UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

May 13, 2011

Mr. Timothy S. Rausch
Senior Vice President and Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Boulevard, NUCSB3
Berwick, PA 18603

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – NRC TEMPORARY INSTRUCTION 2515/183 INSPECTION REPORT 05000387/2011008 AND 05000388/2011008

Dear Mr. Rausch:

On April 28, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Susquehanna Steam Electric Station (SSES), using Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event." The enclosed inspection report documents the inspection results which were discussed on April 28, 2011, with you and other members of your staff.

The objective of this inspection was to promptly assess the capabilities of the Susquehanna Steam Electric Station to respond to extraordinary consequences similar to those that have recently occurred at the Japanese Fukushima Daiichi Nuclear Station. The results from this inspection, along with the results from this inspection performed at other operating commercial nuclear plants in the United States will be used to evaluate the United States nuclear industry's readiness to safely respond to similar events. These results will also help the NRC to determine if additional regulatory actions are warranted.

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report. You are not required to respond to this letter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Lawrence T. Doerflein

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

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

Enclosure: Inspection Report 05000387/2011008 and 05000388/2011008

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/RA/

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	50-387, 50-388
License No:	NPF-14, NPF-22
Report No:	05000387/2011008 and 05000388/2011008
Licensee:	PPL Susquehanna, LLC
Facility:	Susquehanna Steam Electric Station, Units 1 and 2
Location:	Berwick, Pennsylvania
Dates:	March 23, 2011 through April 28, 2011
Inspectors:	P. Finney, Senior Resident Inspector J. Greives, Resident Inspector
Approved by:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000387/2011008 and 05000388/2011008; 03/23/2011 – 04/28/2011; Susquehanna Steam Electric Station, Units 1 and 2; Temporary Instruction 2515/183 - Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event.

This report covers an announced Temporary Instruction (TI) inspection. The inspection was conducted by two resident inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

INSPECTION SCOPE

The intent of the TI is to provide a broad overview of the industry's preparedness for events that may exceed the current design basis for a plant. The focus of the TI was on (1) assessing the licensee's capability to mitigate consequences from large fires or explosions on site, (2) assessing the licensee's capability to mitigate station blackout (SBO) conditions, (3) assessing the licensee's capability to mitigate internal and external flooding events accounted for by the station's design, and (4) assessing the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. If necessary, a more specific followup inspection will be performed at a later date.

INSPECTION RESULTS

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events, typically bounded by security threats, committed to as part of NRC Security Order Section B.5.b issued February 25, 2002, and severe accident management guidelines and as required by Title 10 of the Code of Federal Regulations (10 CFR) 50.54(hh). Use Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," Section 02.03 and 03.03 as a guideline. If IP 71111.05T was recently performed at the facility the inspector should review the inspection results and findings to identify any other potential areas of inspection. Particular emphasis should be placed on strategies related to the spent fuel pool. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action	Describe what the licensee did to test or inspect equipment.
a. Verify through test or inspection that equipment is available and functional. Active equipment shall be tested and passive equipment shall be walked down and inspected. It is not expected that permanently installed equipment that is tested under an existing regulatory testing program be retested. This review should be done for a reasonable sample of mitigating strategies/equipment.	PPL verified through testing, inspections, and walkdowns their capability to mitigate conditions that result from beyond design basis events. The actions completed for this effort included reviews, walkdowns, confirmation of equipment staging and testing of non-plant equipment for the station Extensive Damage Mitigation Guidelines (EDMGs), supporting Damage Control (DC) Procedures for B.5.b, and those Off Normal Procedures (ON) used under B.5.b. Additionally, the Emergency Operations Procedures (EOPs), Emergency Support (ES) Procedures, and supporting Off Normal (ON) Procedures that support implementation of the Severe Accident Management Guidelines (SAMGs) were reviewed. All necessary equipment used to implement these procedures was field-verified utilizing the organizations (Operations, Mechanical Maintenance, Instrument and Control (I&C), Electrical Maintenance, Chemistry, and Effluents Fire Brigade) that would perform the actions during an event.
	Describe inspector actions taken to confirm equipment readiness (e.g., observed a test, reviewed test results, discussed actions, reviewed records, etc.).
	The inspectors assessed PPL's capabilities by conducting a review of their walkdown and testing activities. Additionally, the inspectors independently walked down and inspected equipment, both plant and non-plant, associated with all major B.5.b strategies, with particular emphasis on those strategies related to the spent fuel pools.

		To assess the equipment credited for use by the SAMGs, the inspectors walked down plant equipment associated with venting the primary containment, both remotely and locally. Additionally, the inspectors field-verified equipment, both plant and non-plant, necessary to flood the reactor pressure vessel (RPV) and primary containment.
		Discuss general results including corrective actions by licensee.
		All equipment designated for use by the B.5.b strategies or SAMGs was verified as being available for use with one exception: During a procedure walkdown of the ability to perform EP-PS-115, Tab K, Chemistry identified that a critical action to determine primary containment drywell H_2, O_2 and N_2 concentrations based on a sample of DW atmosphere, could not be completed due to a failed plant component. This failure of the Post Accident Sampling System (PASS) was discovered in January 2011 during a routine surveillance and is scheduled to be repaired in July 2011 (Reference AR/CR 1341360 / PCWO 1341827). Additionally, numerous vulnerabilities and enhancements were identified by PPL and the inspectors. The inspectors concluded that the equipment was available and functional, and that none of the identified issues would prevent PPL from responding to beyond design basis events as specified in the B.5.b strategies or SAMGs. Documents reviewed by the inspectors, including specific condition reports (CRs), are listed in the Supplemental Information Attachment to this report.
Licensee Action		Describe the licensee's actions to verify that procedures are in place and can be executed (e.g. walkdowns, demonstrations, tests, etc.).

b. Verify through walkdowns or demonstration that procedures to implement the strategies associated with B.5.b and 10 CFR 50.54(hh) are in place and are executable. Licensees may choose not to connect or operate permanently installed equipment during this verification. This review should be done for a reasonable sample of mitigating strategies/equipment.		PPL verified through reviews and field walkdowns that the station EDMGs, supporting DC procedures for B.5.b and those ON procedures used under B.5.b were in-place and executable with four exceptions. Two B.5.b strategies were unable to be field verified due to being in a high radiation area or requiring a unit outage to complete. Plant Component Work Orders (PCWOs) were generated to track completion of these field verifications at the next available opportunity. Additionally, reviews and walkdowns were performed to verify that the station procedures required for implementation of the SAMGs were in-place and executable. All field walkdowns were performed by organizations that would be expected to perform the required actions during an event.
		Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.
		The inspectors assessed PPL's capabilities by conducting a review of their walkdown activities and reviewing all deficiencies, vulnerabilities, or enhancements entered into the corrective action program (CAP). In addition, the inspectors independently verified the availability of all required procedures and walked down selected procedures to assess the adequacy of PPL's actions. Specific procedural walkdowns included all major B.5.b strategies, with specific emphasis on those related to the spent fuel pools, as well as primary containment venting and RPV and primary containment flooding.
		Discuss general results including corrective actions by licensee.
		The inspectors concluded that all required procedures were in place and executable, and did not identify any issues that would prevent PPL's ability to respond to beyond design basis events. All documents reviewed by the inspectors, including CRs for vulnerabilities and enhancements identified through procedure reviews and field walkdowns, are listed in the Supplemental Information Attachment to this report.

Licensee Action		Describe the licensee's actions and conclusions regarding training and qualifications of operators and support staff.
c. Verify the training and qualifications of operators and the support staff needed to implement the procedures and work instructions are current for activities related to Security Order Section B.5.b and severe accident management guidelines as required by 10 CFR 50.54 (hh).		PPL reviewed all training requirements and records for Operations, Fire Brigade, and B.5.b pumper operators that were required to implement B.5.b strategies. PPL documented that all individuals were found to be qualified and that no gaps existed in the training program or documentation reviewed.
		Describe inspector actions and the sample strategies reviewed to assess training and qualifications of operators and support staff.
		The inspectors reviewed PPL's actions to assess the training and qualifications of personnel needed to implement B.5.b strategies. In addition, the inspectors independently verified that personnel qualifications were current and that periodic training was appropriate for implementation of B.5.b strategies and SAMGs.
		Discuss general results including corrective actions by licensee.
		All personnel required to implement the B.5.b strategies and SAMGs were found to have current qualifications. Additionally, qualification and periodic training material was determined to be adequate. The inspectors reviewed all training enhancements that were identified, both by PPL and the inspectors, and concluded that none of the enhancements would have prevented PPL from responding to beyond design basis events. All documents reviewed by the inspectors, including CRs describing specific enhancements, are listed in the Supplemental Information Attachment to this report.

Licensee Action	Describe the licensee's actions and conclusions regarding applicable agreements and contracts are in place.
d. Verify that any applicable agreements and contracts are in place and are capable of meeting the conditions needed to mitigate the consequences of these events. This review should be done for a reasonable sample of mitigating strategies/equipment.	PPL reviewed the Letters of Agreement with off-site agencies as required by Rev. 53 of the SSES Emergency Plan. PPL found that all of the agreements required were current, in place, and capable of meeting the conditions needed to mitigate the consequences of the events described in this Temporary Instruction. In addition, PPL confirmed that each off-site agency was in receipt of the current Letters of Agreement and were still capable of meeting the terms.
	For a sample of mitigating strategies involving contracts or agreements with offsite entities, describe inspector actions to confirm agreements and contracts are in place and current (e.g., confirm that offsite fire assistance agreement is in place and current).
	The inspectors assessed PPL's capabilities by conducting an independent review of the Letters of Agreement with the Berwick Volunteer Fire Company and Nanticoke Fire Department. Additionally, the inspectors interviewed personnel and walked down equipment at the Berwick Volunteer Fire Company to ensure they were aware of the current Letter of Agreement and that equipment met the requirements specified in the applicable B.5.b strategy.
	Discuss general results including corrective actions by licensee.
	PPL did not identify any deficiencies. The inspectors also determined that all Letters of Agreement necessary to implement the applicable B.5.b strategies were current. Additionally, all equipment necessary for implementation of the strategies was found to be adequate. All documents that were reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.

Licensee Action		Document the corrective action report number and briefly summarize problems noted by the licensee that have significant potential to prevent the success of any existing mitigating strategy.
e. Review any open corrective action documents to assess problems with mitigating strategy implementation identified by the licensee. Assess the impact of the problem on the mitigating capability and the remaining capability that is not impacted.		The inspectors reviewed each CR for potential impact to PPL's mitigation strategies. The inspectors concluded none of the identified deficiencies, vulnerabilities, or enhancements had significant potential to prevent the success of any existing mitigating strategy. The CRs reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions, as required by 10 CFR 50.63, "Loss of All Alternating Current Power," and station design, is functional and valid. Refer to TI 2515/120, "Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22" as a guideline. It is not intended that TI 2515/120 be completely reinspected. The inspection should include, but not be limited to, an assessment of any licensee actions to:		
Licensee Action		Describe the licensee's actions to verify the adequacy of equipment needed to mitigate an SBO event.

a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.		PPL conducted tests, inspections, and walkdowns of the implementing procedures to verify attendant equipment and tools necessary to mitigate an SBO were properly staged and functional. PPL ran the SBO Diesel Generator (DG) under loaded conditions for one hour and verified that associated equipment was sufficient to be connected per procedures to identified motor control centers (MCCs).
		Describe inspector actions to verify equipment is available and useable.
		The inspectors assessed PPL's capabilities by conducting a review of PPL's walkdown activities and reviewing all deficiencies, vulnerabilities, or enhancements entered into the corrective action program (CAP). In addition, the inspectors independently verified the adequacy of PPL's actions by performing walkdowns of equipment in the field pertaining to an SBO. Specifically, the inspectors walked down the cross-tie of the residual heat removal (RHR) system to the RHR service water (RHRSW) system and the use of fire protection system water to cool the reactor core isolation cooling (RCIC) pump lube oil cooler. The inspectors verified that required equipment was also staged for bypassing the high pressure coolant injection (HPCI) turbine pump high exhaust pressure trip and HPCI high drywell pressure initiation signals. Lastly, the inspectors observed the loaded run of the SBO DG.
		Discuss general results including corrective actions by licensee.

		All equipment designated for use to respond to an SBO was verified as being available for use. PPL identified a vulnerability in that the SBO portable diesel generator may be susceptible to natural or manmade situations that would render it unavailable because it is not routinely stored in a hardened building or enclosure. This vulnerability was entered into PPL's CAP as AR/CR 1374258 for future consideration. Though other issues were identified by PPL and the inspectors, none were identified that would prevent PPL from responding to an SBO. The inspectors concluded that equipment was properly staged, tested, and maintained. All documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.
Licensee Action		Describe the licensee's actions to verify the capability to mitigate an SBO event.
b. Demonstrate through walkdowns that procedures for response to an SBO are executable.		PPL verified through reviews and field walkdowns that all SBO procedures were in-place and executable. Walkdowns were performed by personnel that would be expected to implement the actions during an event.
		Describe inspector actions to assess whether procedures were in place and could be used as intended.
		The inspectors assessed PPL's capabilities by conducting a review of their activities described above and reviewing all deficiencies, vulnerabilities, or enhancements entered into the CAP. In addition, the inspectors independently verified the adequacy of PPL's actions by performing walkdowns of the procedures necessary to connect the station's portable SBO DG to plant MCCs and supply the RCIC lube oil coolers with fire protection water.
		Discuss general results including corrective actions by licensee.

		All procedures necessary to respond to an SBO were verified as being in-place and executable. Though outside the inspection period, two recent violations pertaining to PPL's ability to respond to an SBO were identified. Specifically, PPL identified that Emergency Operating Procedure, EO-000-031, "Station Power Restoration," Revision 17, was inadequate in the restoration of offsite power following an SBO. This licensee-identified violation of 10 CFR 50.63 was documented in Integrated Inspection Report 05000387; 388/2010-004 (ML103160334). Secondly, as documented in Integrated Inspection Report 05000387; 388/2011-002, PPL failed to enter a condition into the CAP as required when a Refueling Water Storage Tank level indicator was found out of calibration. This ultimately led to inaccurate level indication and an extended period with RWST level below that considered nominal for SBO response. None of the issues identified by PPL and the inspectors during this Temporary Instruction would have prevented PPL from responding to an SBO. The inspectors concluded the SBO procedure was current and executable. All documents reviewed by the inspectors are listed in the Supplemental Information Attachment to this report.

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design. Refer to IP 71111.01, "Adverse Weather Protection," Section 02.04, "Evaluate Readiness to Cope with External Flooding" as a guideline. The inspection should include, but not be limited to, an assessment of any licensee actions to verify through walkdowns and inspections that all required materials and equipment are adequate and properly staged. These walkdowns and inspections shall include verification that accessible doors, barriers, and penetration seals are functional.	
Licensee Action	Describe the licensee's actions to verify the capability to mitigate existing design basis flooding events.
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.	PPL's actions completed for this effort included reviews of the flooding design and licensing bases for internal and external flooding, walkdowns of all credited flood barriers, and confirmation of equipment functionality for the equipment credited in the design and licensing bases for internal and external flooding. Areas that were inaccessible due to high radiation were either scheduled for inspection during the next refueling outage or inspection of the accessible exterior portions of the area was credited. PPL has no temporary equipment staged, and uses permanent plant equipment for flood mitigation. Equipment credited in the internal or external flooding design and licensing bases analyses consisted of sump drain isolation valves, drain line check valves, level switches, and flood detectors. PPL verified this equipment to be adequate either by walkdown and inspection or by relying on existing preventive maintenance (PM) activities. Where existing PMs were credited, PPL verified the PM task was current and the frequency was appropriate. PPL also verified through visual inspection of accessible doors, barriers and penetration seals, that the plant could withstand design basis flooding events.
	Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.

		The inspectors assessed PPL's capabilities by conducting a review of their activities described above as well as reviewing all deficiencies, vulnerabilities, or enhancements entered into the CAP. In addition, the inspectors independently verified the adequacy of PPL's actions by performing walkdowns of an area containing risk significant structures, systems and components (SSCs) in accordance with IP 71111.06.
		Discuss general results including corrective actions by licensee.
		The inspector concluded that all required materials are adequate and properly staged, tested, and maintained to respond to an internal or external flood within the plant's design basis. While no operability or significant concerns were identified, issues were identified by PPL and the inspectors and appropriately entered into the corrective action program. All documents reviewed by the inspectors, including CRs identifying the various issues, are listed in the Supplemental Information Attachment to this report.

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. Assess the licensee's development of any new mitigating strategies for identified vulnerabilities (e.g., entered it in to the corrective action program and any immediate actions taken). As a minimum, the licensee should have performed walkdowns and inspections of important equipment (permanent and temporary) such as storage tanks, plant water intake structures, and fire and flood response equipment; and developed mitigating strategies to cope with the loss of that important function. Use IP 71111.21, "Component Design Basis Inspection," Appendix 3, "Component Walkdown Considerations," as a guideline to assess the thoroughness of the licensee's walkdowns and inspections.		
Licensee Action		Describe the licensee's actions to assess the potential impact of seismic events on the availability of equipment used in fire and flooding mitigation strategies.

a. Verify through walkdowns that all required materials are adequate and properly staged, tested, and maintained.		PPL performed walkdowns and inspections of important equipment needed to mitigate fire and flood events and identified equipment that could potentially be impacted during a safe shutdown earthquake (SSE). In most cases, the current design and licensing requirements excluded seismic qualification. PPL's evaluations addressed two (2) aspects of the walkdowns and inspections performed. The first aspect of PPL's review was aimed at assuring that the important fire and flood mitigating equipment met all of its current design and licensing requirements. The second aspect of PPL's review was to perform an assessment of the capability of important fire and flood mitigating equipment to survive an SSE level earthquake. The review performed for this second aspect was completed using the current knowledge of the SSES civil, seismic, and piping engineers, supplemented by the available industry information for assessing seismic ruggedness. The review performed for this second aspect was considered by PPL to be an expert assessment as opposed to a seismic qualification. The criteria PPL applied for this second aspect of the review, as discussed in EC-RISK-1151, Revision 0, were as follows: 1. The site seismicity requirements for SSES are considered, in general, to be low. Additionally, most of the structures at SSES are founded on solid bed rock which eliminates any amplification of the seismic motion through the soil. The maximum ground acceleration for SSES is 0.1g. On the Richter Scale, this equates to an approximate 5.6 level earthquake. This would equate to an earthquake on the lower side of the Modified Mercalli Intensity Scale of VII, which means damage to most power plant equipment would not be expected. 2. In general, equipment having rugged construction with a favorable profile located at lower elevations in the plant would not be expected to be damaged. This is particularly true for equipment anchor bolted to the floor, but could also be true for non-anchored equipment with a favorable profile, i.e. small height to width ratio. Where available, seismic evaluations performed for the Seismic Individual Plant Examination for External Events (IPEEE) were used. 3. EPRI Report NP-5617 "Recommended Piping Seismic-Adequacy Criteria Based on Performance During and After Earthquakes" was published in January 1988. This report visited five power plants and two industrial facilities in California to collect data used to

		evaluate piping performance. The report also compiled worldwide statistics on earthquake-induced piping damage and failure for the previous 60 years to reach an overall conclusion that welded steel piping can easily withstand an earthquake with ground motion up to 0.5g. This EPRI report identified three areas where damage was most likely to occur: excessive seismic anchor movement, system interaction, and corrosion. 4. In general, a loss-of-offsite power would not be expected as a result of a SSE for the Susquehanna site. This is true since the most vulnerable component in the offsite power system is the ceramic insulators on transformers. The expected failure level for these components based on the Seismic PRA is approximately 0.2g.
		Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.
		The inspectors assessed PPL's evaluation by conducting a review of their activities described above, as well as reviewing all deficiencies, vulnerabilities, or enhancements entered into the CAP. In addition, the inspectors independently verified the adequacy of PPL's actions by performing walkdowns of the Unit 1 Reactor Building RHR and RBCCW Equipment Rooms, which included areas inspected by PPL, as well as areas exempted due to ALARA concerns, the Unit 1 Condensate Storage Tank (CST) and Refueling Water Storage Tank (RWST) berm area, and major plant fire protection equipment.
		Discuss general results including corrective actions by licensee. Briefly summarize any new mitigating strategies identified by the licensee as a result of their reviews.

All equipment credited to mitigate fire or flooding events was verified as meeting current regulatory requirements. All of the vulnerabilities identified in Section 03.04 are considered beyond the current design basis. Vulnerabilities and general conclusions are as follows:

1. As discussed above, in general, a loss-of-offsite power would not be expected as a result of a SSE for the Susquehanna site. Despite this, in PPL's flooding evaluation for the case of a rupture of the circulating water piping expansion joints, a SSE induced loss-of-offsite power was assumed to occur. When considering a rupture of the circulating water piping expansion joints in combination with a loss-of-offsite power, the ability to detect and isolate the circulating water piping break will be lost since the flood detectors for the condenser bay area and circulating water piping isolation valves are powered from offsite power. This will result in the contents of each cooling tower basin being emptied into the Turbine Building basement. PPL considered this condition along with the effects of this condition on safety-related structures. The west wall of the Reactor Buildings was inspected by PPL, as discussed in 03.03 above, as a flood barrier to a height above the anticipated flood height for this condition to assure that safety-related equipment is not adversely impacted. The capability of the west wall of the Reactor Building to act as a flood barrier was determined to be an adequate mitigating measure for this potential vulnerability. Therefore, for this event, PPL considered there to be no impact to plant safe shutdown.

2. Overall, the portions of the fire protection system (FPS) that were walked down appeared to be in good condition. Since, the FPS is not generally designed to Seismic Category I requirements, PPL considered it a general vulnerability. However, PPL concluded that non-seismically designed piping systems, such as FPS, have been shown, through a number of industry accepted programs and reports, to remain functional after a seismic event. Accordingly, PPL did not prescribe mitigating strategies to address this vulnerability.

3. The fuel oil day tank for the backup diesel fire pump does not have a supporting arrangement that appears to be able to accommodate significant horizontal inertial loads because of its post supports and small corroded single fasteners used in the base plate at each support leg. The loss of fuel oil day tank during a seismic event would prevent the functioning of the backup diesel fire pump.

		4. The clarified water storage tank appears to have limited seismic capabilities because of its height (100 feet) compared to a relatively small diameter. The loss of the tank during a seismic event would create a local flooding issue and eliminate the primary water source for both the diesel-driven and motor-driven fire pumps. 5. Post-indicator valve (PIV) 1P1104 and its associated hose house did not have any protective bollards/posts. As a result, the PIV and hose house are susceptible to vehicular damage. AR/CR 1380258 was written to have bollards installed to provide protection. 6. The storage racks for the B.5.b equipment in the warehouse addition were not secured and may topple during a seismic event. In addition, the B.5.b equipment was located in the back corner of the warehouse in a room that had many items stored in a haphazard manner. Subsequent to an SSE, it may be difficult to access necessary B.5.b equipment. AR/CR 1383546 was written to address the noted storage concern and the B.5.b equipment was subsequently relocated to a separate location. Several additional deficiencies and enhancements were identified by PPL and the inspectors and entered into the CAP. All documents reviewed by the inspectors, including CRs describing the identified issues, are listed in the Supplemental Information Attachment to this report.

Meetings

4OA6 Exit Meeting

The inspectors presented the inspection results with Mr. T. Rausch and other members of licensee management at the conclusion of the inspection on April 28, 2011. Propriety information reviewed by the inspectors during the inspection was returned to the licensee. The inspectors verified the inspection report does not contain proprietary information.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
D. Wagner, Nuclear Plant Operator
K. Keck, Nuclear Plant Operator
T. Gorman, Project Manager
R. Remsky, Offsite Emergency Planner
S. Davis, Manager Nuclear Emergency Planning
L. Casella Jr., Senior Technology Specialist
S. Maguire, Senior Technology Specialist
J. Williams, Off-Shift Unit Supervisor
M. Rochester, Nuclear Regulatory Affairs

Berwick Volunteer Fire Department
Bill Coolbaugh, Fire Chief

Nuclear Regulatory Commission
C. Cahill, Senior Reactor Analyst
D. Molteni, Operations Engineer

Other
L. Winker, Nuclear Safety Specialist, Pennsylvania Department of Environmental Protection

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

ARs/CRs with an asterisk (*) indicate the document was written as a result of the inspection effort.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events

Procedures:

DC-B5B-001, Spraying/Makeup to the Spent Fuel Pools using the Portable Pump Truck or Offsite Fire Department Fire Truck with Aerial Apparatus, Rev. 5
DC-B5B-200, Depressurization of Unit Two RPV Using ADS SRVs with a Portable Power Supply Connected in the Upper or Lower Relay Room, Rev. 2

DC-B5B-201, Depressurization of Unit Two RPV Using ADS SRVs with a Portable Power Supply Connected at the DIV 1 or DIV 2 Containment Penetration, Rev. 3
EP076, Severe Accident Management Overview and Transition, Rev. 3
EP077, Severe Accident Progression and Phenomenon, Rev. 5
EP104, Station Response to Terrorism, Rev. 0
EP-DS-001, Containment Combustible Gas Control, Rev. 5
EP-DS-002, RPV and Primary Containment Flooding, Rev. 5
EP-DS-004, Primary Containment and RPV Venting, Rev. 3
ES-013-001, Fire Protection System Cross-Tie to RHRSW, Rev. 11
ES-173-001, Venting Suppression Chamber within Offsite Release Limits, Rev. 7
ES-173-003, Venting Suppression Chamber without Radiological Release Limitation, Rev. 12
ES-173-004, Venting Drywell without Radiological Release Limitation, Rev. 10
ES-250-003, RCIC Manual Injection with Loss of AC and DC Power, Rev. 6
FB028, Mobile Pumping Apparatus 0P911 Operation, Rev. 1
OP-281-001, Unit 2 Refuel Platform Operation, Rev. 33

Condition Reports:

1341360, Drywell Atmosphere could not be Completed due to a Failed Plant Component
1373058, SDHR Skid Shelter Building Vulnerability
1373202, Enhancements to ON-144(244)-001
1373416, Procedure DC-B5B-102 Needs Adverse Weather Conditions Consideration
1373421, B.5.b Emergency Equipment Storage Shed Storage Deficiencies
1373430, Tornado Debris - Potential Impact to Spray Pond
1374133, Equipment Needed for Critical EOP Actions was out of Service
1374229, Minor Conflict between ES-013-001 and SO-013-008
1374254, Storage Building for the Portable B.5.B Pumper is not a Seismic Structure
1374256, DC-B5B-102 (202) Requires a Lineup in a Potentially Inaccessible Area
1374272, Some Maintenance Personnel not Qualified to Wear Breathing Apparatus
1374835, ES-013-001 Fire Protection System Cross-Tie to RHRSW Procedure Enhancement
1374840, Scaffold is Required to Access TE-E112N004A and TE-E11-2N027A
1374858, Sound Powered Phone Cable not Labeled
1374907, Inventory List and PM Needed for ES-150-003 and ES-250-003 Equipment
1374925, Inventory List Needed for Att H of EO-100-030 and Att F of EO-200-030
1375465, Procedure Enhancements
*1379533, Investigated a Report From NRC Resident of Oil Dripping from HV150F045.
*1379564, Cable Tray E1KF10 has One Broken Support Strap
*1385584, Procedure Enhancement for DC-B5B-001
*1385591, Non-controlled Inventory List Discovered in B.5.b Equipment Storage Boxes
*1390645, Hatch on the SBGT Duct RB 1 has Wing Nuts and the Unit 2 Hatch has Hex Nuts
*1390649, Z-Tex on the J Box for HD 27508B Limit Switch is Coming off.
*1390654, Cotter Pins on HD 17508A/B Linkage not as Secure as Those on HD 27508A/B.
*1391451, Bow in Instrument Air Line for Valves Associated with Containment Venting
*1392175, EP-DS-002 and EP-DS-005 were Beyond their Periodic Review Date
*1395298, Failure to Incorporate Lessons Learned into Training for B.5.b Pumper Truck
*1395304, Numerous Enhancements Required for Various ES Procedures
*1396109, Difference in Sequence of Stroking Valves with Containment Atmosphere Control

Other:

PLE-0025011, Letter of Agreement – 2011 Berwick Volunteer Fire Department, Rev. 0
PLE-0025022, Letter of Agreement – 2011 Nanticoke Fire Department, Rev. 0

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions

Procedures:

EO-100-030, Unit 1 Response to Station Blackout, Rev. 25
EO-100-030, Unit 1 Response to Station Blackout, Rev. 25
EO-200-030, Unit 2 Response to Station Blackout, Rev. 21
ES-002-001, Supplying 125V DC Loads with Portable Diesel Generator, Rev. 13
ES-013-001, Fire Protection System Cross-Tie to RHRSW, Rev. 11
ES-152-001, HPCI Turbine Isolation, Trip and Initiation Bypass, Rev. 16
ES-252-001, HPCI Turbine Isolation, Trip and Initiation Bypass, Rev. 16
GDS-08, Design Standard for Station Blackout, Rev. 12
OP-002-001, Station Portable Diesel Generator, Rev. 15
OPS-1-S, Operational Policy Statement - Quality Assurance for Station Blackout, Rev. 2

Condition Reports:

1374229, Minor Conflict between ES-013-001 and SO-013-008
1374258, Blue Max Portable DG May be Susceptible to Natural or Manmade Situations
1374835, ES-013-001 Fire Protection System Cross-Tie to RHRSW Procedure Enhancement
1374872, Significant Amount of Sound Powered Extension Cord Required by Certain ES Procedures (See Also 1374876, 1374882)
1374925, Inventory Needed for Attachment H of EO-100-030 and Attachment F of EO-200-030 (See Also 1374934)
*1375267, Conduit E2K0291 has Duct Tape Wrapped Around it
*1378253, HV-212-F073A is Missing a Cap Screw on MOV Cover
*1378257, There is Dirt/Debris around HV-212-F075A Gland
*1378261, Drain HV-212-F074A is Almost Completely Blocked with Debris and Drain HV-212-F074B is Completely Blocked with Debris
*1378272, There is a Large Tear in the Wrap (Intersection of E2K0291and E2KG23)
*1378277, Check valve 212F078A External Indicating Arm has Two Nuts with Less than Adequate Thread Engagement
*1378278, FME Such as a Tie Wrap, Cigarette, and Red Tube in Hanger GBB204H92
*1378282, Issues with HV112F073A during Walkdown of ES-013-001
*1378288, Issues with HV112F075A during Walkdown of ES-013-001
*1378297, Issues with HV112F074A during Walkdown of ES-013-001
*1378306, Leak where U-1 Containment Wall Meets Floor in U-1 Div 1 RHR Pump Room
*1378321, Potential Staging Concern for Drain Hoses for the Unit 2 Outage

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design

Drawings:

E105038, Reactor and Turbine Buildings Miscellaneous Exterior Details, Rev. 10
E105247-5, Reactor Building Units 1/2 Blowout Panels Plan and Sections, Rev. 1
E105203-2, Reactor Building Units 1/2 Foundations-Steam Vent Walls/Sections/Details, Rev. 14

Condition Reports:

1221784, Water was Found Dripping in the Unit 1 Lower Cable Spreading Room
1373654, Provide Support to Engineering in Preparing Station Flood Barrier Drawings for Use during the Implementation of TP-012-001, Station Flood Barrier Inspection
1373656, Summarize in a Calculation Information from the FSAR and Other Design Basis Calculations to Document in a Single Location the Effects of External Floods
1373657, Summarize in a Calculation Information from the FSAR and Other Design Basis Calculations to Document in a Single Location the Internal Flooding Events Required by the Design and Licensing Basis, Including MELB, HELB
1377424, Develop a 6-Year PM for ESSW Pump House Flood Detectors
1377428, Perform PM on ESSW Pump House Flood Detectors
1377491, Perform a Walkdown of the Fuel Pool Lo Level Switches to Confirm their Acceptability
1379577, To Confirm the Assumptions used in the External Flooding Analysis Perform a Site Walkdown to Confirm the Site Topography and Flow Pathways
1379582, Continue with the Development of Station Flood Barrier Drawings
1379605, Perform the Required Repair Action Restoring the Seal Material around a Temporary Cable for Flood Barrier Deviation Report 11-C2736R0-01
1380165, Flood Door Reconciliation
1380941, External Flooding Conditions could Potentially Affect Other SBO or B.5.b Equipment
1380977, TP-012-001, Flood Barrier, Walkdown Deviations
1381027, Seven Conditions Identified in the Station Flood Barrier Walkdowns Need to be Reviewed to Determine if they will be Justified within the Flooding Calculations
1381045, Station Flood Barrier Walkdowns
1381170, Perform the Required Repair Action of Cleaning the Floor Drain for Flood Barrier Deviation Report 11-C2739R0-09
1381172, Perform the Required Repair Action of Patching a Minor Surface Defect on a Small Area of Concrete for Flood Barrier Deviation Report 11-C2738R0-01
1381176, Perform the Required Repair Action of Repairing the Damaged Portion of the Door Seal on Door 593 for Flood Barrier Deviation Report 11-C2737R0-06
1381177, Perform the Required Repair Action Adjusting Doors 204 and 206 for Improved Seating on the Door Seal for Flood Barrier Deviation Report 11-C2735R0-01 and 02
1381178, Perform the Required Repair Action of Replacing the Floor Drain Caps on the Equipment Drains for Flood Barrier Deviation Report 11-C2731R0-01.
1381179, Perform the Required Repair Action of repairing Minor Concrete Surface Defects for Flood Barrier Deviation Report 11-C2730R0-03 and 0
1381180, Perform the Required Repair Action of Replacing Some Missing Caulk for Flood Barrier Deviation Report 11-C2729R0-16

1381181, Perform the Required Repair Action of Repairing a Crack and a Gouge in a Penetration Seal for Flood Barrier Deviation Report 11-C2729R0-06
1381183, Perform the Required Repair Action of Repairing the Damaged Portion of the Door Seal on Door 511 for Flood Barrier Deviation Report 11-C2729R0-03
1381185, Perform the Required Repair Action Adjusting Door 105 for Improved Seating on its Door Seal for Flood Barrier Deviation Report 11-C2726R0-01
1381187, Perform the Required Repair Action Cleaning Normally Closed Floor Drains for Flood Barrier Deviation Report 11-C2725R0-02 & 03.
1381189, Perform the Required Repair Action of Repairing Caulk on a Penetration Seal for Flood Barrier Deviation Report 11-C2717R0-01
1381194, Perform the Required Repair Action of Repairing Damage Penetration Seal Material for Flood Barrier Deviation Report 11-C2738R0-03
1381197, Perform the Required Repair Action of restoring the Internal Conduit Seal for Flood Barrier Deviation Report 11-C2738R0-02
1381199, Perform the Required Repair Action of Repairing Damage to the Penetration Seal for Flood Barrier Deviation Report 11-C2736R0-03
1381211, Perform a Re-Review of the Flooding Program to Assure that all Design Requirements are Adequately Documented
1381667, Determine that the Specified Flood Rating is Consistent with the Capability of the Penetration Seals Installed in the Barrier
*1391253, Junction Box JB1643 in Unit 1 is Missing 5 Cover Screws
*1391257, Junction Box JB0931 in Unit 1, is Missing 1 Cover Screw
*1391259, Junction Box JB0442 in Unit 1, is Missing all but 2 Cover Screws
*1391419, Overhead Light near the Unit 1 HPCI F003 Valve Needs Bulbs Replaced
*1391985, Dymeric Sealant at Joint between the South Wall of the 'A' Diesel Building and the Unit 1 Reactor Building Needs to be Replaced
*1392065, Biscoflex 150 Leaded Gel Seal is Damaged on Oenetration X-29-3-4
*1395261, Evaluate Procedural Requirements to Maintain the Limited Margin to Impacting the HPCI Room Steam Vents
1977489, Develop a Periodic PM for the Fuel Pool Low Level Switches

Other:

C1981-01, Routine Task - Inspection and Functional Test of LSH11020A
C2727-01, Unit 1 Reactor Building Station Flood Barrier Plan, Rev. 0
C4456-01, Routine Task - Float Integrity Check of Ball Float of LSH11020A
D296442-1, Unit 1 Reactor Building Station Flood Barrier Plan, Rev. 0
EC-FLOD-1001, Evaluation of Response to IER L1 11-1, Recommendations 3 and 4 for Station Flooding, Rev. 0
EC-FLOD-1002, Impact of Postulated Flooding from Rupture of Cooling Tower Basin, Circulating Water in Turbine Building, U1 and U2 CSTs and RWST, Rev. 0
NDAP-QA-1105, Dynamic Qualification of Equipment/SQRT Program, Rev. 4
RTPM 572680, Routine Task - Float Integrity Check of Ball Float of LSH11020A
RTPM 590929, Routine Task - Inspection and Functional Test of LSH11020A

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events

Drawings:

E105012, Circulating Water Pumphouse and Water Treatment Building - Fire Protection, Rev. 5
E106227, Fire Protection Pumphouse North/South Gatehouse, Security Control Center, Rev. 51

Calculations/Evaluations:

EC-FLOD-0500, Re-Evaluate Maximum Flood Depth in Reactor Building Piping/Penetration Room, Rev. 2

Condition Reports:

1380258, PIV 1P1104 does not have Protective Bollards
1383108, Missing Bolt at Hose Station 243
1383111, Ext 1559 has Only One Wheel Chocked
1383125, Ext. 2200 not Found
1383137, Header Ends at Column Lines 36 and T vs. Column Line 37.4 as per Drawing
1383140, Fire Protection Carbon Steel Suction and Discharge Piping has Experienced MIC
1383158, Abandoned Support to be Removed
1383159, Fire Extinguishers were in areas Different than Shown on the C-1700 Drawings
1383176, Fire Protection Piping and Conduit Sharing the Same Support
1383546, Storage Racks for B.5.b Equipment in the Warehouse Addition are not Secured and may Topple during a Seismic Event
*1392047, Seismic Gap Sealing Requirements
*1395322, Circulating Water Pumphouse is not Seismically Qualified
*1396672, Procedural Enhancements

Other:

NE-94-001, SSES Individual Plan Examination for External Events, June 1994
EC-RISK-1151, Documentation for Item 4 of IER L1 11-1, Rev. 0
EC-FLOD-1001, Evaluation of Response to IER L1 11-1, Recommendations 3 and 4 for Station Flooding, Rev. 0

LIST OF ACRONYMS USED

ADAMS	Agencywide Document and Access Management System
AR	Action Report
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
CST	Condensate Storage Tank
DC	Damage Control
DG	Diesel Generator
EDMG	Extensive Damage Mitigation Guidelines
EOP	Emergency Operating Procedure
ES	Emergency Support Procedure
EWR	Engineering Work Request
FPS	Fire Protection System
FSAR	[SSES] Final Safety Analysis Report
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation and Air-Conditioning
IPEEE	Individual Plant Examination for External Events
LOOP	Loss of Offsite Power
MCC	Motor Control Center
NRC	Nuclear Regulatory Commission
ON	Off-Normal
PASS	Post Accident Sampling System
PPL	PPL Susquehanna, LLC
RBCCW	Reactor Building Closed Cooling Water
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RHRSW	Residual heat Removal Service Water
RPV	Reactor Pressure Vessel
SAMG	Severe Accident Management Guidelines
SBO	Station Blackout
SSE	Safe Shutdown Earthquake
SSES	Susquehanna Steam Electric Station
WO	Work Order