August 4, 2005

Mr. Britt T. McKinney
Senior Vice President & Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd. - NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT NOS. 05000387/2005007 AND 05000388/2005007

Dear Mr. McKinney:

On June 24, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed a Safety System Design and Performance Capability team inspection at the Susquehanna Steam Electric Station. The enclosed inspection report documents the inspection results which were discussed on June 24, 2005, with you and members of your staff.

The inspection examined activities conducted under your license related to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

Based on the results of this inspection, no findings of significance were identified.

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Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-387, 05-388
License Nos. NPF-14, NPF-22

Enclosure: Inspection Report Nos. 05000387/2005007 and 05000388/2005007

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REGION I

Docket Nos.	05000387, 05000388
License Nos.	NPF-14 and NPF-22
Report Nos.	05000387/2005007 and 05000388/2005007
Licensee:	PPL Susquehanna, LLC
Facility:	Susquehanna Steam Electric Station, Units 1 and 2
Location:	769 Salem Blvd. - NUCSB3 Berwick, PA 18603-0467
Dates:	June 6-10, and June 20-24, 2005
Inspectors:	Michael Modes, Senior Reactor Inspector, Division of Reactor Safety (DRS) (Team Lead) Richard Barkley, Senior Reactor Inspector, DRS Frank Arner, Senior Reactor Inspector, DRS Jennifer Bobiak, Reactor Inspector, DRS Jeffrey Josey, Reactor Inspector, DRS James Levio, NRC Contractor Karen Johnson, Co-op Student Engineer, DRS (Trainee)
Approved by:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000387/2005007, 05000388/2005007; June 6-10 and June 20-24, 2005; Susquehanna Steam Electric Station Units 1 and 2; Engineering Team Inspection.

The inspection was conducted by five regional inspectors and an NRC contractor. No findings of significance were identified during the inspection. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3 dated July 2000.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Safety System Design and Performance Capability (IP 71111.21)

a. Inspection Scope

In selecting systems and components for review, the team focused on risk significance and considered the risk information contained in the NRC's Risk Informed Inspection Notebook for Susquehanna Steam Electric Station (SSES) Units 1 & 2. Using risk insights, the team selected the automatic depressurization system (ADS) and the high pressure coolant injection (HPCI) system and their respective components for review.

The review of the automatic depressurization system included the six automatically controlled safety-relief valves installed on the main steam lines inside primary containment. The team reviewed the automatic function, by action of an electric-pneumatic control system, of these dual purpose valves. The relief by normal mechanical action is intended to prevent over pressurization of the reactor vessel. The depressurization by automatic action of the control system was reviewed because it reduces reactor vessel pressure during small and medium size Loss-of-Coolant Accident (LOCA) scenarios in which the high pressure coolant injection system is not available.

The team specifically reviewed the design capability of major risk significant components of the automatic depressurization system including the ADS valves, ADS solenoids and the ADS nitrogen supply system. This review was performed to determine if the design basis was in conformance with the licensing commitments, regulatory requirements and design output documents. Operational procedures were reviewed to determine if the procedure could be implemented given the current system configuration. These procedures were compared against lesson plans, training, and simulator use to assure the plant configuration matched to training configuration.

Regarding the high coolant pressure injection system, the team focused on the steam turbine driven constant-flow pump assembly, associated system piping, valves, controls, and instrumentation located in the reactor building. The team inspected the HPCI suction piping from both the condensate storage tank and the suppression pool. The team also reviewed the HPCI injection line into the reactor feedwater line. In addition, the team inspected the HPCI system controls, such as the remote controls for valve and turbine operation.

Since the HPCI system is provided to ensure that the reactor core is adequately cooled in the event of a small break in the reactor coolant pressure boundary which does not result in rapid depressurization of the reactor vessel, a number of high risk sequences, such as station blackout, were considered during the inspection. In addition, since the

HPCI system is designed to pump water into the reactor vessel for a wide range of pressures, the team evaluated HPCI performance capability for various backpressures.

The team reviewed the design and operation of the ADS and HPCI system. Specifically, the team reviewed the design basis documents, the Technical Specifications (TS), the Updated Final Safety Analysis Report (USFAR), and the ADS valve vendor manual. The design output documents reviewed included piping and instrument drawings. The team performed this review to determine whether the system and component functional requirements during normal, abnormal and accident conditions were met and to ensure consistency with various design documents, design specifications and control diagrams.

For both systems, the team reviewed selected mechanical calculations and analyses to verify the appropriate input assumptions were used and that the assumptions applied to the current system and plant configuration. The team verified that adequate engineering methods were utilized and the technical bases supported the conclusions. The team also selected some design and electrical calculations, and performed independent calculations to evaluate their adequacy.

The team evaluated system environmental conditions, including the effect of various design basis accidents, to verify plant conditions were bounded by the equipment qualification assumptions. A sample of preventive maintenance activities were reviewed to verify that maintenance was performed as scheduled and that environmental qualification was being maintained. The team evaluated a sample of surveillance and pre-operational test results to verify system capability. In addition, the team chose the intermittent steam-trap alarm to focus on the two-phase flow and flow accelerated corrosion in the steam-trap drain.

The team reviewed the control wiring diagrams of ADS and HPCI to verify, for example, that pump operation, including automatic initiation, conforms with the system operation described in the updated final safety analysis report. The review included control of valves critical to the correct operation of the systems. The team reviewed both alternating and direct current power distribution to ensure that a single failure of an electrical component or source did not impair the ability of the systems to perform their safety function. The review confirmed that sufficient instrumentation was provided to initiate automatic functions and to monitor the operation of the systems during a loss-of-offsite power (LOOP).

The team reviewed the Class 1E battery load calculation to verify that required loads had been correctly identified and to ensure that the batteries were capable of meeting the load requirements under worst-case duty cycles. Since station black out is a risk significant accident scenario for both ADS and HPCI, the calculations were reviewed specifically against the Susquehanna coping scheme. The team also reviewed the direct current voltage drop calculation and sampled recent battery performance tests to verify that adequate voltage was provided to the safety-related loads during worst-case loading. The team reviewed environmental qualification of motors and valves to verify that the motors and valves would be capable of performing their required safety function.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed a sample of corrective action reports, as identified in the Documents Reviewed section, to verify that Susquehanna Steam Station personnel were identifying issues at an appropriate threshold, entering them in the corrective action program, and taking appropriate corrective actions. Also, the inspectors evaluated corrective actions to confirm that repairs and/or modifications to components had no adverse impact on the system design basis.

b. Findings

No findings of significance were identified.

4OA5 Other

(Closed) URI 05000387; 05000388/2001004-03; Inclusion of SLC Design Modifications for ATWS Rule in the Design Bases of the Plant

During the March 2001 safety system design and performance capability team inspection, NRC staff identified that the Standby Liquid Control (SLC) system would not obtain the assumed flow-rate specified under the Anticipated Transient Without Scram (ATWS) Rule as defined in 10 CFR50.62. The specific postulated scenario of concern was an ATWS with Loss-of-Offsite Power (LOOP) event. Non-cited violation 05000387; 05000388/2001004-02 was subsequently issued. PPL took corrective actions by implementing physical hardware changes to correct the nonconforming condition. The NRC staff also opened an Unresolved Item (URI) in order to later review PPL's conclusion regarding the functional requirement of the SLC system with respect to the ATWS rule, the applicability of TS section 3.1.7 to the ATWS Rule in this case, and PPL's decision not to report the failure to meet the requirements of the ATWS rule.

The inspectors reviewed PPL's corrective actions responding to the URI. The team reviewed condition report (CR) numbers 316309, 316780, 321640, and 548025. The team found PPL's evaluation, including their completed and proposed corrective actions to be acceptable. These included licensing bases changes, enhancements to training regarding the interpretation of the ATWS requirements with respect to design bases, and hardware and procedure changes which fully addressed the concerns of the issue. Based on the review of the above, the inspectors considered this unresolved item closed. No violations of NRC requirements were identified.

4OA6 Meetings, including Exit

On June 24, 2005, at the completion of the inspection, the team presented the inspection results to Mr. McKinney and other members of his staff. The team verified that the inspection report does not contain proprietary information. Any proprietary information that was provided or examined during the inspection was returned to the licensee upon completion of the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Adelizzi, Senior Engineer - Plant Analysis
P. Brady, Supervisor - Electrical and I&C Design
D. Brophy, Senior Engineer - Nuclear Regulatory Affairs
R. Centenaro, Mechanical Design Engineering
D. Gladey, Senior Electrical Engineer
S. Kartchner, Senior Engineer - Station Engineering / ADS System Engineer
J. Krais, Manager - Nuclear Design Engineering
B. M^{c}Kinney, Senior Vice President and Chief Nuclear Officer
E. Miller, Senior Engineer - Nuclear Regulatory Affairs
J. Petrilla, Unit Supervisor - Operations
J. Vandenberg, Senior Engineer - Station Engineering / HPCI System Engineer

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

05000387; 05000388/200104-03	URI	Inclusion of SLC Design Modifications for ATWS Rule in the Design Bases of the Plant

DOCUMENTS REVIEWED

Calculations and Design Documents:

EC-083-0502, ADS Accumulator Sizing, Rev. 2
EC-083-0505, ADS Accumulator Minimum Pressure Requirement, Rev. 1
EC-083-0535, Generic Letter 89-04 Evaluation of ADS Supply Containment Instrument Gas Check Valves 126152, 126154, 226152, and 226154, Rev. 0
EC-083-0630, Verification of ADS Valve Pneumatic Actuator Test Data, Rev. 0
EC-083-1035, Reactor Water Level (ADS Permissive) Allowable Value, TRM Setpoint and Process Setpoints of LIS-B21-2N042A,B, Rev. 0
Design Basis Document 016, Main Steam System and Automatic Depressurization System, Rev. 2
Design Change Package Cover Sheets DCPs 225633 & 225635

Condition Reports (CR):

75539	394371	646197	682959*
249300	522789	657309	682361*
382741	562709	682447*	683826*
392886	593310*	682854*	684212*
394357	601438*	682468*	

(Note: "*" = Generated as a result of the inspection)

Miscellaneous Documents:

8856-M1-E11-54-1, RHR Pump Curve
8856-M1-E21-28-2, Core Spray Pump Curve
Crosby Safety Valve Installation and Operations Manual
Preoperational/Acceptance Test P283.2A, Rev. 0, Main Steam ADS/SRV
System Training Document TM-OP-083E-ST
SSES Proposed License Amendment on ADS-LPCI Discharge Pressure TS 3.3.5.1-1, Function 4.f and 5.f, PLA-5722, Dated March 4, 2004
TS Amendment No. 220 for SSES Unit 1 and TS Amendment No. 196 for SSES Unit 2, dated March 29, 2005
PRA Presentation to NRC Team during the Safety System Design and Performance Capability Inspection at SSES - June 2005
System Health Reports for Unit 1 & Unit 2 Main Steam/ADS for 4th Qtr. 2004 and 1st Qtr. 2005
Preventive Maintenance Task C0692-01 & C0692-02
Piping and Instrument Drawings E-106246, Rev. 46 & E-106231, Rev. 31

Procedures:

AR-110-001, ADS and DRWL CLG 1C601, Rev. 13
AR-114-001, High Pressure Coolant Injection System 1C601, Rev. 23
EO-000-102, RPV Control, Rev. 2
EO-000-103, Primary Containment Control, Rev. 3
EO-000-104, Secondary Containment Control, Rev. 2
EO-000-112, Rapid Depressurization, Rev. 2
EO-000-113, Level/Power Control, Rev. 2
EO-100-030, Unit 1 Response to Station Blackout, Rev. 19
EO-200-030, Unit 2 Response to Station Blackout, Rev. 17
ES-002-001, Supplying 125V DC Loads with Portable Diesel Generator, Rev. 8
ES-013-001, Fire Protection System Cross-Tie to RHRSW, Rev. 8
ES-152-002, HPCI Suction Auto Swapover Bypass, Rev. 9
OP-024-004, Transfer and Test Mode Operations of Diesel Generator E, Rev. 24
OP-152-001, HPCI System, Rev 34
OP-183-001, Automatic Depressurization System and Safety Relief Valves, Rev. 16
OP-283-001, Automatic Depressurization System and Safety Relief Valves, Rev. 15
SO-183-002, 2 Year Manual Actuation of ADS Valves
SO-283-002, 2 Year Manual Actuation of ADS Valves

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ADS	Automatic Depressurization System
ATWS	Anticipated Transient Without Scram
CR	Condition Report
HPCI	High Pressure Coolant Injection System
LOCA	Loss-of-Coolant Accident
LOOP	Loss-of-Offsite Power
SLC	Standby Liquid Control System
SSES	Susquehanna Steam Electric Station
TS	Technical Specifications
USFAR	Updated Final Safety Analysis Report
URI	Unresolved Item