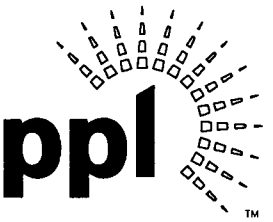
Britt T. McKinney
Sr. Vice President & Chief Nuclear Officer

PPL Susquehanna, LLC
769 Salem Boulevard
Berwick, PA 18603
Tel. 570.542.3149 Fax 570.542.1504
btmckinney@pplweb.com



AUG 29 2008

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SUSQUEHANNA STEAM ELECTRIC STATION
REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (LRA)
SECTION 2.5
PLA-6413

Docket Nos. 50-387 and 50-388

References:

1) *PLA-6110, Mr. B. T. McKinney (PPL) to Document Control Desk (USNRC), "Application for Renewed Operating License Numbers NPF-14 and NPF-22," dated September 13, 2006.*

2) *Letter from Ms. E. H. Gettys (USNRC) to Mr. B. T. McKinney (PPL), "Request for Additional Information for the Review of the Susquehanna Steam Electric Station, Units 1 and 2 License Renewal Application," dated July 30, 2008.*

3) *PLA-6362, Mr. B. T. McKinney (PPL) to Document Control Desk (USNRC), "Units 1 and 2 License Renewal Application (LRA) Station Blackout Scope Addition," dated May 7, 2008.*

In accordance with the requirements of 10 CFR 50, 51, and 54, PPL requested the renewal of the operating licenses for the Susquehanna Steam Electric Station (SSES) Units 1 and 2 in Reference 1.

Reference 2 is a request for additional information (RAI) related to LRA Section 2.5, Station Blackout Scoping. The enclosure to this letter provides the additional requested information.

The SSES LRA was previously amended by Reference 3 to expand the Station Blackout scoping boundary in response to an RAI. NRC Staff Draft LR-ISG-2008-01 guidance that was used at the time of this amendment did not include the switchyard circuit breaker control circuits within the scope of license renewal. Therefore, the LRA is amended as described in the Enclosure to add the subject control circuits to the scope of license renewal. For clarity, the Attachment provides the additional control circuits along with

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the changes previously transmitted by Reference 3. Therefore, the information contained in the Attachment supersedes the Enclosure to Reference 3 in its entirety.

There are no new regulatory commitments contained herein as a result of the attached responses.

If you have any questions, please contact Mr. Duane L. Filchner at (610) 774-7819.

I declare, under penalty of perjury, that the foregoing is true and correct.

Executed on: 8/29/2008

for BT McKinney

B. T. McKinney

Enclosure: PPL Responses to NRC's Request for Additional Information (RAI)
Attachment: SBO Scope Addition Revised LRA Sections 2.1, 2.2, 2.4, 2.5, 3.5, 3.6

Copy: NRC Region I
Ms. E. H. Gettys, NRC Project Manager, License Renewal, Safety
Mr. R. Janati, DEP/BRP
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector
Mr. A. L. Stuyvenberg, NRC Project Manager, License Renewal, Environmental

Enclosure to PLA-6413
PPL Response to NRC's
Request for Additional Information (RAI)

RAI 2.5-2:

In its May 7, 2008 letter (ADAMS Accession No. ML081420028), the licensee modified the scoping boundary for the station blackout recovery paths to include 230 kilovolt circuit breakers. As the licensee did not specifically exclude the associated control circuits and structures for the circuit breakers, it is assumed that these components are included in the scope of license renewal. In accordance with 10 CFR 54.4(a)(3) and SRP-LR Sections 2.1.3.1.3 and 2.5.2.1.1, the control circuits and structures associated with the circuit breaker should be in the scope of license renewal. Please confirm whether these components are within the scope of license renewal.

PPL Response:

The structures associated with the 230 kilovolt circuit breakers included in the scoping boundary for the station blackout recovery paths are included within the scope of license renewal. The control circuits were not included within the scope of license renewal based on NRC Staff Draft LR-ISG-2008-01 guidance that was used at the time the SSES LRA was amended by the May 7, 2008 letter (Reference 3).

The LRA is revised to add the subject control circuits to the scope of license renewal as shown in the Attachment. For clarity, the Attachment includes the changes previously transmitted by Reference 3 and supersedes the Enclosure to Reference 3 in its entirety.

Attachment to PLA-6413
SBO Scope Addition
Revised LRA Sections 2.1, 2.2, 2.4, 2.5, 3.5, 3.6

2.1 SCOPING AND SCREENING METHODOLOGY

2.1.1.3.5 Station Blackout (10 CFR 50.63)

➢ The following text under Section 2.1.1.3.5 (on LRA pages 2.1-11 and 2.1-12) is revised by addition (***bold italics***).

10 CFR 50.63 requires that each light-water-cooled nuclear power plant be able to withstand and recover from a station blackout. A station blackout (SBO) is defined in the regulations as the loss of offsite and onsite alternating current (AC) electric power to the essential and nonessential switchgear buses in a nuclear power plant. It does not include the loss of AC power fed from inverters powered by station batteries. The objective of this requirement is to assure that nuclear power plants are capable of withstanding an SBO and maintaining adequate reactor core cooling and containment integrity for a required duration.

In response to the issuance of the SBO Rule, PPL evaluated SSES against the applicable regulatory requirements in 10 CFR 50.63. The SBO evaluation is documented in an SSES coping assessment, which demonstrates the capability of installed equipment at SSES to operate systems necessary for coping with an SBO event, and to bring the plant to, and maintain it in, a safe shutdown condition.

The SSES coping assessment has been reviewed and accepted by the NRC in the Safety Evaluation Report (SER) dated January 14, 1992 (Reference 2.1-8), and an SER supplement dated June 16, 1992 (Reference 2.1-9).

At SSES, all plant equipment (i.e., systems and instrumentation) necessary to cope with SBO, recover from SBO, and ensure Primary Containment isolations was identified and investigated to assure that all items necessary for the equipment to function would be available for at least four hours. This is the equipment relied upon for compliance with 10 CFR 50.63.

NUREG-1800, Revision 1, contains additional considerations related to the determination of SBO scoping boundaries for license renewal. The NUREG addresses the determination of the boundaries of the plant system portion of the offsite power system relied upon to restore the offsite power for license renewal considerations. ***Prior to the issue of NUREG-1800 (Revision 1), these additional considerations were published in NRC LR Interim Staff Guidance (ISG)document ISG-02, "Staff Guidance on Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout (SBO) Rule (10CFR50.63) for License Renewal – 10CFR54.4(a)(3)," dated 4/1/2002.***

Based on a review of the SSES current licensing basis for SBO, the intended functions for each system and structure supporting the 10 CFR 50.63 requirements are determined. The guidance in NUREG-1800 is used to identify any additional systems and structures performing an intended function for SBO. SSCs that perform an intended function for SBO are included in the scope of license renewal.

2.2 PLANT-LEVEL SCOPING RESULTS

Table 2.2-2, License Renewal Scoping Results for Electrical and I&C Systems

➢ The following portion of Table 2.2-2 (on LRA page 2.2-7) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Table 2.2-2 (continued)		
System Name	**In Scope?**	**Screening Results Section**
Safety Parameter Display	Yes	2.5
Security	No	
Seismic Monitors	No	
Shaft Voltage Detection	No	
Switchyard	~~No~~***Yes***	***2.5***
Thrust Wear Detection	No	
Transient Monitoring	No	
Turbine and Supervisory Instrumentation	No	

Table 2.2-3, License Renewal Scoping Results for Structures

➢ The following portion of Table 2.2-3 (on LRA page 2.2-19) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Table 2.2-3

Structure Name	In Scope?	Comments / Screening Results Section
Station Blackout ***(SBO)*** Component Foundations and Structures in the Yard (startup transformers T-10 and T-20 and associated disconnect switches, ~~and~~ ESS transformers, ***and Transmission Towers***)	Yes	2.4.9.5

Table 2.2-3, License Renewal Scoping Results for Structures

➢ The following portion of Table 2.2-3 (on LRA page 2.2-22) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Table 2.2-3

Structure Name	In Scope?	Comments / Screening Results Section
T-10 230kV Switchyard Station Blackout (SBO) Component Foundations and Structures [located outside the security fence]	***Yes***	***2.4.9.8***
230kV Switchyard Station Blackout (SBO) Component Foundations and Structures [located outside the security fence]	***Yes***	***2.4.9.9***
500 kV Switchyard ***Station Blackout (SBO) Component Foundations and Structures [located outside the security fence]*** ~~(Switching Station)~~	~~No~~ ***Yes***	***2.4.9.10*** ~~Located outside security fence. Provides area and facilities for switchyard. Fenced area with single story commercial grade modular steel structures and towers on concrete foundations.~~ ~~Structure provides support and anchorage for nonsafety-related equipment and equipment not required to support regulated events. None of the major components in this structure present a seismic II/I situation. The structure does not perform an intended function delineated in 10 CFR 54.4(a).~~

2.4 SCOPING AND SCREENING RESULTS: STRUCTURAL

2.4.9 Yard Structures

➢ The following text under Section 2.4.9.5 (on LRA page 2.4-31) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

2.4.9.5 Station Blackout ***(SBO)*** Component Foundations and Structures in the Yard (Startup Transformers T-10 and T-20 and Associated Disconnect Switches, ~~and~~ ESS Transformers***, and Transmission Towers***)

Structure Description

The station blackout component foundations and structures in the yard (startup transformers T-10 and T-20 and associated disconnect switches, ~~and~~ Engineered Safeguards Systems (ESS) transformers***, and transmission towers***) are not seismic Category I structures. Startup transformers T-10 and T-20, ~~and~~ associated disconnect switches (motor-operated air switches 1R105 and 2R105) ***and transmission towers*** ~~define the physical boundary that~~ provide~~s~~ an offsite alternating current (AC) source for recovery from a station blackout (SBO) regulated event.

The startup transformers and associated disconnect switches, as well as the ESS Transformers, are supported by reinforced concrete pads. ***The disconnect switches are supported by steel frame structures and the transmission conductors are supported by steel transmission towers and related foundations.*** ~~Disconnect switches are supported by steel frame structures, electrical cables are supported by tapered steel transmission towers.~~

Reason for Scope Determination

The station blackout component foundations and structures in the yard (startup transformers T-10 and T-20 and associated disconnect switches, and ESS transformers) provide physical support for equipment relied upon to demonstrate compliance with the Station Blackout (10 CFR 50.63) regulated event. This meets the 10 CFR 54.4(a)(3) scoping criteria.

The transmission towers provide physical support for components included in scope based on guidance related to SBO scoping contained in NUREG-1800, Revision 1.

In addition, the station blackout component foundations and structures in the yard (startup transformers T-10 and T-20 and associated disconnect switches, ~~and~~ ESS transformers***, and transmission towers***) are in the scope of license renewal because they contain:

- Structural components that are relied on during station blackout events.
- ***Structural components associated with SBO offsite power recovery per the guidance in NUREG-1800, Revision 1.***

2.4.9 Yard Structures

➢ The following new sections are added after Section 2.4.9.7 (on LRA page 2.4-33) and are revised by addition (***bold italics***).

2.4.9.8 T-10 230kV Switchyard Station Blackout (SBO) Component Foundations and Structures (located outside security fence)

Structure Description

Dead end structure and breakers (2S and 2T) and control cubicle support supplying power from the T-10 230kV switchyard to the 13.8kV bus 10 providing offsite AC sources for recovery from an SBO.

The dead end structure and breakers (2S and 2T) are supported by reinforced concrete foundations. The control cubicle supports/protects the circuitry and controls.

Reason for Scope Determination

The dead end structure, breakers and control cubicle provide physical support for components included in scope based on guidance related to SBO scoping contained in NUREG-1800, Revision 1.

In addition, the T-10 230kV Switchyard dead end structure, breakers and control cubicle are in the scope of license renewal because they contain:

- ***Structural components associated with SBO offsite power recovery per the guidance in NUREG-1800, Revision 1.***

2.4.9.9 230kV Switchyard Station Blackout (SBO) Component Foundations and Structures (located outside security fence)

Structure Description

Dead end structure, breakers (2T and 2W) and control cubicle support supplying power from the 230kV switchyard to the 13.8kV bus 20 providing offsite AC sources for recovery from an SBO.

The dead end structure and breakers (2T and 2W) are supported by reinforced concrete foundations. The control cubicle supports/protects the circuitry and controls.

Reason for Scope Determination

The dead end structure, breakers and control cubicles provide physical support for components included in scope based on guidance related to SBO scoping contained in NUREG-1800, Revision 1.

In addition, the 230kV Switchyard dead end structure, breakers and control cubicle are in the scope of license renewal because they contain:

- ***Structural components associated with SBO offsite power recovery per the guidance in NUREG-1800, Revision 1.***

2.4.9.10 500kV Switchyard Station Blackout (SBO) Component Foundations and Structures (located outside security fence)

Structure Description

230kV dead end structure, 230kV capacitive coupled voltage transformer (CCVT) and line trap, 230kV switch, 230kV current transformer, 230kV breaker and control cubicle support supplying power from the 500kV switchyard to the 13.8kV bus 20 providing offsite AC sources for recovery from an SBO.

The 230kV dead end structure, 230kV CCVT and line trap, 230kV switch, 230kV current transformer, and 230kV breaker are supported by reinforced concrete foundations and/or steel piles. The control cubicle supports/protects the circuitry and controls.

Reason for Scope Determination

The 230kV dead end structure, 230kV CCVT and line trap, 230kV switch, 230kV current transformer, 230kV breaker and control cubicle provide physical support for components included in scope based on guidance related to SBO scoping contained in NUREG-1800, Revision 1.

In addition, the 500kV Switchyard 230kV dead end structure, 230kV CCVT and line trap, 230kV switch, 230kV current transformer, 230kV breaker and control cubicle are in the scope of license renewal because they contain:

- ***Structural components associated with SBO offsite power recovery per the guidance in NUREG-1800, Revision 1.***

2.4.9 Yard Structures

Table 2.4-9, Yard Structures, Components Subject to Aging Management Review

➢ Table 2.4-9 (on LRA page 2.4-35) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Component Type	Intended Function (as defined in Table 2.0-1)
Battery Racks (SBO)	***SRE***
Cooling Tower Basin outlet screen guides	SRE
Cooling Tower Basin outlet screens	SRE
Disconnect Switch / CCVT and Line Trap / Switch / Current Transformer / Breaker Support Structures (SBO)~~Disconnect switch support towers~~	~~EN, SNS,~~ SRE
Manhole covers	EN, MB, SNS, SRE
Metal Siding (SBO)	***SRE***
Piles (500kV Switchyard) (SBO)	***SRE***
Raised Flooring (includes support system) (SBO)	***SRE***
Roof Decking (SBO)	***SRE***
Structural Steel: Beams, Columns, Plates, and Trusses (includes welds and bolt connections) (SBO)	***SRE***
Transmission Towers and Dead End Structures (SBO)~~Transmission towers~~	~~EN, SNS,~~ SRE
Valve vault and instrument pit hatches	EN, MB, SNS, SRE, SSR
Condensate Storage Tank (CST) retention basins	FLB, SNS
Cooling Tower Basins	SRE
Cooling Tower Basin outlet structures	EN, SRE
Diesel Generator (DG) Fuel Oil Tank foundations	SRE, SSR
Diesel Generator (DG) Fuel Oil Tank vaults	EN, MB, SRE, SSR
Duct banks	EN, MB, SRE, SSR
Manholes	EN, MB, SRE, SSR
Masonry Block Walls (SBO)	***SRE***
Outdoor tank foundations: Condensate Storage Tank (CST), Clarified Water Storage Tank (CWST), Refueling Water Storage Tank (RWST)	EN, SNS, SRE
Piping trenches	EN, MB, SNS, SRE, SSR
Reinforced Concrete (Floors) (SBO)	***SRE***

Component Type	Intended Function (as defined in Table 2.0-1)
Transformer / Disconnect Switch / CCVT and Line Trap / Switch / Current Transformer / Breaker/ Control Cubicle Foundations (SBO) ~~Transformer/Disconnect switch foundations (SBO and ESS)~~	~~EN, SNS~~, SRE
Valve vaults and instrument pits	EN, FLB, MB, SNS, SRE, SSR
Trenches (SBO cables)	***SRE***

2.5 SCOPING AND SCREENING RESULTS: ELECTRICAL

2.5.5 Electrical/I&C Component Commodity Groups Requiring an Aging Management Review

➢ The following text under Section 2.5.5 (on LRA pages 2.5-6 and 2.5-7) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

2.5.5.3 High-Voltage Insulators

A high-voltage insulator is a component uniquely designed to physically support a high-voltage conductor and to separate the conductor electrically from another conductor or object. The high-voltage insulators evaluated for license renewal at SSES include those used to support and insulate high-voltage electrical components (i.e., transmission conductors and connections, in particular those associated with ***the offsite power supply***~~Start-Up Transformers T10 and T20~~).

There are two basic types of insulators: station post insulators and strain (or suspension) insulators. Station post insulators are large and rigid. They are used to support stationary equipment such as short lengths of transmission conductors and disconnect switches. Strain insulators are used in applications where movement of the supported conductor is expected and allowed. This includes maintaining tensional support of transmission conductors between transmission towers or other supporting structures.

At SSES, the high-voltage insulators within the license renewal scope are the station post insulators ***and strain insulators*** associated with ***the offsite power supplies.*** ~~Start-Up Transformers T10 and T20 (to support the short lengths of transmission conductors connecting the start-up transformers to the motor-operated air break switches, and to support the motor-operated air break switches 1R105 and 2R105). High-voltage insulators in the switchyards are not in the license renewal scope.~~

The function of high-voltage insulators is to insulate and support an electrical conductor. High voltage insulators are passive, long-lived components. Therefore, high voltage insulators meet the criteria of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.5.4 Transmission Conductors and Connections

Transmission conductors are category aluminum conductor steel reinforced (ACSR), stranded aluminum conductors wrapped around a steel core and are constructed of aluminum and steel. They are uninsulated, high-voltage conductors used to carry loads in plant switchyards and in distribution applications. The transmission conductor connections are cast aluminum.

The sections of transmission-type conductors at SSES within the scope of license renewal are ***associated with the offsite power supplies.*** ~~located at~~ ***The in-scope transmission conductors are used to connect*** Start-Up Transformers T10 and T20~~; they connect the transformers~~ with motor-operated air break switches 1R105 and 2R105, ***to interconnect the motor-operated air break switches with the switchyards (T10 Tap and 230-500kV Yard Tie), and to interconnect in scope equipment in the switchyards.*** ~~The sections of transmission conductor are approximately 22 feet and 12 feet long, respectively.~~ These ~~sections of~~ transmission conductors are included to meet the guidance of Revision 1 of NUREG-1800 with respect to off-site power restoration after a station blackout (SBO) event.

The function of transmission conductors is to provide electrical connection to specified portions of an electrical circuit to deliver voltage and current. Transmission conductors are passive, long-lived components. Therefore, transmission conductors ***and connections*** meet the criteria of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.6 Evaluation Boundaries

➢ The following text under Section 2.5.6 (on LRA pages 2.5-7 through 2.5-9) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

2.5.6.2 Station Blackout Evaluation Boundaries

10 CFR 54.4(a)(3) requires that plant systems, structures, and components (SSCs) relied on for compliance with the 10 CFR 50.63 regulations on Station Blackout (SBO), be included in the scope of license renewal. The NRC issued additional guidance on the scoping of equipment relied on to meet the requirements of the Station Blackout rule in the form of an Interim Staff Guidance document (ISG-02). Subsequently, this guidance was incorporated into NUREG-1800, Revision 1.

Using the requirements of the License Renewal Rule, the guidance provided in NUREG-1800, the insights of ISG-02, and SSES design basis and current licensing basis documentation, the in-scope SSCs for SBO (and the appropriate SBO license renewal scoping boundary) were identified. The following paragraphs describe the SBO license renewal boundary definition for SSES.

Two independent offsite power sources are supplied to SSES via Start-Up Transformers T10 and T20 and are shared by both units. The source connected through transformer T10 is supplied from the T10 230 kV switchyard located to the west of the plant. The offsite source connected through transformer T20 is supplied at 230 kV from the yard tie circuit between the Susquehanna 500 kV and 230 kV switchyards. The tie line runs from the 230 kV switchyard (located across the Susquehanna River from the plant) to the 500 kV switchyard (located south of the plant). The 500 kV switchyard contains a 500/230 kV transformer (for the tie line). None of these switchyards are within the SSES site boundary (i.e., the owner controlled area). The switchyards are not under the control (operational or administrative) of SSES. See Figure 2.5-1 for further detail, and a simplified graphical representation of the SSES SBO license renewal boundary.

Per the guidance of NUREG-1800, the plant system portion of the offsite power system used to connect the plant to the offsite power source needs to be included in the scope of license renewal. For SSES, the power sources supplied to the plant via Start-Up Transformers T10 and T20 provide the SBO recovery path from the offsite power system. To ensure inclusion of all the appropriate SSCs within the scope of license renewal, the boundary between the offsite power system (the grid) and the plant system portion of the offsite power system must be identified.

The boundary points for the SBO license renewal boundary ***were identified by beginning at the Start-Up Transformers and following the offsite power supply circuits away from the plant until the first circuit breakers at transmission system voltage were encountered. In the T10 230 kV Switchyard, the SBO LR boundary is at circuit breakers 2T and 2S. In the 500 kV Switchyard, the SBO LR boundary is at the 230 kV circuit breaker (designated as "CB" in Figure 2.5-1) on the East side of the switchyard. In the 230 kV Switchyard, the SBO LR boundary is at circuit breakers 2T and 2W. These circuit breakers are shown in Figure 2.5-1***~~.are the motor-operated air break (MOAB) switches, 1R105 and 2R105, located just downstream of Transformers T10 (switch 1R105) and T20 (switch 2R105). These switches were selected as the boundary points because they are the last (and the only) SBO recovery-related active components in the 230 kV transmission system that are under the control of the plant control room operator. All other SBO recovery-related transmission system breakers and~~

~~switches are under the control of offsite agencies. The motor-operated air break switches are shown in Figure 2.5-1.~~

~~NUREG-1800 states that the boundary of the plant portion of the offsite power system is typically established at the circuit breakers in the switchyard. While not at a circuit breaker in the switchyard, the SBO boundary established for SSES is equivalent to that described in NUREG-1800 for the following reasons.~~

~~At SSES, no transmission system switchyard equipment is included within the license renewal SBO scoping boundary. The Start-Up Transformers and associated MOABs are not located in the transmission system switchyards. A separate transformer yard inside the plant security fence is provided for each of the Start-Up Transformers (T10 and T20). The connection to the transmission system via the MOAB is made in these transformer yards.~~ All of the equipment needed to connect to the offsite transmission system (for SBO recovery) ~~and to provide protection for the Start-Up Transformers~~ is in the scope of license renewal and is located in ***the transmission system switchyards mentioned above, in the transmission line corridors between the plant and the switchyards, in the plant yard area,*** ~~these transformer yards~~ or inside plant buildings. Back feed through the unit main transformers is not credited as an SBO recovery path for SSES, so no transmission switchyard equipment is brought into the license renewal scope for this situation. ***Control circuits for the in-scope 230kV switchyard circuit breakers are within the scope of license renewal at SSES.***

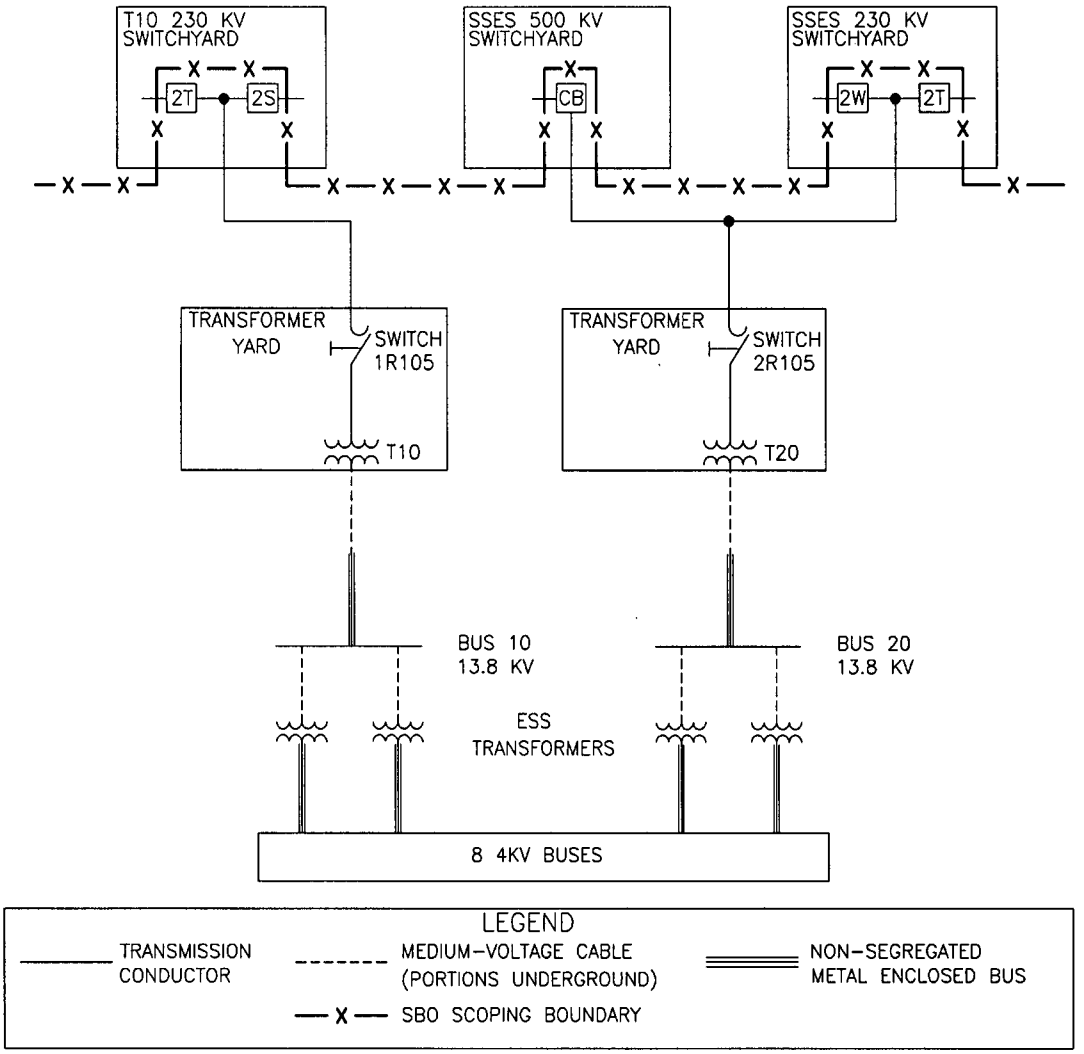
~~The MOABs (1R105 and 2R105) are equivalent to a circuit breaker in this application because of their service requirements. Under SBO conditions and during offsite power restoration, these MOABs are not required to switch full load current. During an SBO, the offsite 230 kV power sources will be de-energized, so the MOABs do not need to switch load current. When offsite power is lost, breakers on the secondary side of the Start-Up Transformers disconnect them from their load. The procedurally controlled process for reconnecting the load requires that the MOAB be closed prior to reconnecting the secondary side of the transformer to its load. In this case, the MOAB is switching only transformer inrush current and is operating well within its design ratings. The MOABs allow the plant operators the flexibility to disconnect the plant from the grid under SBO conditions and to control when connections to the grid are re-established, in order to ensure protection of the Start-Up Transformers and preservation of the plant portion of the SBO recovery path. The control circuits for the MOABs are powered from the plant 125 VDC system. All components (control relays, power supplies, and cables) are within the scope of license renewal.~~

~~The SSES design does not rely on the MOABs for interruption of fault current to protect the Start-Up Transformers. Any transformer faults are detected by transformer-mounted instruments or protective relays located in the plant switchgear rooms. As described in the SSES FSAR, upon detection of a transformer fault, a trip of the appropriate transmission line remote breakers is initiated. Although this direct transfer trip is the primary protection scheme, full reliance is not placed on this scheme to de-energize the line. Backup protection is provided by a high-speed ground switch located in the transformer yard. This switch closes a few cycles after the transformer fault is detected to place a positive fault on the 230 kV transmission line to ensure that the remote breakers trip to de-energize the line. The MOAB automatically opens after the 230 kV system is de-energized to isolate the applicable Start-Up Transformer from the transmission system. The MOAB is not relied upon to disconnect the faulted Start-Up Transformer and the fault current switching capability that would be provided by a circuit breaker is not required in this application. The transformer protective relays and the controls for the high-speed ground switch are powered from the plant 125 VDC system. All of the components required to protect the Start-Up Transformers (protective relays, high-speed ground switch, and associated cables) are within the scope of license renewal at SSES.~~

2.5.6.2 Station Blackout Evaluation Boundaries

➢ The following figure under Section 2.5.6.2 (on LRA page 2.5-10) is replaced. The text associated with Figure 2.5-1 (on LRA page 2.5-10) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Figure 2.5-1
Graphical Representation of the SSES SBO License Renewal Boundary



As is shown ***at the top of this figure, the SBO LR scoping boundary is at circuit breakers located in the three switchyards.*** ~~connection to the grid is made in the transformer yards at switches 1R105 and 2R105. All of the 230 kV components in the plant portion of the offsite power system are listed in the plant's equipment database as part of the 13.8 kV electrical system.~~

3.5.2.1.9 Yard Structures

➢ The following portion of Section 3.5.2.1.9 (on LRA pages 3.5-13 and 3.5-14) is revised by addition (***bold italics***).

Materials

Yard components subject to aging management review are constructed of the following materials:

- Carbon Steel
- Concrete
- ***Concrete Blocks***
- Concrete (Structural Backfill)
- Galvanized Steel
- Stainless Steel

Aging Management Programs

The following programs are credited for managing the effects of aging on yard components:

- Structures Monitoring Program
- ***Masonry Wall Program***

3.5 AGING MANAGEMENT OF CONTAINMENTS, STRUCTURES, AND COMPONENT SUPPORTS

Table 3.5.2-9, Aging Management Review Results - Yard Structures

➢ The following portion of Table 3.5.2-9 (starting on LRA page 3.5-105) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Table 3.5.2-9 Aging Management Review Results - Yard Structures								
Component/ Commodity	**Intended Function[1]**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Programs**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
Battery Racks (SBO)	***SRE***	***Carbon Steel***	***Protected from weather***	***Loss of material***	***Structures Monitoring Program***	***III.A3-12***	***3.5.1-25***	***A***
		Galvanized Steel	***Protected from weather***	***None***	***None***	***III.B3-3***	***3.5.1-58***	***A***
Disconnect Switch ***/CCVT and Line Trap/ Switch/ Current Transformer / Breaker Support Structures (SBO)*** ~~Support Towers~~	~~EN, SNS,~~ SRE	Carbon Steel	Exposed to weather	Loss of material	Structures Monitoring Program	III.A3-12	3.5.1-25	A
		Galvanized Steel	Exposed to weather	Loss of material	Structures Monitoring Program	III.B2-7	3.5.1-50	C

Table 3.5.2-9 Aging Management Review Results - Yard Structures								
Component/ Commodity	Intended Function[1]	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Metal Siding (SBO)	*SRE*	*Carbon Steel*	*Exposed to weather*	*Loss of material*	*Structures Monitoring Program*	*III.A3-12*	*3.5.1-25*	*A*
		Galvanized Steel	*Exposed to weather*	*Loss of material*	*Structures Monitoring Program*	*III.B2-7*	*3.5.1-50*	*C*
Piles (500kV Switchyard) (SBO)	*SRE*	*Carbon Steel*	*Below Grade*	*Loss of material*	*Structures Monitoring Program*	*N/A*	*N/A*	*I, 0501*
		Galvanized Steel	*Below Grade*	*Loss of material*	*Structures Monitoring Program*	*N/A*	*N/A*	*I, 0501*
Raised Flooring (includes support system) (SBO)	*SRE*	*Carbon Steel*	*Protected from weather*	*Loss of material*	*Structures Monitoring Program*	*III.A3-12*	*3.5.1-25*	*A*
		Galvanized Steel	*Protected from weather*	*None*	*None*	*III.B5-3*	*3.5.1-58*	*C*
Roof Decking (SBO)	*SRE*	*Carbon Steel*	*Protected from weather*	*Loss of material*	*Structures Monitoring Program*	*III.A3-12*	*3.5.1-25*	*A*
		Galvanized Steel	*Protected from weather*	*None*	*None*	*III.B5-3*	*3.5.1-58*	*C*

Table 3.5.2-9 Aging Management Review Results - Yard Structures								
Component/ Commodity	**Intended Function[1]**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Programs**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
Structural Steel: Beams, Columns, Plates, and Trusses (includes welds and bolted connections) (SBO)	***SRE***	***Carbon Steel***	***Protected from weather***	***Loss of material***	***Structures Monitoring Program***	***III.A3-12***	***3.5.1-25***	***A***
		Galvanized Steel	***Protected from weather***	***None***	***None***	***III.B5-3***	***3.5.1-58***	***C***
Transmission Towers ***and Dead End Structures (SBO)***	~~EN, SNS,~~ SRE	***Carbon Steel***	***Exposed to weather***	***Loss of material***	***Structures Monitoring Program***	***III.A3-12***	***3.5.1-25***	***A***
		Galvanized Steel	Exposed to weather	Loss of material	Structures Monitoring Program	III.B2-7	3.5.1-50	C
Masonry Block Walls (SBO)	***SRE***	***Concrete Blocks***	***Protected from weather***	***Cracking***	***Masonry Wall Program***	***III.A3-11***	***3.5.1-43***	***A***
		Concrete Blocks	***Exposed to weather***	***Cracking***	***Masonry Wall Program***	***III.A3.11***	***3.5.1-43***	***A***

Table 3.5.2-9 Aging Management Review Results - Yard Structures								
Component/ Commodity	**Intended Function[1]**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Programs**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
Reinforced Concrete Floors (SBO)	***SRE***	***Concrete***	***Protected from weather***	***None***	***Structures Monitoring Program***	***N/A***	***N/A***	***I, 0501***
Transformer/ Disconnect Switch/ ***CCVT and Line Trap/ Switch/ Current Transformer / Breaker/ Control Cubicle*** Foundations (SBO ~~and ESS~~)	~~EN, SNS,~~ SRE	Concrete	Exposed to weather	None	Structures Monitoring Program	N/A	N/A	I, 0501
Trenches (SBO cables)	***SRE***	***Concrete***	***Below grade***	***None***	***Structures Monitoring Program***	***N/A***	***N/A***	***I, 0501***
			Exposed to weather	***None***	***Structures Monitoring Program***	***N/A***	***N/A***	***I, 0501***
			Exposed to raw water	***Loss of material*** ***Cracking***	***Structures Monitoring Program***	***III.A6-5***	***3.5.1-35***	***G, 0521***

Table 3.5.2-10, Aging Management Review Results – Bulk Commodities

➢ The following portion of Table 3.5.2-10 (LRA pages 3.5-131 and 3.5-132) is revised by addition (***bold italics***).

Table 3.5.2-10 Aging Management Review Results – Bulk Commodities

Component/ Commodity	Intended Function[1]	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Compressible Joints and Seals	EXP, FLB, SNS, ***SRE***	Elastomer	Protected from weather	Cracking Change in material properties	Structures Monitoring Program	III.A6-12	3.5.1-44	C, 0525
			Exposed to weather	Cracking Change in material properties	Structures Monitoring Program	III.A6-12	3.5.1-44	C, 0525
Roof Membrane	FLB, SNS, ***SRE***	Elastomer / Built-up Roofing	Protected from weather	Cracking Change in material properties	Structures Monitoring Program	III.A6-12	3.5.1-44	C, 0525
			Exposed to weather	Cracking Change in material properties	Structures Monitoring Program	III.A6-12	3.5.1-44	C, 0525

➢ The following portion of Table 3.5 Plant Specific Notes (LRA page 3.5-138) is revised by addition (***bold italics***).

Plant-Specific Notes:	
0521	The GALL does not list exposed to raw water environment for this component type. SSES operating experience has shown cases of water accumulating in manholes. Therefore, aging mechanisms pertaining to raw water environments are also applicable within manholes, ***trenches (SBO cables)***, valve vaults, and instrument pits. The identified AMP is used to manage aging effects for the period of extended operation.

3.6 AGING MANAGEMENT OF ELECTRICAL AND INSTRUMENTATION AND CONTROLS

3.6.2.1.1 Non-EQ Insulated Cables and Connections

➢ The following text under Section 3.6.2.1.1 (on LRA pages 3.6-2 through 3.6-8) is revised by addition (***bold italics***).

Materials

The materials of construction for the Insulated Cables and Connections are:

- I&C Cable Insulation
  - EP, EPDM, EPR, Hypalon, Kapton, ***PVC,*** Silicone Rubber, Teflon (FEP), Tefzel, XLP, XLPE, XLPO
- Power Cable Insulation
  - EP, EPR, HTK (Kerite), Hypalon, ***PVC,*** Silicone Rubber, XLP, XLPE, XLPO
- Connections (Insulation)
  - EPDM, EPR, Kapton, Melamine, Nylon, Phenolic, XLP, XLPE, XLPO
- All Cable and Connections (Conductors/Connections)
  - Various Metals

3.6.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

➢ The following text under Section 3.6.2.2 (on LRA pages 3.6-6 through 3.6-8) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

3.6.2.2.2 Degradation of Insulator Quality due to Presence of Any Salt Deposits and Surface Contamination, and Loss of Material due to Mechanical Wear

There are no aging effects identified that require aging management for the high-voltage insulators subject to aging management review for SSES. Due to its inland location, salt spray from the ocean is not of concern at SSES. The rural location of SSES provides for minimal contamination from industrial effluents. The buildup of surface contaminants is gradual and is periodically washed away by rainfall. Therefore, contamination is not identified as an aging mechanism. ~~The high-voltage insulators within the scope of license renewal for SSES are connected to rigid components, such that significant movement is not considered as a stressor, and wear is not identified as an aging mechanism.~~

Loss of material due to mechanical wear is an aging effect for certain strain insulators if they are subject to significant movement. Movement of the insulators can be caused by wind blowing the supported transmission conductor, causing it to swing from side to side. If this swinging is frequent enough, it could cause wear on the metallic contact points of the insulator string and between an insulator and the supporting hardware.

Although this aging mechanism is possible, industry experience has shown that transmission conductors do not normally swing unless subjected to a substantial wind and they stop swinging shortly after the wind subsides. Wind loading that can result in conductor sway is considered in the transmission system design. Therefore, loss of material due to mechanical wear is not an aging effect requiring management for the high-voltage insulators.

3.6.2.2.3 Loss of Material due to Wind-Induced Abrasion and Fatigue, Loss of Conductor Strength due to Corrosion, and Increased Resistance of Connection due to Oxidation or Loss of Pre-Load

There is no switchyard bus within the scope of license renewal for SSES. For the transmission conductors and connections subject to aging management review for SSES, there are no aging effects identified that require aging management. ~~The effects of wind do not require aging management as the sections of transmission conductor in the scope of license renewal are short in length, rigid, and connected to rigid components.~~

Wind-induced abrasion and fatigue are not aging effects applicable to in scope transmission conductors. Industry experience has shown that transmission conductors do not normally swing unless subjected to a substantial wind and they stop swinging after a short period once the wind subsides. Because the transmission conductors are not normally moving, loss of material due to wind-induced abrasion and fatigue is not an aging effect requiring management.

Loss of conductor strength due to corrosion of the transmission conductor is not identified as an aging effect due to ample design margin and a minimal corrosion process at the rural location of SSES. Connection resistance is not identified as a stressor based on the use of good bolting practices and review of site operating experience.

EPRI 1003057, the License Renewal Electrical Handbook, concludes that the most prevalent aging mechanism contributing to loss of conductor strength of ACSR (aluminum conductor steel reinforced) transmission conductors is corrosion. For ACSR conductors, degradation begins as a loss of zinc from the galvanized steel core wires. Corrosion rates depend largely on air quality, which involves suspended particles in the air, SO_2 concentration, rain, fog chemistry, and other weather conditions. Corrosion of ACSR conductors is a very slow process that is even slower in rural areas with less air pollution. SSES is located in a rural area in north-central Pennsylvania where airborne particle concentrations are comparatively low.

Tests performed by Ontario Hydroelectric showed a 30% composite loss of conductor strength for an 80 year-old sample of an ACSR conductor (due to corrosion). With respect to the Ontario Hydroelectric study, the National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength and that consideration for ice, wind, and temperature be included in the design. The discussion in EPRI 1003057 demonstrates that with a 30% loss of conductor strength, there is still margin between the NESC requirements and the actual conductor strength. Because the SSES transmission conductor design and installation meet the NESC requirements, the Ontario Hydroelectric study is considered to bound the SSES configuration.

Therefore, based on the expected low corrosion rates due to plant location and the margins included in the design, corrosion of the transmission conductors is not considered a significant aging effect for the period of extended operation.

Increased connection resistance is not identified as an aging effect requiring management. Bolted connections associated with the transmission conductors employ the use of good bolting practices consistent with the recommendations of EPRI 1003471, "Electrical Connector Application Guidelines." Bolting hardware is selected to be compatible with the lugs used on the transmission conductors and Belleville washers are used to compensate for temperature changes and to maintain proper tightness. The review of site operating experience revealed no bolted connection failures associated with transmission conductors at SSES.

Table 3.6.2-1, Aging Management Review Results – Electrical and I&C Components

➢ The following text for Plant-Specific Notes associated with Table 3.6.2-1 (on LRA pages 3.6-22 and 3.6-23) is revised by addition (***bold italics***) and deletion (~~strikethrough~~).

Plant-Specific Notes:	
0605	The ***evaluation in Section 3.6.2.2.3 concludes there are no aging effects that require management for the*** transmission conductors identified as in the license renewal scope at SSES. ~~are very short segments (approximately 12-22 feet) which connect the Start-Up Transformers T10 and T20 to their respective motor-operated air break switches 1R105 and 2R105. These switches constitute the boundary points for the SBO license renewal boundary. The segments of transmission conductor are not subject to aging management because they do not exhibit aging mechanisms/effects.~~ An aging management program at SSES is not required.
0609	Regarding the aging mechanisms for the high-voltage insulators: salt spray on the high-voltage insulators is not of concern at SSES, due to its inland location. There is minimal contamination due to industrial effluents because of the rural location of SSES. The buildup of surface contaminants is gradual and is washed away by rainfall. Therefore, contamination is not identified as an aging mechanism. The high-voltage insulators identified within the scope of license renewal for SSES ***do not normally move unless the transmission conductors are subjected to high wind. Because the movement stops shortly after the wind subsides, mechanical*** ~~are connected to rigid components, such that significant movement is not considered a stressor, and~~ wear is not identified as an aging mechanism.

B.2.41 Non-EQ Electrical Cables and Connections Visual Inspection Program

➢ The first paragraph of the "Scope of Program" element (on LRA page B-123) is revised as follows by addition (***bold italics***).

Aging Management Program Elements

The results of an evaluation of each program element are provided below.

- Scope of Program
  The Non-EQ Electrical Cables and Connections Visual Inspection Program is credited with detecting aging effects from adverse localized environments in non-EQ cables and connections at SSES. The program is applicable to non-EQ cables and connections found in the Reactor Buildings, Circulating Water Pumphouse and Water Treatment Building, Control Structure, Diesel Generator Buildings, Turbine Building, Engineered Safeguards Service Water Pumphouse, and various yard structures (manholes, duct banks, valve vaults, instrument pits, etc.). ***This program is also applicable to the cables and connections within the scope of license renewal located in the yard areas and control cubicles of the T10 230 kV Switchyard, the 500 kV Switchyard, and the 230 kV Switchyard.***