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U. S. Nuclear Regulatory Commission Attn: Document Control Desk Washington, DC 20555-0001

# SUSQUEHANNA STEAM ELECTRIC STATION (SSES) LICENSEE EVENT REPORT 50-387/2013-001-01 LICENSE NOS NPF-14 and NPF-22 PLA-7082 Docket Nos. 50-387 and 50-388

Reference: PPL letter PLA-7041, J. A. Franke (PPL) to USNRC (Document Control Desk), "Susquehanna Steam Electric Station, License Event Report 50-387/2013-001-00, License Nos. NPF-14 and NPF-22," dated July 8, 2013.

Attached is supplemental Licensee Event Report (LER) 50-387/2013-001-01, submitted to provide additional information associated with the condition in which the SSES Diesel Generator 'B' to 4.16 kV bus '2B' synchronizing selector switch failed. This resulted in a condition that is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as any operation or condition which was prohibited by the SSES Technical Specifications.

There were no actual consequences to the health and safety of the public as a result of this event.

There are no regulatory commitments associated with this LER.

Sincerely

J.A. Franke

Attachment: LER 50-387/2013-001-01

Copy: NRC Region I

Mr. J. W. Greives, NRC Sr. Resident Inspector Mr. J. A. Whited, NRC Project Manager Mr. L. J. Winker, PA DEP/BRP

NRC FO (10-2010)	RM 366	5	U.S. NUCLEAR REGULATORY COMMISSION					Al Es rec lice es Cc	APPROVED BY OMB: NO. 3150-0104 EXPIRES:10/31/2013 Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to						
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On 5/7/2013 at 0053 the control room noted HS-00040B (Emergency Diesel Generator (D/G) 'B' to bus '2B' synchonizing selector switch) failed in the 'on' position during performance of SO-024-001B "Monthly Diesel Generator B Operability Test." Based on the design of the SSES synchronizing selector switch circuitry, with HS-00040B failed in the 'on' position, all other synchronizing selector switches were rendered non-functional. The initial operability determination by the Senior Reactor Operators (SRO) for the failed synchronizing selector switch was that the switch did not have a safety function and that the D/Gs and offsite AC sources were operable. During the operability determination, the assessment of the LCO 3.8.1 Surveillance Requirements (SR) did not identify all of the SRs impacted by the failed selector switch. Therefore it was not recognized that the failed switch caused SRs 3.8.1.8 and 3.8.1.16 associated with Unit 1 LCO 3.8.1 and Unit 2 LCO 3.8.2 to not be met in accordance with SR 3.0.1.

The Direct Cause of the event was a failure of synchonizing selector switch HS-00040B, which failed in the 'on' position during performance of SO-024-001B. The Apparent Cause determined that procedure guidance was not provided that operability of the synchronizing selector switch is required to meet the SR 3.8.1.8 and SR 3.8.1.16 surveillance requirements.

An immediate corrective action was to replace the failed synchronizing selector switch. Additional planned corrective actions include revising the affected surveillance procedures; evaluating the feasibility of synchronizing circuit design changes; and reviewing Operability Determination Training recently provided for effectiveness.

There were no adverse consequences to the health and safety of the public as a result of this event. This event is being reported under 10 CFR 50.73(a)(2)(i)(B) as any operation or condition which was prohibited by the SSES TS.

NRC Form 366 (10-2010)

NRC FORM 366A

(10-2010)

# LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

U.S. NUCLEAR REGULATORY COMMISSION

1. FACILITY NAME	2. DOCKET		6. LER NUMBER	3. PAGE	
Susquehanna Steam Electric Station Unit 1	05000387	YEAR 2013	sequential NUMBER -001	REVISION NUMBER - 01	2 OF 5

NARRATIVE

# CONDITION PRIOR TO THE EVENT

Unit 1 – Mode 1, 100 percent Rated Thermal Power

Unit 2 - Mode 5, 0 percent Rated Thermal Power

## **EVENT DESCRIPTION**

On 5/7/2013 at 0053 the control room noted HS-00040B (Emergency Diesel Generator (D/G) 'B' to Bus '2B' synchonizing selector switch) failed in the 'on' position during performance of SO-024-001B "Monthly Diesel Generator B Operability Test." Based on the design of the SSES synchronizing selector switch circuitry, with HS-00040B failed in the 'on' position, all other synchronizing selector switches were rendered non-functional. The synchronizing hand switches have a removable key and only one key is provided to operations so that only one of the thirty-seven (13.8 kV and 4.16 kV) synchronizing hand switches can be in the 'on' position at a time. This switch failure prevented the snychronizing scope to return to its de-energized position. A condition report (CR) documented this condition and identified that all manual synchronizing operations of the 13.8 kV and 4.16 kV busses could not be performed while the switch was in the 'on' position. The initial operability determination by the Senior Reactor Operators (SRO) for the failed synchronizing selector switch was completed on 5/7/2013 at 0328. It was determined that the switch did not have a safety function and that the D/Gs and offsite AC sources were operable. The synchronizing switches are a design function to allow manual synchronization of a running and loaded D/G to the offsite circuits, and manual transfer from the normal to alternate offsite circuits.

During the operability determination, the assessment of the LCO 3.8.1 Surveillance Requirements did not identify all of the SRs impacted by the failed selector switch. Only SRs 3.8.1.3, 3.8.1.4, 3.8.1.5, 3.8.1.6, 3.8.1.7, 3.8.3.1, 3.8.3.2, and 3.8.3.4 were identified in SO-024-001B as surveillances associated with the test. It was not recognized that the failed switch caused some of the other SRs associated with SSES Unit 1 LCO 3.8.1 and Unit 2 LCO 3.8.2 to not be met. The SRs not met on both Units 1 and 2 were determined to be SR 3.8.1.8 and SR 3.8.1.16. Accordingly, Unit 1 LCO 3.8.1 and Unit 2 LCO 3.8.2 should have been entered in accordance with SR 3.0.1. In addition, some procedures could not be performed as a result of the condition; however, none were required to be performed while the condition existed.

At the time of the switch failure Unit 1 was operating in Mode 1 and therefore, LCO 3.8.1 'AC Sources – Operating', was applicable. LCO 3.8.1 was considered not met due to SR 3.8.1.8 and SR 3.8.1.16 not being met. Since no LCO 3.8.1 Conditions were entered, no required Actions were taken. This condition on Unit 1 was reported in accordance with 10 CFR 50.73 (a)(2)(i)(B) as any operation or condition which was prohibited by the plant's TS

Unit 2 was in Mode 5 at the time of the switch failure and therefore, LCO 3.8.2 'AC Sources – Shutdown', was applicable. Since no LCO 3.8.2 Conditions were entered, no required Actions were taken. Accordingly, LCO 3.8.2 Condition A "One or more required AC Sources inoperable," and Required Action A.2.3 to immediately initiate actions to suspend operations with a potential for draining the reactor vessel (OPDRVs), should have been entered. Since the Required Action to suspend OPDRVs was not performed, the enforcement discretion per EGM 11-003 was not applicable to any OPDRV activities that were performed while LCO 3.8.2 required Action A.2.3 was not met. This condition on Unit 2 was reported in accordance with 10 CFR 50.73 (a)(2)(i)(B) as any operation or condition which was prohibited by the plant's Technical Specifications (TS). Additionally, this condition was previously identified as an exception to PPL's application of EGM 11-003 guidance during the in SSES Unit 2 16<sup>th</sup> Refueling and Inspection Outage (RIO). LER 50-388/2013-001-00 was submitted on June 14, 2013 via PLA-7018 to document this condition. Further, LCO 3.8.2 was not met due to SR 3.8.2.1 not met, since SR 3.8.1.16 is a required SR to meet Unit 2 LCO 3.8.2 surveillance requirements.

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#### NARRATIVE

#### Sequence of Events

The following is a summary of the events related to this reportable condition:

• <u>5/7/2013 00:40</u> While performing SO-024-001B, the synch switch for Unit 2B ESS Bus HS-00040B appears to have failed in the synch position. CR 1700407 written to document this failure.

• <u>5/7/2013 00:53</u> Synchronizing Select Switch DG B to Bus 2B is determined to be broken in the closed position, the synchronizing scope will not work for any other busses. Use of any other synchronizing selector switch will cause the fuse to blow.

• <u>5/7/2013 00:56</u> CR 1706404 written to identify that the synchronizing circuit at Susquehanna needs to be reviewed in accordance with NDAP-QA-0524 for Failure Effect Codes and Single Point Vulnerability mitigation.

• <u>5/7/2013 15:48</u> CR 1700812 written to evaluate an engineering change to electrically jumper out the synch switch for breaker 2A20204 (HS-00040B) from the circuit to allow all other synch switches to function.

• <u>5/7/2013</u> PCWO 1700528 written to determinate / remove the defective synchronizing selector switch from control room panel 0C653. PCWO 1700647 written to replace synchronizing selector switch HS-00040B on panel 0C653.

• 5/8/2013 18:10 Power supply de-energized for synchronizing selector switch replacement

• <u>5/9/2013 13:17</u> Completed replacement of HS00040B DG B to Bus 2B Synchronizing Selector Switch on Panel 0C653 under WO 1700647

• <u>5/14/2013 03:55</u> The SSES NRC Senior Resident requested clarification related to compliance with the TS SR 3.8.16 surveillance requirement for the HS00040B DG B to Bus 2B Synchronizing Selector Switch failure (documented in CR 1703293) The TS Bases for SR 3.8.1.16 states: "As required by Regulatory Guide 1.9 (Ref. 3)", this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and that the DG can be returned to ready to load status when offsite power is restored. It also ensures that the auto start logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the DG controls are in isochronous and the output breaker is open.

• <u>5/28/2013 16:58</u> CR 1708912 was written to identify that the condition prohibited by Unit 2 TS 3.8.2 involved OPDRVs. Specifically, LCO 3.8.2 required action A.2.3 to immediately initiate actions to suspend OPDRVs was not followed on Unit 2. As a result, enforcement discretion criteria item 4 of EGM 11-003, Revision 1 was not met because TS Action requirement for Mode 5 OPDRV activities were not followed as required by criteria item 4 for approximately 75 hours. Because criteria item 4 was not met, enforcement discretion under EGM 11-003 was not applicable to any OPDRV activities that were performed while LCO 3.8.2 required action A.2.3 was not met.

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Susquenanna Steam Electric Station Onit		2013	- 001	- 01	4 OF 5	

#### NARRATIVE

## CAUSE OF THE EVENT

The Direct Cause of the event was a failure of the D/G 'B' to Bus '2B' synchonizing selector switch (HS-00040B) which failed in the 'on' position during performance of SO-024-001B "Monthly Diesel Generator B Operability Test.

The Apparent Cause was that Surveillance Procedure SO-024-001B did not provide guidance that the synchronizing selector switch is required to meet the TS SR 3.8.1.8 and SR 3.8.1.16 surveillance requirements. A Causal Factor was determined to be that the SRO review was limited to the TS surveillance requirements of SO-024-001B, and it was not recognized that operation of the synchronizing selector switch was necessary to meet these requirements. SR 3.8.1.8 is met by performing SE-1(2)04-1(2)01(2), "24 month 4.16kv Class 1E Bus to Offsite Supply Transfer Check". SR 3.8.1.16 is met by performing SE-1(2)24-1(2)07, "LOCA LOOP Testing" on a two year frequency. Consequently, these SRs are not frequently reviewed and exercised.

## ANALYSIS/SAFETY SIGNIFICANCE

#### Actual Consequences:

There were no actual consequences to the health and safety of the public as a result of this event. The broken synchronizing selector switch caused TS SR's to not be met, which resulted in Unit 1 LCO 3.8.1 and Unit 2 LCO 3.8.2 to not be met. At no time were the A, B, C, or D required D/Gs not capable of performing their safety function to automatically start and load to the Emergency Safety Switchgear (ESS) busses.

Additionally, at no time were either of the offsite power sources unable to supply their connected loads or automatically transfer from the preferred to the alternate source or vice versa if necessary. The switch failure affected restoration of power following a LOOP, in which the offsite power source would not be able to re-synchronize to the ESS busses with the loads remaining connected to the D/Gs. Additionally, the switch failure would have prevented manual transfer of the ESS busses from the normal offsite circuit to the alternate offsite circuit if necessary.

Since the inoperable AC power sources were determined to have maintained their ability to perform their necessary shutdown risk function, the impact to OPDRV activities was determined to be of low shutdown risk significance and an adequate level of safety was provided during the performance of the OPDRV activities described in Unit 2 LER 50-388/2013-001-00 (PLA-7018, dated June 14, 2013).

## Potential Consequences:

In the event of a LOOP off site power could not have been re-synchronized to the running loads on the ESS buses, and manual transfer of the ESS buses from the normal offsite circuit to the alternate offsite circuit would have been prevented without repair of the broken synchronizing selector switch or its isolation from the circuit.

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# LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

# CORRECTIVE ACTIONS

An immediate corrective action was to replace the failed synchronizing selector switch.

Longer term corrective actions planned thus far:

- Revise the affected surveillance procedures to provide guidance that the synchronizing selector switch is required to meet the surveillance requirements of SR 3.8.1.8 and SR 3.8.1.16.
- Reclassify all existing synchronizing switches to have the same failure effect and maintenance rule codes, which will establish an equal criticality for all switches.
- Create a maintenance plan to change out the switches to improve reliability.
- Evaluate the feasibility of synchronizing circuit design changes.
- Perform a sampling of surveillances that would lead to a 2 hour LCO if the surveillance failed, to ensure that there are sufficient directions in procedures to alert Operators when performing the TS review.
- Review Operability Determination Training recently provided for effectiveness.
- Submit an INPO Operating Experience Report for this event.

## PREVIOUS SIMILAR EVENTS

No previous similar events in which a single point vulnerability equipment failure resulted in a condition prohibited by TS on both SSES Units were identified.