March 14, 2006

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - THIRD 10-YEAR INSERVICE TESTING INTERVAL PROGRAM PLAN (TAC NOS. MC8460 AND MC8461)

Dear Mr. McKinney:

By letter dated September 29, 2005, PPL Susquehanna, LLC (the licensee or PPL) submitted relief requests, 1RR06 and 2RR06, associated with its third 10-year inservice testing (IST) program interval for pumps and valves for Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2). The licensee proposed two alternatives to the requirements of Title 10 of the *Code of Federal Regulations*, Part 50, Section 55a (10 CFR 50.55a), concerning the requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance ISTC-3522(c) for its third 10-year interval IST program.

The Nuclear Regulatory Commission (NRC) staff has reviewed PPL's regulatory and technical analysis in support of its requests for relief for 1RR06 and 2RR06. The NRC staff's findings and conclusion are documented in the enclosed safety evaluation.

Based on the information provided by PPL, the NRC staff concludes that PPL's proposed alternatives for 1RR06 and 2RR06 provide an acceptable level of quality and safety, provided that the leak testing is performed every 24 months subject to the provisions of Surveillance Requirement 4.0.2. Therefore, pursuant to 10 CFR 50.55a(3)(I), the NRC staff authorizes the proposed alternatives for 1RR06 and 2RR06 as described in PPL's letter dated September 29, 2005, for SSES 1 and 2 for the third 10-year interval IST program.

If you have any questions, please contact the project manager, Rich Guzman, at (301) 415-1030.

Sincerely,

/RA/

Richard J. Laufer, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosure:
As stated

cc w/encl: See next page

If you have any questions, please contact the project manager, Rich Guzman, at (301) 415-1030.

Sincerely,

/RA/

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ACCESSION NO.: ML060330188 *SE provided by memo. No substantive changes made.

OFFICE	LPLI-1/PE	LPLI-1/PM	LPLI-1/LA	CPTB/BC*	OGC	LPLI-1/BC
NAME	NMorgan	RGuzman	SLittle	SLee	MBupp	RLaufer
DATE	2/22/06	3/14/06	2/22/06	1/26/2006 SE DTD	3/3/06	3/14/06

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Susquehanna Steam Electric Station, Units 1 and 2

cc:

Robert A. Saccone
General Manager - Nuclear Operations
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603-0467

Aloysius J. Wrape, III
General Manager - Performance
Improvement and Oversight
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Terry L. Harpster
General Manager - Plant Support
PPL Susquehanna, LLC
769 Salem Blvd., NUCSA4
Berwick, PA 18603-0467

Rocco R. Sgarro
Manager - Nuclear Regulatory Affairs
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Walter E. Morrissey
Supervising Engineer
Nuclear Regulatory Affairs
PPL Susquehanna, LLC
769 Salem Blvd., NUCSA4
Berwick, PA 18603-0467

Michael H. Crowthers
Supervising Engineer
Nuclear Regulatory Affairs
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Steven M. Cook
Manager - Quality Assurance
PPL Susquehanna, LLC
769 Salem Blvd., NUCSB2
Berwick, PA 18603-0467

Luis A. Ramos

Community Relations Manager,
Susquehanna
PPL Susquehanna, LLC
634 Salem Blvd., SSO
Berwick, PA 18603-0467

Bryan A. Snapp, Esq
Assoc. General Counsel
PPL Services Corporation
Two North Ninth Street, GENTW3
Allentown, PA 18101-1179

Supervisor - Document Control Services
PPL Susquehanna, LLC
Two North Ninth Street, GENPL4
Allentown, PA 18101-1179

Richard W. Osborne
Allegheny Electric Cooperative, Inc.
212 Locust Street
P.O. Box 1266
Harrisburg, PA 17108-1266

Director - Bureau of Radiation Protection
Pennsylvania Department of
Environmental Protection
P.O. Box 8469
Harrisburg, PA 17105-8469

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 35, NUCSA4
Berwick, PA 18603-0035

Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Board of Supervisors
Salem Township
P.O. Box 405
Berwick, PA 18603-0035

Dr. Judith Johnsrud
National Energy Committee

Susquehanna Steam Electric Station, Units 1 and 2

cc:

Sierra Club
443 Orlando Avenue
State College, PA 16803

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST NOS. 1RR-06 AND 2RR-06

FOR THE INSERVICE TESTING PROGRAM PLAN

OF THE THIRD 10-YEAR INSPECTION INTERVAL

PPL SUSQUEHANNA, LLC

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

By letter dated September 29, 2005 (Accession No. ML052850082), PPL Susquehanna, LLC (the licensee or PPL) submitted relief requests associated with its third 10-year inservice testing (IST) program interval for pumps and valves for its Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2). The licensee proposed two alternatives to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for SSES 1 and 2 third 10-year interval IST program. The Nuclear Regulatory Commission's (NRC) evaluation of relief requests 1RR06 and 2RR06 are contained herein. These relief requests are applicable to the third 10-year interval IST program for SSES 1 and 2.

2.0 REGULATORY EVALUATION

For the SSES 1 and 2 third 10-year interval, Title 10 of the *Code of Federal Regulations*, Part 50, Section 55a (10 CFR 50.55a), requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with the ASME Code, Section for Operation and Maintenance (OM) and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to paragraphs (a)(3)(I), (a)(3)(ii),or (f)(6)(I) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a permits the Commission to authorize alternatives and to grant relief from ASME Code requirements upon making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to Code requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants."

The SSES 1 and 2 third 10-year IST interval began on June 1, 2004. The third 10-year IST programs were developed to meet the requirements of the 1998 Edition through 2000 Addenda of the ASME OM Code.

The NRC's findings with respect to authorizing alternatives and granting or denying the IST program relief requests are given below.

3.0 TECHNICAL EVALUATION

3.1 Code Requirement

Paragraph ISTC-3522(c) of the OM Code requires that if exercising is not practical during operation at power and cold shutdowns, it shall be performed during refueling outages.

3.2 Component Identification

The components for Unit 1 and Unit 2 affected by these relief requests are the check valves identified in Table 1 and 2, respectively.

Table 1
1RR06

Pump Number	Description	Code Class	OM Code Category
086018	Control Structure Chilled Water - 6"	3	C
086118	Control Structure Chilled Water - 6"	3	C
086241	Control Structure Chilled Water - 2"	3	C
086341	Control Structure Chilled Water - 2"	3	C

Table 2
2RR06

Pump Number	Description	Code Class	OM Code Category
211165A	Emergency Service Water - 2"	3	C
211165B	Emergency Service Water - 2"	3	C

3.3 Specific Relief Requested

The licensee requests relief from the Code requirements, of paragraph ISTC-3522(c) for Control Structure Chilled Water (CSCW) check valves listed in Table 1 and for Emergency Service Water (ESW) check valves listed in Table 2.

3.4 Basis for Relief

The licensee provides the following basis for relief for 1RR06 and 2RR06:

> Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code ISTC-3522(c). The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.
>
> The components listed above are check valves with no external means for exercising and no external position indication. The only means to verify closure is by leak testing. This involves setup of test equipment and system configuration changes that are a hardship without a compensating increase in quality or safety on a quarterly or cold shutdown basis. The leak testing can be performed at intervals other than refueling outages such as during system outage windows.
>
> Prior to performing a system outage on-line, its effect on risk is evaluated in accordance with requirements of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." This requirement states in part that: "Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities."
>
> PPL complies with the requirements of 10 CFR 50.65(a)(4) via application of a program governing maintenance scheduling. The program dictates the requirements for risk evaluations as well as the necessary levels of action required for risk management in each case. The program also controls operation of the on-line risk monitor system, which is based on probabilistic risk assessment (PRA). With the use of risk evaluation for various aspects of plant operations, PPL has initiated efforts to perform additional maintenance, surveillance, and testing activities during normal operation. Planned activities are evaluated utilizing risk insights to determine the impact on safe operation of the plant and the ability to maintain associated safety margins. Individual system components, a system train, or a complete system may be planned to be out of service to allow maintenance, or other activities, during normal operation.
>
> Leak testing may involve a system breach, if required to repair a failed valve. However, during the disassembly process to perform maintenance, the subject valve is isolated and the associated section of piping drained. Thus, the system breach does not increase the risk due to internal flooding or internal system loss-of-coolant accident. The risk associated with these activities would be bounded by the risk experienced due to the system outage. Therefore, closure testing of these valves by leak testing during scheduled system outages while on-line would have no additional impact on core damage frequency.
>
> PPL performs on-line maintenance on the Control Structure Chilled Water (CSCW) [and the ESW] systems. Minor maintenance work activities of limited scope require Operations authorization to perform. Also, Operations authorization is required if the activity has the potential to affect or affects a system, structure or component. It may also be scheduled as System Outage Window.

Tasks performed during on-line maintenance include items such as pump inspections, relief valve testing, electrical breaker maintenance and testing, and valve diagnostic testing. Leak testing of the check valve is expected to take approximately 4 to 6 hours. This IST activity would be conducted simultaneously with other on-line maintenance activities. Based on maintenance history and past scheduling experience and work execution, the additional check valve leakage testing will neither extend the on-line maintenance nor increase the overall system unavailability.

Therefore, performing IST activity on-line would change neither the duration of the on-line system outage window nor the core damage probability (CDP) associated with the existing on-line maintenance activities. For these reasons, the risk/(CDP) over the entire operating/shutdown spectrum would remain unchanged with approval of these relief requests.

If the check valve needed to be replaced, the valves used to provide the isolation boundary for the replacement of the check valves have an excellent history of providing adequate isolation. Once adequate isolation is confirmed, it is maintained by passive isolation valves or valves made passive (e.g., de-energized motor operated valves) that are controlled in accordance with the SSES Energy Control Process. A loss of isolation capability under these conditions is not considered credible due to the passive characteristics of the isolation valves.

Risk associated with on-line maintenance activities is controlled through the SSES work management process. This process includes preventive measures for maintaining safety and minimizing risk while performing on-line maintenance activities.

The level of quality associated with IST activities is independent of whether the activity is performed on-line or during an outage. The same personnel, procedures, and acceptance criteria are used in either case. The safe conduct of maintenance and IST activities is built into the work management process. The inspection activities are planned ensuring adequate isolation boundaries are established to protect both maintenance personnel involved in the activity and plant equipment.

PPL manages system outage windows on a recurring cycle. Risk insight is used to ensure that proposed work or inspection activities balance reliability with unavailability. The work selection process provides the means to ensure, through the oversight of knowledgeable personnel, that when system unavailability is to be incurred, the preventive maintenance, corrective maintenance, and other inspections required to maximize the system's reliability are included in the system outage window. In this manner, each window is scoped to maximize the reliability benefit from taking system unavailability while minimizing the unavailability such that it is maintained at a level that minimizes overall risk. PPL is confident that this rigorous work selection, scoping, and risk management system will identify all work that is more appropriately placed in outages, and schedules such work accordingly.

Leak testing check valves and other periodic work activities in the CSCW [and ESW] system[s] will cause CSCW [and ESW] to become inoperable in accordance with Technical Specifications (TS) and the Technical Requirements Manual (TRM). In accordance with TS 3.7.3, operation with one Control Room Emergency Outside Air

Supply (CREOAS) subsystem inoperable is permitted for up to 7 days. In accordance with TS 3.7.4, operation with one control room floor cooling system inoperable is permitted for up to 30 days. In accordance with TRM 3.7.9, operation with a single division of the Control Structure Chilled Water system inoperable is permitted for up to 30 days. In accordance with TRM 3.8.6 (Unit 1 only), operation with one required Emergency Switchgear Room Cooling subsystem inoperable is permitted for up to 30 days. Leak testing of CSCW check valves takes between 4 and 6 hours, which would typically be accomplished within a 24-hour system work window.

[...]In accordance with TS 3.7.2, operation with one Emergency Service Water subsystem inoperable is permitted for up to 7 days. In accordance with TRM 3.8.6, operation with one required Emergency Switchgear Room Cooling subsystem inoperable is permitted for up to 30 days. Leak testing of ESW check valves takes between 2 and 4 hours, which would typically be accomplished within a 24-hour system work window.

Work that requires entry into a TS LCO REQUIRED ACTION statement is planned and scheduled using the SSES Work Management Process previously described above. The Work Management Process establishes the scope of work such that only 50% of the TS LCO time is required to perform the scheduled work. In addition, Evolution Coordinators/Engineering Personnel provide coverage for resolving problems. Spare parts that are necessary for rework are identified and made available in case rework becomes necessary. Based on historical performance, performance of check valve leak testing would not affect the duration of the time spent in the LCO REQUIRED ACTION.

As more system outages are performed on-line, it is evident that selected refueling outage inservice testing activities, (e.g., closure testing by leak testing) could be performed during these system outage windows (SOW) without sacrificing the level of quality or safety. Inservice testing performed on a refueling outage frequency is currently acceptable in accordance with ASME OM Code, 1998 Edition through 2000 Addenda. By specifying testing activities on a frequency commensurate with each refueling outage, ASME OM Code, 1998 Edition through 2000 Addenda, establishes an acceptable time period between testing. Historically, the refueling outage has provided a convenient and defined time period in which testing activities could be safely and efficiently performed. However, an acceptable testing frequency can be maintained separately without being tied directly to a refueling outage. Inservice testing performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of ASME OM Code, 1998 Edition through 2000 Addenda.

Over time, approximately the same number of tests will be performed using the proposed operating cycle frequency as would be performed using the current refueling outage frequency. Thus, inservice testing activities performed during the proposed operating cycle test frequency provide an equivalent level of quality and safety.

3.5 Proposed Alternative Testing

Susquehanna proposes alternative testing as follows:

> Pursuant to 10 CFR 50.55a(a)(3)(I), SSES 1 and 2 proposes an alternative testing frequency for performing inservice testing of the valves identified above. The valves will be closure tested by leak testing on a frequency of at least once per operating cycle in lieu of once each refueling outage as currently allowed by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-3522(c), "Category C Check Valves." The open safety function of check valves 086018 and 086118 will be demonstrated quarterly in conjunction with the Control Structure Chilled Water flow verification (inservice pump test). The open function of check valves 086241 and 086341 is demonstrated continuously through the keepfill function. [...]The open function of check valves 211165A and 211165B is [also] demonstrated continuously through the keepfill function.
>
> This proposed alternative is requested for the duration of the third ten-year Interval Susquehanna Steam Electric Station Unit 1 IST Program (June 1, 2004 through May 31, 2014).

3.6 Evaluation of Relief Request Nos. 1RR06 and 2RR06

Valves 086018 and 086118 are six (6) inch Emergency Condenser Pump 0P171A/B discharge check valves. They have an open safety function to provide a flow path from the Emergency Condenser Pump to the Control Structure Chiller Condenser. These check valves have no closed safety function.

Valves 086241 and 086341 are two (2) inch ESW keepfill check valves. These valves are considered part of the CSCW system. They are keepfill check valves that allow Service Water to maintain the Emergency Condenser Water Circulating (ECWC) subsystem full. The ECWC subsystem is fed from the ESW system. These check valves have a closed safety function to prevent the diversion of the ESW from the ECWC subsystem when operating under emergency conditions. These check valves have no open safety function.

Valves 211165A and 211165B are two (2) inch ESW keepfill check valves. They have a closed safety function to prevent the diversion of the safety-related ESW. These check valves have no open safety function.

The licensee requested relief from the Code testing requirements of paragraph ISTC-3522(c) which states if exercising is not practicable during operations at power and cold shutdown, it shall be performed during refueling outages. The licensee proposes to closure test CSCW check valves 086018, 086118, 086241, 086341, and ESW check valves 211165A and 211165B by leak testing each valve on a frequency of at least once per operating cycle in lieu of once each refueling outage. The valves are not to be grouped for testing.

Testing of certain valves during the operating cycle in lieu of during the refueling outage as prescribed by the Code may be authorized provided the licensee has considered and implemented factors to ensure that the proposed alternative provides an acceptable level of quality and safety. These factors include: (1) a determination that it is impractical to test the

valve quarterly and during cold shutdowns; (2) testing can be accomplished in significantly less time than the allowed outage time permitted by applicable TSs; (3) the risks associated with testing the valves during the operating cycle are addressed by the licensee; and (4) any compensatory measures to be established as a means to reduce the impact (e.g., risk and operational worker safety) of testing with the nuclear power plant at power are addressed and implemented.

As discussed in the basis for relief, the licensee addressed each of these factors to ensure the proposed alternatives provide an acceptable level of quality and safety. Each factor is discussed below:

The licensee performs on-line maintenance of the CSCW and ESW systems for pump testing, relief valve testing, electrical breaker maintenance and testing, and valve diagnostic testing which causes the CSCW and ESW systems to become inoperable in accordance with TS and TRM requirements. Leak testing of the CSCW and ESW check valves will be conducted simultaneously with the other on-line maintenance activities during the CSCW and ESW system outage and is estimated to take between 4 and 6 hours, which is significantly less time permitted by the TS and TRM. Additionally, the licensee stated that based on maintenance history and past scheduling experience and work execution, the additional check valve leakage testing should neither extend on-line maintenance nor increase the overall system unavailability. The NRC staff considers the estimated leak test time significantly less than the TS and TRM outage times and considers this acceptable.

Prior to performing on-line testing, its effect on risk must be evaluated in accordance with the requirements of 10 CFR 50.65(a)(4), “Requirements for monitoring the effectiveness of maintenance at nuclear power plants.” Section 50.65(a)(4) states, in part, “Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall access and manage in the increase in risk that may result from the proposed maintenance activities.” The licensee states compliance with 10 CFR 50.65(a)(4) via application of a program governing maintenance scheduling which includes risk evaluations and on-line risk monitoring based on probability risk assessment. Furthermore, the licensee performs on-line maintenance on the CSCW and ESW systems for other maintenance activities. The check valve leakage tests would be conducted simultaneously with the other on-line maintenance activities. Based on maintenance history and past scheduling experience and work execution, the additional check valve leakage testing should neither extend the on-line maintenance nor increase the overall system unavailability. Therefore, performing the IST leakage activity on-line during the CSCW and ESW maintenance outage should change neither the duration of the on-line system outage window nor the core damage probability associated with the existing on-line maintenance activities.

As compensatory measures for possible CSCW and ESW check valve repair, the licensee can provide isolation for the check valves and has determined that the isolation boundary valves have an excellent history of providing isolation. Spare parts necessary for rework are identified and made available.

The licensee requested to perform closure testing of CSCW check valves 086018, 086118, 086241, 086341 and ESW check valves 211165A and 211165B by leak testing on a frequency of at least once per operating cycle in lieu of once each refueling outage. Consistent with the surveillance intervals delineated in Surveillance Requirement (SR) 4.0.5, closure tests shall be

conducted every 24 months, subject to the provisions of SR 4.0.2. SR 4.0.2 permits a 25% extension of the normal surveillance interval to facilitate surveillance scheduling and consideration of plant operating conditions that may not be suitable for conducting the surveillance. This extension is authorized by Specification 4.0.2 and is not intended to be used repeatedly as a convenience to extend the disassembly and inspection test frequencies.

On the basis of the above, the licensee has demonstrated that appropriate measures are taken to closure test CSCW check valves 086018, 086118, 086241, 086341, and ESW check valves 211165A and 211165B by leak testing on a frequency of at least once per operating cycle in lieu of once each refueling outage. The operating frequency interval for testing is defined as 24 months subject to the provisions of SR 4.0.2. This testing provides an acceptable level of quality and safety.

3.7 Conclusion

The NRC staff concludes that the licensee's proposed alternative to closure test CSCW check valves 086018, 086118, 086241, 086341, and ESW check valves 211165A and 211165B by leak testing on a frequency of at least once per operating cycle in lieu of once each refueling outage provides an acceptable alternative to the Code requirements of paragraph ISTC-3522(c). Therefore, the proposed alternative of relief requests 1RR06 and 2RR06, provided the tests are performed every 24 months subject to the provisions of SR 4.0.2, may be authorized for the third 120-month IST interval pursuant to 10 CFR 50.55a(a)(3)(I) on the basis that the alternatives provides an acceptable level of quality and safety.

Principal Contributor: James Strnisha

Date: March 14, 2006