



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

March 03, 2022
NOC-AE-22003872
10 CFR 50.73
STI: 35289429

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

South Texas Project
Unit 2
Docket No. STN 50-499
Licensee Event Report 2022-001-00

Automatic Actuation of Emergency Diesel Generator due to Lockout of Switchyard Electrical Bus

Pursuant to reporting requirements of 10 CFR 50.73(a)(2)(iv)(A), STP Nuclear Operating Company hereby submits the attached South Texas Project Licensee Event Report (LER) 2022-001-00 for valid actuation of an emergency AC electrical power system included under 10 CFR 50.73(a)(2)(iv)(B)(8).

The event did not have an adverse effect on the health and safety of the public.

There are no commitments in this submittal.

If there are any questions, please contact Stephanie Rodgers at 361-972-4527 or me at 361-972-7888.

A handwritten signature in black ink, appearing to read "Michael A. Schaefer".

Michael A. Schaefer
Site Vice President

sr

Attachment: LER 2022-001-00, Automatic Actuation of Emergency Diesel Generator due to Lockout of Switchyard Electrical Bus


cc:

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
1600 E. Lamar Boulevard
Arlington, TX 76011-4511

Attachment

LER 2022-001-00

Automatic Actuation of Emergency Diesel Generator due to
Lockout of Switchyard Electrical Bus

NRC FORM 366 (08-2020)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 08/31/2023			
 LICENSEE EVENT REPORT (LER) (See Page 3 for required number of digits/characters for each block) (See NUREG-1022, R.3 for instruction and guidance for completing this form https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)					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, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollections.Resource@nrc.gov , and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: oir_submission@omb.eop.gov . The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.					
1. Facility Name South Texas Unit 2					2. Docket Number 05000499		3. Page 1 OF 5			
4. Title Automatic Actuation of Emergency Diesel Generator due to Lockout of Switchyard Electrical Bus										
5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
01	06	2022	2022	- 001 -	00	03	04	2022	N/A	05000
9. Operating Mode 1										10. Power Level 100
11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)										
10 CFR Part 20		<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.36(c)(2)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)		
<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		10 CFR Part 73		
<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.69(g)		<input type="checkbox"/> 50.73(a)(2)(v)(B)				
<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> 73.71(a)(5)		
<input type="checkbox"/> 20.2203(a)(2)(i)		10 CFR Part 21		<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)		<input type="checkbox"/> 73.77(a)(1)(i)		
<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 21.2(c)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)		<input type="checkbox"/> 73.77(a)(2)(i)		
<input type="checkbox"/> 20.2203(a)(2)(iii)		10 CFR Part 50		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)		<input type="checkbox"/> 73.77(a)(2)(ii)		
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)				
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)				
<input type="checkbox"/> Other (Specify here, in Abstract, or in NRC 366A).										
12. Licensee Contact for this LER										
Licensee Contact Stephanie Rodgers, Licensing Engineer								Phone Number (Include Area Code) (361) 972-4527		
13. Complete One Line for each Component Failure Described in this Report										
Cause	System	Component	Manufacturer	Reportable To IRIS	Cause	System	Component	Manufacturer	Reportable To IRIS	
X	FK	INS	LAPP	Y						
14. Supplemental Report Expected						15. Expected Submission Date		Month	Day	Year
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)										
16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)										
<p>On January 06, 2022, with both units operating at 100% power, the South Texas Project 345 kV south switchyard electrical bus unexpectedly de-energized. The de-energization of the south bus resulted in a loss of power to the Unit 2 standby transformer which was supplying power to the Engineered Safety Features (ESF) 4160V busses for the Unit 2 B Train. The associated Emergency Diesel Generator 22 automatically started in response to the undervoltage condition, as designed.</p> <p>The cause of this event was an electrical flashover on a Transmission Distribution Service Provider owned insulator on the south bus. This event is reportable as an event which resulted in the automatic actuation of the Unit 2 emergency AC electrical power systems. Corrective actions included replacing the insulator, performing inspections for abnormal electrical Corona on the insulators (no adverse values were found), and cleaning of the other insulators on the North and South bus. There were no previous indications of issues with the insulator.</p> <p>The event did not result in any offsite release of radioactivity or increase of offsite dose rates and there were no personnel injuries or damage to any safety-related equipment associated with this event. Additionally, all ESF equipment operated as designed. Therefore, there was no adverse effect on the health and safety of the public.</p>										

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME		2. DOCKET NUMBER	3. LER NUMBER		
South Texas Unit 2		05000-499	YEAR	SEQUENTIAL NUMBER	REV NO.
			2022	- 001	- 00

NARRATIVE**I. Description of Reportable Event****A. Reportable event classification**

This event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in the valid actuation of an emergency AC electrical power system (50.73(a)(2)(iv)(B)(8)).

B. Plant operating conditions prior to event

Prior to the event on January 6, 2022, STP Unit 2 was at 100% power in Mode 1.

C. Status of structures, systems, and components that were inoperable at the start of the event and that contributed to the event

No other structures, systems, or components were inoperable at the start of this event that contributed to this event.

D. Background information

The Offsite Electrical System consists of two standby transformers, the 138 kV emergency transformer, two main power transformers, 345 kV lines connecting the main power transformers and the standby transformers to the switchyard, the 345 kV switchyard, nine 345 kV transmission circuits from the South Texas Project Electric Generating Station (STPEGS) 345 kV switchyard to the interconnecting grids, and the 138 kV radial line connected to the 138 kV emergency transformer. The transmission system provides reliable sources of offsite power for supplying plant auxiliary power systems for plant startup, shutdown or at any time that power is unavailable from the unit's main generator.

The standby transformers are individually supplied by separate and independent overhead 345 kV ties from the 345 kV switchyard, one from the south bus and one from the north bus. Each standby transformer normally supplies B Train Engineered Safety Features (ESF) busses in each unit. The ESF busses in each unit can be aligned to be powered from either the Unit 1 or the Unit 2 standby transformer.

Per STP Technical Specification (T.S.) 3.8.1.1.e, with two of the above required offsite A.C. circuits inoperable, within 24 hours restore at least one of the inoperable offsite sources to OPERABLE status or apply the requirements of the Configuration Risk Management Program (CRMP) or be in at least HOT STANDBY within the next 6 hours. Unit 2 entered T.S. Action 3.8.1.1.e. in response to this event.

E. Narrative summary of the event

On January 06, 2022, at 06:03 with both units operating at 100% power, a south bus lockout occurred that caused an engineered safety system to actuate and momentarily de-energize the bus to clear the fault. The 345kV was automatically restored successfully. This momentary loss of the 345 kV south bus in the switchyard caused the Unit 2 ESF bus to lockout and transfer to the ESF Unit 2 Train B Standby Diesel Generator 22 as designed. The control room received reports of a visible flash observed in the switchyard at 06:10. A second event at 07:43 of a clear flashover was observed by onsite Transmission Distribution Service Provider (TDSP) personnel. The south bus auto de-energized both times as designed to clear a fault. After the second event, the TDSP



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took down the bus manually to allow for maintenance and the Unit 2 standby transformer was declared inoperable. STP and TDSP personnel quickly identified the TDSP owned insulator and gathered necessary parts for replacement. The loss of the Unit 2 standby transformer caused an automatic bus trip of the Unit 2 B Train 4.16KV bus, the automatic start of the Unit 2 Train B Standby Diesel Generator 22 and the automatic sequenced loading of ESF equipment. During this event Unit 2 stayed at 100% power. At 10:44, the off-site power was restored to Unit 2 4.16KV bus via the Unit 2 standby transformer. The insulator on the South Bus was replaced, other insulators were cleaned, and a normal power configuration was established at 22:27 on January 06, 2022.

Note: all times are approximate and are listed in Central Daylight Time

January 6, 2022 [06:03]	Received Loss of Offsite Power on Train B ESF Bus. ESF diesel generator 22 started automatically, and B Sequencer commenced Mode 2 sequence with no discrepancies. South bus de-energized momentarily and re-energized approximately 40 Seconds later, Unit 2 standby transformer locked out.
January 6, 2022 [06:10]	Received report that a visible flash was observed in the switchyard at about the time of the incident. Declared STP switchyard south bus, one source to ESF bus E2B and Unit 2 standby transformer inoperable. Entered T.S. Action 3.8.1.1.e with two of the above required offsite A.C. circuits inoperable.
January 6, 2022 [06:30]	Operations entered off-normal plant procedure due to loss of Standby bus 2G
January 6, 2022 [07:43]	South Bus automatically de-energized due to re-occurrence of original fault. Notified by TDSP that line workers observed fault and have potentially identified the cause as an insulator. The Unit remains stable with ESF diesel generator 22 carrying ESF Bus 2B
January 6, 2022 [09:26]	Energized 13.8KV standby Bus 2G from Unit 1 standby transformer
January 6, 2022 [10:22]	Closed ESF Bus E2B Feeder Breaker and commenced unloading ESF diesel generator 22, exited T.S. 3.8.1.1.e and entered T.S. 3.8.1.1.a with one offsite circuit of the above-required A.C. electrical power sources inoperable.
January 6, 2022 [10:44]	ESF power availability T.S. Surveillance requirement performed satisfactorily.
January 6, 2022 [10:45]	Exited plant procedure for loss of power to one or more 13.8 kV standby bus
January 6, 2022 [11:29]	Reported event to NRC HOO (EN 55692) under 10 CFR 50.72(b)(3)(iv)(A) as an event resulting in the valid actuation of an emergency AC electrical power system (50.72(b)(3)(iv)(B)(8)).
January 6, 2022 [22:27]	Exited T.S. Action 3.8.1.1.a following restoration of 345 kV south bus and Unit 2 standby transformer declared operable.

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F. Method of discovery

This event was self-revealed when a bus lockout in the switchyard caused the loss of a credited off-site electrical power source. This resulted in the automatic actuation of on-site emergency power sources. A second flashover was observed by a TDSP employee.

II. Component failures**A. Failure Mode, mechanism, and effects of failed component**

The failure mode was an insulator electrical arch flash that caused a phase-to-ground short. The protective relay detected the fault and cycled the breaker which momentarily removed all voltage from the bus to isolate the south bus from the fault.

B. Cause of component or system failure or personnel error

A flashover occurred when an electrical arch flashed along the top side of a TDSP owned insulator from the bus to the insulator support, effectively grounding the A phase of the south bus.

C. Systems or secondary functions that were affected by the failure of components with multiple functions

The de-energization of the south bus disconnected Unit 2 standby transformer from the grid. Since this transformer is the normal supply to Unit 2 B Train ESF bus, the resulting undervoltage condition initiated a loss of offsite power (LOOP) signal, which sent a valid actuation signal to the Unit 2 Train B Standby Diesel Generator 22.

D. Failed component information

- System: { FK } (Switchyard - TSDP owned equipment)
- Component: { INS }
- Manufacturer: LAPP {LAPP}
- Model: {34618-1} {24812-2}

III. Analysis of the event**A. Safety system responses that occurred**

The loss of the Unit 2 standby transformer caused an automatic bus trip of the Unit 2 B Train 4.16KV bus, the automatic start of the Unit 2 Train B Standby Diesel Generator 22 and the automatic sequenced loading of ESF equipment.

B. Duration of safety system inoperability

When the south bus was de-energized, Unit 2 entered T.S. Action 3.8.1.1.e on January 6, 2022, at 06:03 hours due to two independent offsite circuits being inoperable – the switchyard south bus and ESF bus E2B were not connected to their offsite source. Upon re-energization of ESF Bus E2B at 10:22 hours (4 hours and 19 minutes later), Unit 2 exited T.S. Action 3.8.1.1.e and entered T.S. Action 3.8.1.1.a due to one independent offsite circuit being inoperable. Unit 2 exited T.S. Action 3.8.1.1.a at 22:27 hours

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(12 hours and 05 minutes later) when the offsite circuits were declared operable following the restoration of the switchyard south bus and Unit 2 standby transformer. Therefore, the total safety system inoperability duration was 16 hours and 24 minutes.

C. Safety consequences and implications

This event resulted in the actuation of the Unit 2 emergency AC electrical power system. This event did not result in any offsite release of radioactivity or increase of offsite dose rates, and there were no personnel injuries or damage to other safety-related equipment. Therefore, there was no adverse effect on the health and safety of the public.

IV. Cause of the event

The cause of the event was due to arch flash across a TDSP owned insulator which resulted in a phase-to-ground fault and subsequent bus lock out. There were no previous indications of issues with the insulator.

V. Corrective actions

1. The insulator that experienced the flash was replaced.
2. Corona effect inspections were performed on insulators before and after cleaning (no adverse values were found).
3. Other insulators on the North and South Bus were cleaned.
4. Equipment was restored as required by plant conditions.
5. Applicable T.S. Action statements were met.

VI. Previous similar events

A review of internal operating experience identified no similar events at STP.