determined that PP&L properly identified and reported this issue and found PP&L's proposed and completed corrective actions to be appropriate. LER 50-387/99-003-00 is closed.

c. Conclusion

In a Licensee Event Report, PP&L identified that the "C" outboard main steam isolation valve did not meet the Technical Specification seat leakage specification. PP&L's corrective actions, including valve rebuild and re-test activities, were good. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with section VII.B.1.a of the NRC Enforcement Policy. This violation was documented in PP&L's corrective action program as condition report 187209.

## II. Maintenance

### **M1 Conduct of Maintenance**

#### M1.1 Surveillance and Pre-Planned Maintenance Activity Review

a. Inspection Scope (61726,62707,40500)

The inspectors observed and reviewed selected portions of pre-planned maintenance and surveillance activities, to determine whether the activities were conducted in accordance with NRC requirements and SSES procedures.

b. Observations and Findings

The inspectors observed portions of the following work activities and surveillances:

Work Authorizations

RTPM 100868	Votes Test for RCIC HV-149-F019
PCWO 100217	Modify RCIC BDID 17674A2 (DCP 98-3014A)
RTPM 201119	Votes Test for RCIC HV-150-F045
RTPM 103132	Replace RCIC Steam Trap ST-149D003
PCWO 105337	"A" EDG Governor Instability Investigate & Rework
RTPM 100478	"A" EDG Post Overhaul Engine Analysis & Load Balance
PCWO 214659	"A" EDG Troubleshooting
PCWO 214914	Leak Testing of "2D" RHR Minimum Flow Orifice Flanges

Surveillances

SI-199-226	Excess Flow Check Valve XV-142-F059G Functional Test
OP-149-005	RHR Suppression Pool Cooling

Selected portions of procedures and drawings associated with the maintenance and surveillance activities were also reviewed and determined to be acceptable. In general, the inspectors noted that maintenance personnel were knowledgeable of their assigned activities.

c. Conclusions

Maintenance and surveillance activities satisfied NRC requirements and were generally conducted in accordance with PP&L procedures.

M1.2 Maintenance Program Implementation Review

a. Inspection Scope (62700)

During November 15-19, 1999, the inspectors verified that maintenance activities for risk significant structures, systems, and components (SSCs) were being conducted in a manner that resulted in reliable and safe operation of the plant. The inspectors reviewed and evaluated the work control process and recent actions to identify and improve SSC performance.

The inspectors reviewed the performance of maintenance activities for the following risk significant systems: emergency diesel generators, instrument air, emergency service water, residual heat removal, reactor protection, 125 VDC, 250 VDC, 4.16 KV, control rod manual control, and control rod drive hydraulics systems.

The inspectors observed a Maintenance Rule (10 CFR 50.65) expert panel meeting, dealing with the performance goals for the liquid radwaste system, and reviewed the Maintenance Rule 50.65(a)(3) periodic assessment dated March 4, 1999.

b. Observations and Findings

The Maintenance Rule expert panel for the liquid radwaste system provided a positive influence on effective goal setting.

The periodic assessment provided some good findings on the Maintenance Rule program. PP&L took corrective actions that appeared to be responsive to the findings of the assessment.

All Maintenance Rule category (a)(1) and (a)(2) SSCs are required to be included in the Maintenance Rule (a)(3) periodic assessment. The inspectors noted that the March periodic assessment included all category (a)(1) SSCs, but only included a sample of 8 category (a)(2) SSCs. The inspectors concluded that the Maintenance Rule quarterly report and the system quarterly reports, in conjunction with the March periodic assessment, satisfied most of the assessment elements discussed in Nuclear Management and Resources Council (NUMARC) 93-01. PP&L initiated condition report 215989 to better define the (a)(3) periodic assessment activities.

The inspectors interviewed plant personnel and reviewed plant procedures that detailed the work control process. The inspectors determined the procedures adequately described the work control process. The inspectors observed daily meetings concerning the control of the work control process. The meetings were effective in the identification of issues that required additional work planning and coordination to affect repairs to plant equipment. The inspectors determined the work control process was conducted in accordance with the plant procedures. No significant findings were identified.

c. Conclusions

Maintenance Rule (10 CFR 50.65) activities and the work control process satisfied NRC requirements, with no significant findings identified.

**M4 Maintenance Staff Knowledge and Performance**

M4.1 Core Spray Relay Logic Surveillance Test Failure

a. Inspection Scope (61726,62707,40500)

The inspectors reviewed maintenance activities related to high contact resistance in the core spray (CS) logic relays. The activities and work documents were reviewed to determine whether the activities were conducted in accordance with NRC requirements and SSES procedures.

b. Observations and Findings

On October 31, 1999, PP&L performed surveillance test SI-180-301, required by TS, to verify that the CS and LPCI logic will properly function during accident conditions. The surveillance acceptance criteria required the relay contacts to indicate closed with a resistance of approximately zero Ohms. One CS relay contact was identified as having a resistance value of 2,500 Ohms which should have resulted in a surveillance test failure. Maintenance technicians cycled the relay approximately twelve times and used different instruments to measure the resistance, but the final contact resistance varied between 2,000 and 4,000 ohms. PP&L documented the abnormal contact resistance in condition report 211294.

Maintenance management reviewed the test data and, based upon previous experience with oxide buildup on relay contacts, assumed that the contact was functional with the observed contact resistance. Because the contact was considered operable, maintenance management concluded that the surveillance test acceptance criteria had been satisfied. The surveillance test was approved as satisfactory. No formal assessment, operability determination, or surveillance test procedure change was performed.

After the inspectors discussed the surveillance results with PP&L, PP&L determined that an additional functional test was necessary to confirm maintenance's decision on relay contact resistance acceptability. On November 4, an alternate test demonstrated that the relay and core spray logic would function with the abnormal contact resistance.

The inspectors determined that the October 31, 1999, as-found contact resistance did not satisfy the specified surveillance test acceptance criteria, but had been signed-off as acceptable. The inspectors concluded that PP&L failed to complete the core spray surveillance test in accordance with the instructions of the surveillance test. 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be accomplished in accordance with prescribed instructions. This constitutes a violation of minor significance that is not subject to

formal enforcement action, because the alternate testing verified the operability of the contact.

c. Conclusion

PP&L inappropriately used an informal process to determine that a core spray relay met specified surveillance test acceptance criteria. Although the core spray relay did not meet the specified surveillance acceptance criteria, PP&L concluded that the relay was functional based on their previous experience. After the core spray technical specification surveillance test results were approved, PP&L recognized that their actions were informal and inappropriate and performed an alternate test which verified that the core spray relay was functional.

M4.2 Control of Work during Thermo-Lag Fire Barrier Modifications

a. Inspection Scope (62707,71707)

On November 5, and on November 17, maintenance activities for thermo-lag modification work caused a reactor protection system (RPS) actuation (half-scam). The inspectors reviewed PP&L's response to determine whether the work activities were conducted in accordance with NRC requirements and SSES procedures.

b. Observations and Findings

On November 5, 1999, the Unit 1 "A" division of RPS tripped (half-scam) due to a momentary reactor high pressure trip signal. PP&L determined the trip signal was caused when a contract maintenance worker installing thermo-lag insulation on cable conduit inadvertently bumped an instrument line associated with instrument scam rack 1C004 (the worker was on scaffolding directly above the rack).

PP&L halted all thermo-lag work and conducted a two day work stand-down to review the event with the contract maintenance work group. PP&L concluded that the workers were not sufficiently knowledgeable of their work environment or the risk of inadvertent instrumentation actuation. Thermo-lag work recommenced on November 8. The corrective actions included increased operator oversight of thermo-lag work, restriction of maintenance activities (i.e., I&C testing) which could result in an RPS actuation to time periods with no thermo-lag work in designated critical areas, and increased thermo-lag work status monitoring by control room operators.

On November 17, the Unit 1 "A" division of RPS tripped (half-scam) due to a momentary trip signal. PP&L determined the trip signal was caused when a contract maintenance worker from a different work group inadvertently bumped an instrument on scam rack 1C004 while erecting scaffolding for thermo-lag work.

The inspectors determined that plant operators responded appropriately to the unexpected instrument trips and that the contract workers were very knowledgeable of the technical details and job skills required to perform their specialty tasks.



The inspectors noted that PP&L did not include contract maintenance workers who install scaffolding to support the thermo-lag work group, in the contract maintenance work group stand-down following the first RPS actuation. The inspectors also noted that PP&L's initial corrective actions, to review the event with the contract maintenance work group and provide additional work oversight, did not prevent a similar occurrence 12 days later. No violation of NRC requirements was identified.

c. Conclusion

On November 5, and on November 17, contract maintenance workers caused unexpected reactor protection system actuations (half-scrams). The inspectors concluded that PP&L's corrective actions for the November 5 event were narrowly focused and as a result, were not effective at preventing a similar event on November 17.

M4.3 Control of Work Instruction Revision during Maintenance Activities

a. Inspection Scope (62707,37551)

On November 3, 1999, the inspectors observed selected portions of five pre-planned maintenance activities during a reactor core isolation cooling (RCIC) system outage window. The activities and work documents were reviewed to determine whether the activities were conducted in accordance with NRC requirements and SSES procedures.

b. Observations and Findings

In general, the inspectors observed that maintenance workers adhered to pre-approved work instructions, PP&L procedures, and good work practices. The inspectors noted that the maintenance workers were knowledgeable of their assigned activities. However, the inspectors identified two examples where the maintenance workers deviated from the approved work instructions.

Modification of Back Draft Isolation Damper Counterweight: The inspectors observed in-progress modification activities on a RCIC room steam flooding back draft isolation damper (BDID 17674A2). The work instructions required the damper to be closed during the modification work then re-opened for post maintenance testing. Nevertheless, the maintenance workers determined that the damper had to be gagged open in order to perform the work. After obtaining verbal approval from a modification group engineer, the workers proceeded without revising the approved work instructions, and without obtaining concurrence from either work control or shift operations to place a safety related component in a non-fail-safe condition.

Votes Test of RCIC HV-149-F019: The inspectors observed post maintenance test activities on HV-149-F019, a RCIC system motor operated valve. The work instructions required a Votes Torque Cartridge (VTC) to be installed for the Votes test, and required the Votes test to be performed in accordance with MT-EO-021, "Votes-MOV Diagnostic Test." MT-EO-021 contained detailed steps for the performance of a VTC test. The maintenance workers, under the direct supervision of a maintenance engineer, were

performing a modified VTC test which was not described, reviewed, or approved in either the work instructions or the associated maintenance procedure.

The inspectors concluded that, in these two examples of informal work control, work management and operations had been effectively removed from the review and approval of changes to pre-approved work. NDAP-QA-0502, "Work Order Process," required changes to work instructions to be reviewed and approved. PP&L Maintenance concluded that the failure to approve work instruction changes did not meet PP&L management expectations. The inspectors determined that the failure to follow required PP&L procedures constitutes a violation of minor significance that is not subject to formal enforcement action.

c. Conclusion

During observations of five pre-planned work activities, the inspectors identified two examples of informal work control. Maintenance workers did not follow PP&L procedures and did not obtain the required approvals for changes to pre-approved work instructions. PP&L concluded that unapproved changes to work instructions did not meet management expectations.

### **III. Engineering**

#### **E4 Engineering Staff Knowledge and Performance**

##### **E4.1 Independent Spent Fuel Storage Installation Safety Evaluation Review**

a. Inspection Scope (37551,60855)

The inspectors reviewed three safety evaluations performed for the Independent Spent Fuel Storage Installation (ISFSI), to determine whether the activities were conducted in accordance with NRC requirements and SSES procedures.

b. Observations and Findings

The inspectors determined that the safety evaluations and screening determinations satisfied the requirements of 10 CFR 50.59 and 10 CFR 72.48. Nevertheless, in one case, a screening determination for installation of a temporary instrument on the reactor building crane, did not provide a sufficient level of detail to support the assumptions and conclusions stated within the document. The inspectors noted that review of additional information, not referenced by the screening determination, was necessary to verify some of the assumption and conclusions contained within the determination.

c. Conclusions

Three safety evaluations, performed for the Independent Spent Fuel Storage Installation, were reviewed and met the requirements of 10 CFR 50.59 and 10 CFR 72.48. The inspectors noted that, in one case, the basis for some assumptions and conclusions were not documented within the evaluation.

#### IV. Plant Support

### **R1 Radiological Protection and Chemistry (RP&C) Controls**

#### **R1.1 Implementation of the Solid Radioactive Waste Program**

##### **a. Inspection Scope (86750-01)**

The inspectors selectively reviewed the availability of documentation of regulatory requirements; PP&L's verification of the license status of organizations to which it shipped radioactive materials; applicable procedures, processes and vendors used for solid waste management; radioactive shipments made since the last inspection; use of scaling factors; radiological housekeeping; and the Process Control Program. Information was gathered through observation of activities, tours of the radiologically controlled area, discussions with cognizant personnel, and review and evaluation of procedures and documents.

##### **b. Observations and Findings**

Up-to-date copies of the applicable NRC and Department of Transportation (DOT) regulations were readily available on PP&L's computer intranet. Copies of the current licenses for recipients of radioactive shipments from PP&L were available. Detailed procedures existed for the solid waste processing and disposal activities. A training procedure was in place which clearly defined the authorization required for an individual to certify low level radioactive waste shipments in accordance with Section II of Appendix G to 10 CFR 20.1001-20.2402. As part of a campaign to reduce the volume of radioactive waste stored on the site over the past several months PP&L shipped sixty-five containers of bead resin, twenty-six of them directly to burial and the remainder to various radioactive waste processors for volume reduction and disposal. The Process Control Program was properly documented and included a description of the waste types generated, waste stream sampling and analysis performed, and waste processing methods used. Procedures were also used for obtaining and analyzing 10 CFR 61 samples and using the resultant data to determine scaling factors to quantify the concentration of hard-to-measure radionuclides in materials or for classification of wastes. Up-to-date waste stream data was available.

In general, adequate radiological housekeeping was observed during tours of the facilities, including the low level radioactive waste storage facility and the radioactive waste building which houses the wet waste processing and de-watering area, the dry active waste (DAW) sorting area, and the potentially clean trash measurement area. Radioactive material and waste were properly labeled and stored in designated locations. Areas and equipment were generally clean and uncluttered. Station walkways were clear of obstacles or tripping hazards.

PP&L prepared for the radioactive waste evolutions in a proficient and effective manner. They surveyed the DAW sorting area and potentially clean trash measurement area. PP&L used a new potentially clean trash measurement device. PP&L documented an evaluation of the potentially clean trash monitoring equipment in a technical basis report

which stated that the level of detection was equal or less than the distributed activity value in Regulatory Guide 1.86.

For performance measurement purposes, PP&L tracked the volume of solid dry active and wet radioactive waste that was generated and disposed. The actual volume of wet solid waste generated through October 1999 was well below the 1999 annual goal. The actual volume of dry active solid waste generated through October 1999 had exceeded the 1999 annual goal due to some unplanned evolutions. Annual goals were established for the years 2000 through 2002 for radwaste generation volumes.

c. Conclusions

PP&L's solid radioactive waste management program continued to be effective, based on proper implementation of the program, the use of documented procedures and controls, satisfactory record keeping, and the acceptable condition of facilities and equipment. Also, the Process Control Program was detailed and provided a description of the waste types generated, waste stream sampling and analyses performed, and waste processing methods used.

R1.2 Compliance with NRC and DOT Regulations for Shipping of Low Level Radioactive Waste for Disposal and Transportation of Other Radioactive Materials

a. Inspection Scope (86750-01)

The inspector selectively reviewed a variety of completed shipping documentation packages. The reviewed material included documentation for shipments of de-watered reactor water clean-up filter media, de-watered bead resin, contaminated protective clothing and other launderable items, dry radioactive waste, 10 CFR 61 samples, and contaminated sand blasting equipment. The inspector also reviewed radiation and contamination surveys, PP&L's determination of DOT shipment subtype, packaging, marking, labeling, and placarding requirements, shipping paper requirements, driver's instructions, emergency response information, and packaging certifications. Information was gathered through observation of activities, tours of the radiologically controlled area, discussions with cognizant personnel, and review and evaluation of procedures and documents.

b. Observations and Findings

Shipments of radioactive material and radioactive waste were made in conformance with NRC and DOT regulations. The quantities of radioactivity and radiation levels contained in each package were appropriately described. The shipping manifests and supporting documentation were properly prepared; radiation and contamination limits were met; waste was properly classified, and shipments were properly typed as to their DOT class. Certificates of compliance for shipping containers were available as required. Transport vehicles for an incoming and an outgoing contaminated laundry shipment were observed to be properly placarded.

c. Conclusions

PP&L's program to transport low level radioactive waste and other radioactive materials was generally effective.

## **R5 Staff Training and Qualification in RP&C Activities**

### a. Inspection Scope (86750-01)

The inspector selectively reviewed training of personnel relative to NRC Bulletin No. 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," and relative to Subpart H-Training of 49 CFR 172. Information was gathered through discussions with cognizant personnel and review and evaluation of procedures and documents.

### b. Observations and Findings

In response to IE Bulletin No. 79-19 and 49 CFR 172, Subpart H, PP&L provided periodic retraining for radioactive waste group personnel in the NRC and DOT regulatory requirements and in the waste burial license requirements. Additionally, personnel training for the use and application of a computerized program relied upon to determine appropriate radioactive waste scaling factors had been conducted by the program vendor. Training records and status for the individuals involved were current.

### c. Conclusions

Based on the type and periodicity of documented training, the NRC and Department of Transportation training and retraining requirements for the radioactive waste group personnel were met.

## **R7 Quality Assurance and Self-Assessment in RP&C Activities**

### a. Inspection Scope (83750-02)

The inspector selectively reviewed various assessment activities conducted since the last NRC inspection including implementation of corrective actions. These included auditing of solid radwaste process controls, surveillances of radioactive waste/material storage and of a radioactive waste shipment, quality control inspections of radioactive shipments, and self-assessments by the radioactive waste group. Various condition reports were also reviewed. Information was gathered through discussions with cognizant personnel and review and evaluation of procedures and documents.

### b. Observations and Findings

A corporate biennial audit of the Process Control Program was in progress at the time of this inspection. Surveillance reports (Nos. 99-054 and 99-058) were detailed and focused on storage requirements in the low level radioactive waste storage facility and on a shipment of radioactive waste to a volume reduction processor.

Radioactive material/waste processing, packaging, and shipping activities received quality control inspections and quarterly summary results were generated.

In part, PP&L's self-assessment program involved checklist-driven observations in the areas of radioactive waste processing, decontamination practices, dry radioactive waste generation, loading DAW containers, and housekeeping. The Self-Assessment Report for the third quarter of 1999 showed that each assessment area was analyzed separately to identify specific issues and also compared to one another to identify differences/trends.

PP&L's problem identification and corrective action program used Condition Reports (CRs) as the tracking document. Selected CRs, generated since the last inspection in this area, were reviewed for significance, characterization, and the adequacy and timeliness of the corrective actions. This review found that the CRs were handled adequately.

c. Conclusions

The assessment and corrective action programs, in the areas of radioactive waste and radioactive material transportation, were effective. The problem identification and corrective action program identified and adequately resolved Condition Reports.

## **V. Management Meetings**

### **X1 Exit Meeting Summary**

A Region I specialist presented the results of the Radiological Waste Management and Radioactive Materials Transportation programs inspection (sections R1, R5, and R7) to members of PP&L management at the conclusion of the inspection, on November 19, 1999. PP&L acknowledged the findings presented.

Region I specialists presented the results of the Maintenance Program Implementation inspection (section M1.2) to members of PP&L management at the conclusion of their inspections, on November 19, 1999. PP&L acknowledged the findings presented.

The inspectors presented the inspection results to members of PP&L management at the conclusion of the inspection period, on December 7, 1999. PP&L acknowledged the findings presented.

The inspectors asked PP&L whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

### INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering Observations
IP 40500	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 60855	Operations of an ISFSI
IP 61726	Surveillance Observations
IP 62700	Maintenance Program Implementation
IP 62707	Maintenance Observations
IP 71707	Plant Operations
IP 71750	Plant Support Activities
IP 83750	Occupational Radiation Exposure
IP 84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92700	On Site Followup of Reports

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

None.

#### Opened/Closed

50-387/99-11-01	NCV	PP&L Analysis of Reactor Scram due to Main Steam Isolation Valve Failure (section O8.2)
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#### Updated

None.

#### Closed

50-387/92-015-04	LER	Fire Barriers Not Surveilled and Not Installed per Specification (section O8.1)
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50-387/92-020-00	LER	Secondary Containment Bypass Leakage (SCBL) Maximum Path Exceeded (section O8.1)
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50-387/99-001-02	LER	Loss of Both Loops of Residual Heat Removal Low Pressure Coolant Injection (section O8.1)
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50-387/99-003-00	LER	PP&L Analysis of Reactor Scram due to Main Steam Isolation Valve Failure (section O8.2)
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### LIST OF ACRONYMS USED

BDID	Back Draft Isolation Damper
CFR	Code of Federal Regulations
CR	Condition Report
CS	Core Spray
DAW	Dry Active Waste
DCP	Design Change Package
DOT	Department of Transportation
EAL	Emergency Plan Action Level
EDG	Emergency Diesel Generator
°F	Fahrenheit
FSAR	Final Safety Analysis Report
ISFSI	Independent Spent Fuel Storage Installation
IR	[NRC] Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LLRT	Local Leak Rate Test
LPCI	Low Pressure Coolant Injection
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NDAP	Nuclear Department Administrative Procedure
NOV	[NRC] Notice of Violation
NRC	Nuclear Regulatory Commission
NUMARC	Nuclear Management and Resources Council
OD	Operability Determination
OSHA	Occupational Safety and Health Administration
PCO	Plant Control Operator
PCPR	Plant Component Problem Report
PP&L	Pennsylvania Power and Light Company
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RPS	Reactor Protection System
RP&C	Radiological Protection and Chemistry
SCBL	Secondary Containment Bypass Leakage
scfh	Standard Cubic Feet per Hour
SSCs	Structures, Systems, and Components
SSES	Susquehanna Steam Electric Station
TS	Technical Specification
VTC	Votes Torque Cartridge