UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

January 14, 2019

Mr. G. T. Powell
President and Chief Executive Officer
STP Nuclear Operating Company
P.O. Box 330
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION, UNITS 1 AND 2 – NRC INSPECTION OF TEMPORARY INSTRUCTION 2515/194, INSPECTION REPORT 05000498/2018010 AND 05000499/2018010

Dear Mr. Powell:

On December 6, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your South Texas Project Electric Generating Station, Units 1 and 2. The NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspectors did not identify any finding or violation of more than minor significance.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

James F. Drake, Acting Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-498 and 50-499
License Nos. NPF-76 and NPF-80

Enclosure:
Inspection Report 5000498/2018010 and
05000499/2018010
w/ Attachment: TI 2515/194 Inspection
Documentation Request

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000498, 05000499
License Numbers:	NPF-76, NPF-80
Report Numbers:	05000498/2018010, 05000499/2018010
Enterprise Identifier:	I-2018-010-0065
Licensee:	STP Nuclear Operating Company
Facility:	South Texas Project Electric Generating Station, Units 1 and 2
Location:	Wadsworth, Texas
Inspection Dates:	December 3, 2018, to December 6, 2018
Inspectors:	S. Graves, Senior Reactor Inspector N. Okonkwo, Reactor Inspector
Accompanying Personnel:	H. Kodali, Electrical Engineer, NRR/DE/EEOB
Approved By:	James F. Drake, Acting Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Temporary Instruction 2515/194, "Inspection of the Licensees' Implementation of Industry Initiative Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (NRC Bulletin 2012-01)," at South Texas Project Electric Generating Station, Units 1 and 2 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information.

List of Findings and Violations

No findings were identified.

INSPECTION SCOPES

This inspection was conducted using Temporary Instruction 2515/194 (ADAMS Accession No. ML17137A416), dated October 31, 2017. The inspectors reviewed the licensee's implementation of Nuclear Energy Institute voluntary industry initiative in compliance with Commission guidance. The inspectors discussed the impacts of open phase conditions on the licensee's electrical system design, the ability to detect and alarm open phase conditions on station transformers, and ongoing implementation of training and updates to operating procedures with plant staff. The inspectors also reviewed licensee analysis and calculations, and performed distribution system and switchyard equipment walkdowns.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

Temporary Instruction 2515/194 – Inspection of the Licensees' Implementation of Industry Initiative Associated With the Open Phase Condition Design Vulnerabilities in Electric Power Systems (NRC Bulletin 2012-01)

The objective of Temporary Instruction 2515/194 is to verify that licensees have appropriately implemented the Nuclear Energy Institute voluntary industry initiative (ADAMS Accession No. ML15075A454), dated March 16, 2015, including updating their licensing basis to reflect the need to protect against open phase conditions.

Temporary Instruction 2515/194-03.01 – Voluntary Industry Initiative (Part 1)

South Texas Project Electric Generating Station, Units 1 and 2 has concluded that their existing safety-related protective relaying scheme combined with their power transformer configuration provided for detection of, and protection against adverse effects of open phase conditions.

Each Unit at South Texas Project Electric Generating Station normally uses a main generator connected through an output circuit breaker to a combination of two large-capacity main transformers connected in parallel to provide power to offsite circuits, and connected via isolated phase bus ducting to a unit auxiliary transformer to provide power to two of three engineered safety feature busses, trains A and C. The third engineered safety feature bus, train B, is normally powered from a separate standby transformer which is fed from offsite power. When the main generator is offline, the plant loads are typically backfed from the offsite power system via the main transformers through the unit auxiliary transformer. This backfeed power flow occurs automatically upon isolation of the main generator. This capability to immediately backfeed power alleviated the need for fast bus transfer of plant loads to other power sources.

Both the main and unit auxiliary transformers are constructed with shell-type cores and have Wye and Delta connected windings that the licensee's analysis shows that when subjected to an open phase condition will regenerate the missing phase voltage. The licensee's analysis showed that under both normal and accident loading conditions, and with an open phase condition without ground-fault, the voltage and current values available at the 4.16 kV engineered safety feature busses appeared adequate to support operation. The analysis also showed that in this configuration the negative sequence values, produced by the phase imbalances, would be below five percent and would not have an immediate adverse impact on connected loading. The analysis showed that this configuration, with an open phase and a ground fault condition, would activate the safety-related 4.16 kV bus undervoltage protective

relays, isolating two of the three engineered safety feature busses from the faulted source and starting the associated emergency diesel generators.

The standby transformer, also a shell-type core, has Wye connected primary, secondary and tertiary windings, which the licensee's analysis showed that when loaded during an open phase condition either with or without a ground fault, would activate the safety-related 4.16 kV bus undervoltage protective relays, isolating the connected engineered safety feature bus from the faulted source and starting the emergency diesel generator. In some analyzed scenarios, the negative sequence voltage exceeded the licensee's administrative limit of 4 percent, but the time delays associated with the undervoltage relays (a maximum delay of approximately 55 seconds) were sufficiently short to separate the busses before adversely impacting connected loads.

The licensee used Electrical Power System Analysis and Operation Software (ETAP), version 12.6.5N, to model their electrical transmission and distribution system behaviors under open phase conditions. This simulation software is widely used throughout the industry to model electrical system behavior under transient and steady-state conditions, including analyzing the effects of both single and double open phases on the high side of power transformers. Version 12.6.5N conformed to the licensee's quality assurance requirements for 10 CFR Part 50, Appendix B, "Quality Assurance Program."

The licensee staff ran several simulations for the inspectors, including a simulation of the 2001 open phase event on Unit 2 described in Licensee Event Report 50-499/2001-001 to compare modeled results to historical information, and ran several scenarios involving failures of isolated phase bus duct conductors without ground faults to ensure the analyzed scenarios were bounding. The inspectors did not identify any discrepancies or errors associated with the software results as compared to the actual event or simulated failures.

INSPECTION RESULTS – OBSERVATIONS/ASSESSMENT

The inspectors identified that under certain electrical system configurations the licensee had not implemented a method to rapidly detect open phase conditions, but due to the capacity of their main transformers this was not an immediate safety concern. The licensee was aware of this issue and entered it into their corrective action program, as Condition Record CR-18-14724. The licensee also identified that operating on two electrical phases of power was problematic and would not continue to operate in this configuration. The licensee entered this issue into their corrective action program, as Condition Record CR-18-14720 and Condition Record CR-18-14724. The inspectors had reasonable assurance that the licensee would appropriately implement the voluntary industry initiative, with noted changes discussed below.

The inspectors determined that the following activities complied with the Temporary Instruction criteria as written:

Detection, Alarms, and General Criteria	TI 2515/194-03.01 - Voluntary Industry Initiative (Part 1)

(1)

a. The licensee determined through analysis that open phase conditions will not prevent the functioning of important-to-safety systems, structures, and components.

b. For most analyzed open phase condition scenarios, detection will occur within a reasonably short period of time (e.g., 24 hours).

c. The licensee was in the process of establishing appropriate documentation regarding open phase condition detection and correction for all plant configurations.

(2) For open phase conditions on the standby transformers, the analysis showed the safety-related undervoltage relays would actuate, isolating the connected engineered safety feature bus from the faulted source and starting the emergency diesel generators. Also, the licensee established surveillance requirements, every 12 hours, to look for evidence of open phase conditions.

(3) The licensee's analysis showed that the existing safety-related undervoltage protective schemes minimized misoperation or spurious action in the range of voltage unbalance normally expected in the transmission system that could cause separation from an operable offsite power source. South Texas Project Electric Generating Station, Units 1 and 2 previously demonstrated that the actuation circuit design for the safety-related undervoltage relays did not result in lower overall plant operation reliability.

(4) No Class-1E circuits were being replaced with non-Class 1E circuits in the design.

(5) The licensee provided updates to their Updated Final Safety Analysis Report to include descriptions of the plant susceptibility to open phase conditions and the plant response to these conditions. After discussions with the inspectors the licensee generated Condition Record CR-18-14714 to evaluate additional updates to the Updated Final Safety Analysis Report to include the ability to detect open phase conditions on the high side of the main transformers as described in Licensee Event Report 50-499/2001-001.

Protective Actions Criteria	TI 2515/194-03.01 - Voluntary Industry Initiative (Part 1)

(1) The licensee determined that South Texas Project Electric Generating Station, Units 1 and 2, were susceptible to an open phase condition. South Texas Project Electric Generating Station, Units 1 and 2 considered single open phase conditions (with and without a ground fault) on both the high-voltage side and low-voltage side of the main transformers and standby transformers. Double open phase conditions were also considered in their analysis. All analyzed double open phase conditions resulted in separation of the 4.16 kV engineered safety feature busses from the affected transformer.

(2) With a single open phase condition present on the standby transformers (with or without ground-fault) and no accident signal present, the analysis showed the safety-related undervoltage relaying scheme would separate the engineered safety feature bus from the faulted transformer and start the emergency diesel generator. Technical specification actions would be met without entry in Technical Specification 3.0.3. Important-to-safety equipment would not be damaged by the open phase condition and shutdown safety would not be compromised. The engineered safety feature busses being powered from the other offsite power sources would not be affected.

With a single open phase condition present on the main transformers (with ground-fault) and no accident signal present, the analysis showed the safety-related undervoltage relaying scheme would separate the engineered safety feature busses from the faulted transformer either immediately or within the time delay period for the undervoltage relays and start the associated emergency diesel generator. Technical specification actions would be met without entry in Technical Specification 3.0.3. The analysis showed that important-to-safety equipment would not be damaged by the open phase condition and shutdown safety would not be compromised. The engineered safety feature busses being powered from the other offsite power sources would not be affected.

(3) With an open phase condition present on the standby transformers (with or without ground-fault) and an accident signal present, the analysis showed the safety-related undervoltage relaying scheme would separate the engineered safety feature bus from the faulted transformer and start the emergency diesel generator, powering the engineered safety feature loads. Technical specification actions would be met without entry in Technical Specification 3.0.3. Important-to-safety equipment would not be damaged by the open phase condition and shutdown safety would not be compromised. The engineered safety feature busses being powered from the other offsite power sources would not be affected.

With an open phase condition present on the main transformers (with ground-fault) and an accident signal present, the analysis showed the safety-related undervoltage relaying scheme would separate the engineered safety feature busses from the faulted transformer either immediately or within the time delay period for the undervoltage relays and start the emergency diesel generator. Technical specification actions would be met without entry in Technical Specification 3.0.3. The analysis showed that important-to-safety equipment would not be damaged by the open phase condition and shutdown safety would not be compromised. The engineered safety feature busses being powered from the other offsite power sources would not be affected.

(4) No new periodic tests, calibrations, or setpoint verifications were established as no new protective features were added. The existing surveillance requirements were not modified. Additional inspections were being considered as part of the licensee's corrective action program to identify enhancements related to transformer inspections and walkdowns. These activities were captured in Condition Record CR-18-14720.

No findings were identified.

The inspectors identified the following exceptions to the Temporary Instruction criteria based on the licensee's decision to use the existing infrastructure to provide detection and protection for open phase conditions, and their efforts to identify a method to detect open phase conditions in all configurations:

Detection, Alarms, and General Criteria Exceptions	TI 2515/194-03.01 - Voluntary Industry Initiative (Part 1)

(1) The licensee's design did not have specific detection or alarms for an open phase condition in the control room. For plant configurations in which the main generator is providing power to plant loads through the unit auxiliary transformer, the licensee relied, in part, on demonstrated motor current unbalance and protective relay response on the 13.8 kV busses to identify impacts from an open phase condition. This immediate plant response alerts the licensee to the possible presence of an open phase condition in this configuration.

To improve the reliability of this detection capability, the licensee entered this issue into their corrective action program as Condition Record CR-18-14720 which will evaluate ways to enhance response to an open phase condition, including changes to operating procedures to incorporate open phase condition diagnostics, crew recognition of open phase conditions, and detailed crew response to minimize the effects of open phase conditions. Specifically, the condition record included provisions to:

a. Incorporate monitoring all 3 phases of 13.8 kV and 4.16 kV busses with criteria for quickly diagnosing open phase conditions

b. Identify training requirements to enhance Operator recognition of open phase conditions and responses

c. Include all enhancements into repeatable processes to ensure consistent crew recognition and response

(2) For configurations in which plant loads are being powered from the offsite power supply through the main transformers and the unit auxiliary transformer (backfeed condition), for open phase conditions without a ground fault, the use of current unbalance protective relaying (automatic detection) did not appear to be an effective method of detection, in part, because of the limited loading on the 13.8 kV busses in this configuration (i.e. no large motors running so no current unbalance protection relays would be expected to operate) and because the analysis showed adequate voltages at the 4.16 kV engineered safety feature busses to preclude actuation of the safety-related undervoltage relays. The licensee recognized that this two-phase electrical power condition did not meet the original design configuration of a three-phase electric power system. The licensee entered this

issue into their corrective action program as Condition Record CR-18-14724 to evaluate the need to analyze and detect for open phase conditions when the main transformer is in a backfeed configuration. This evaluation is expected to identify methods of open phase detection in this operating configuration within a reasonably short period of time (e.g. 24 hours or less).

Protective Actions Criteria Exceptions	TI 2515/194-03.01 - Voluntary Industry Initiative (Part 1)
(1) With a single open phase condition present on the main transformers without ground-fault and an accident signal present, the licensee's analysis showed that the voltage and current values available at the 4.16 kV engineered safety feature busses were adequate to support operation, will all LOCA loading running on the engineered safety feature busses and no emergency diesels running. The analysis also showed that in this configuration the negative sequence values, produced by the phase imbalances, would be below the licensee's administrative limit of five percent and therefore would not have an immediate adverse impact on connected loading. The inspectors noted that the modeling software used nominal nameplate values for analyzed plant equipment such as induction motors and transformers, which typically does not consider any age-related degradations or other potential latent issues affecting operating margin. Further, the licensee recognized that this two-phase electrical configuration differs from the original analyzed design of three-phase electrical power systems, and explained to the inspectors that they had no plans to operate with an existing open phase condition, even though their analysis showed this was feasible. The licensee entered this issue into their corrective action program as Condition Record CR-18-14720 and Condition Record CR-18-14724 to evaluate the need to analyze and detect open phase conditions when the main transformer was in a backfeed condition.	

EXIT MEETINGS AND DEBRIEFS

On December 6, 2018, the inspectors presented the temporary instruction inspection results to Mr. G. Powell, President and Chief Executive Officer, and other members of the licensee staff. The inspectors verified no proprietary information was retained or documented in this report.

DOCUMENTS REVIEWED

Temporary Instruction 2515/194 - Inspection of the Licensees' Implementation of Industry Initiative Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (NRC Bulletin 2012-01)

Condition Records

18-14634*	18-14724*	18-14707*	18-14720*	18-14634*
18-14709*	18-14714*	12-8728	95-1747	

Note: *Identifies condition records written during the inspection

Procedures Number	Title	Revision
0POP01-ZQ-0022	Plant Operations Shift Routines	80
(Pages 20-25)		
0POP09-AN-03M3	Annunciator Lampbox 3M03 Response Instructions	34
0POP04-AE-0001	First Response to Loss of any or all 13.8 kV or 4.16 kV Bus	44
OPSP06-PK-0006	4.16KV Class 1E Degraded Voltage Relay-Channel Calibration/TADOT-Channel 2	31
7Z311Z47503	Main Annunciator Window Assignment List	19

Drawings Number	Title	Revision
00000E0AAAA, Sh. 01	Single Line Diagram Main One Line Diagram Unit No. 1 & 2	29
00009E0PK04#1, Sh. 01	Elementary Diagram ESF Transformer & 4.16kV Bus E1A, E1B & E1C Protection & Metering	14
Figure 8.2-3	High Voltage Switchyard Single Line Diagram	19
0E0AAAA, Sh. 1	Single Line Diagram Main One Line Diagram Unit No. 1 & 2	29
09ENN05#1, Sh.1	Elementary Diagram Main Generator Breaker Control and Protection	8
00009E0NN05#1, Sh. 2	Elementary Diagram Main Generator Breaker Protection and Control	8
00009E0PK04#1, Sh. 2	Elementary Diagram ESF Transformer & 4.16KV Bus E1A, E1B, & E1C Protection and Metering	14
00009E0PKB#1, Sh. 1	Single Line Diagram 4.16 KV Class 1E Switchgear	14
9-E-PKAA-01, #2.	Single Line Diagram 4.16 KV Class 1E Switchgear	10

Drawings Number	Title	Revision
9-E-PKAA-01, #1.	Single Line Diagram 4.16 KV Class 1E Switchgear	12
00009E0PK04#2, Sh. 2	Elementary Diagram ESF Transformer & 4.16KV Bus E2A, E2B, & E2C Protection and Metering	14
00009E0PKAB#2, Sh. 1	Single Line Diagram 4.16 KV Class 1E Switchgear E2B	10
9-E-PKAC-01#1,	Single Line Diagram 4.16 KV Class 1E Switchgear E1C	13
9-E-PKAC-01 #2	Single Line Diagram 4.16 KV Class 1E Switchgear E2C	9
030-505-500-20, Sh. 1	South Texas Substation One-line Relay and Metering Scheme	38
030-505-500-20, Sh. 2	South Texas Substation One-line Relay and Metering Scheme	26
B05595-00002R2	Outline Dimensions	A

Miscellaneous Documents Number	Title	Revision or Date
1OOI01-OL-0010	Unit 1 CP Days Logsheet	December 3, 2018
2OOI01-OL-0010	Unit 2 CP Days Logsheet	December 3, 2018
1OOI01-OL-0003	Unit 1 Yard Days Logsheet	December 2, 2018
LOR 165.01.LP.01 13.8kv	Operator Training Presentation – 13.8 & 4.16 KV Electrical Distribution	1
100.20.HO.01	Operator Training Student Handout – Offsite Electrical Distribution	11
LOR 133	Operator Training – Plant Events	
NLO100.20.HO.01	Offsite Electrical Distribution Student Handout	11
NOC-AE-01001075	South Texas Project Electric Generating Station, Unit 2, Docket No. STN 50-499, Licensee Event Report 01-002 Manual Reactor Trip	April 23, 2001
NOC-AE-12002917	South Texas Project Electric Generating Station, Response to NRC Bulletin 2012-01: Design Vulnerability in Electrical Power System	October 25, 2012
NOC- AE-14003077	STP Nuclear Operating Company Response to Request for Additional Information Response to Bulletin 2012-01, “Design Vulnerability in Electrical Power System”	January 30, 2014.

Miscellaneous Documents Number	Title	Revision or Date
N.Y.20-118	Generator Circuit Breaker Pole Outline PKG2C	May 12, 1984
X-DGM-816	Flow Diagram 2-HBC-10 Air Compressor Plant	July 12, 1984
N.Y. 20399	Generator Circuit Breaker Type PKG-275 KA General Arrangement	July 12, 1984
	South Texas Project Electric Generating Station, Units 1 and 2 Open Phase Condition (OPC) Protection Presentation	December 3, 2018

Vendor Documents Number	Title	Revision or Date
	Westinghouse – Report of Transformer Test, Serial No. BBM1376 (Standby Transformer)	April 26, 1978
1ZXX294309001-PM6	ABB – Rating Plate (Main Transformer)	September 22, 2016
B05595-00002R2	Outline Dimensions (Main Transformer)	March 24, 2017
VTD-G080-0061	GEK-65583, Type IJC51E Current Balance Relay	0

Calculations Number	Title	Revision
14-PK-007	Open Phase Analysis for the Standby and Main Power Transformers	1
EC5000	Voltage Regulation Study	8
EC5052	Degraded and Under-voltage Protection and 120/208 VAC Panelboard Voltage Analysis	6
EC5002	Electrical Auxiliary Power Distribution System Model	8

TI 2515/194 Inspection Documentation Request
South Texas Project Electric Generating Station

Please provide the following documentation (Items 1 – 8) to the lead inspector prior to the onsite inspection date, preferably no later than November 5, 2018. Whenever practical, please provide copies electronically (IMS/CERTREC is preferred). Please provide an index of the requested documents which includes a brief description of the document and the numerical heading associated with the request (i.e., where it can be found in the list of documents requested).

Sam Graves, Lead Inspector
RIV/DRS/EB2
1600 E. Lamar Blvd.
Arlington, TX 76011
817-200-1102
samuel.graves@nrc.gov

1. Copies of any calculations, analyses, and/or test reports performed to support the implementation of your open phase condition (OPC) solution or design. If, in your implementation, OPCs are not detected and alarmed in the control room include documentation that:

   a. Demonstrates the OPC will not prevent functioning of important-to-safety systems, structures and components (SSCs); AND

   b. Detection of an OPC will occur within a short period of time (e.g., 24 hours) AND

   c. Establishes shiftly surveillance requirements to look for evidence of OPCs.

2. If your calculational basis or analysis has determined there is no single credible failure that could cause an OPC, then provide the engineering evaluation(s) which document the technical basis for this determination. The Bruce Power and Forsmark operating experience must be considered as part of this analysis. Also, provide details on any testing performed to validate the analytical results.

3. Copies of any modification packages, including 10 CFR 50.59 evaluations if performed, used for or planned for the implementation of your OPC solution.

4. Copies of periodic maintenance, surveillance, setpoint calibration, and/or test procedures implemented or planned, for your OPC solution or design. If not complete, provide documentation showing plans to complete. Also, provide documents showing the surveillance requirements have been added to the plant TSs if necessary to meet the provisions of 10 CFR 50.36.

5. Copies of your licensing basis changes to Updated Final Safety Analysis Report (UFSAR) and/or Technical Specifications (TS), as applicable, which discuss the design features and analyses related to the effects of, and protection for, any open phase condition design vulnerability. If these documents have not been updated, provide documentation of your plans to do so.

6. Copies of any procurement specifications and acceptance testing documents related to the installation of your OPC solution or design.

7. Copies of any site training the team will need to accomplish to gain access to areas with, or planned, major electrical equipment used in your OPC solution (i.e. switchyard).

8. If your solution does not identify open phase conditions for all credited electrical loading conditions (heavy, light, and unloaded) please provide documentation that demonstrates OPCs will be automatically detected as soon as loads are transferred to the standby source.

9. Provide documentation showing that with an OPC occurrence and no accident condition signal present, either:

    a. An OPC does not adversely affect the function of important-to-safety SSCs, OR

    b. TS LCOs are maintained or the TS actions are met without entry into TS LCO 3.0.3 (or equivalent) AND
        i. Important-to-safety equipment is not damaged by the OPC, AND
        ii. Shutdown safety is not compromised

10. With OPC occurrence and an accident condition signal present:

    a. Provide documentation showing that automatic detection and actuation will transfer loads required to mitigate postulated accidents to an alternate source and ensure that safety functions are preserved, as required by the current licensing bases, OR

    b. Provide documentation showing that all design basis accident acceptance criteria are met with the OPC, given other plant design features. Accident assumptions must include licensing provisions associated with single failures. Typically, licensing bases will not permit consideration of the OPC as the single failure since this failure is in a non-safety system.

Please provide the following documentation to the team on the first onsite day. Whenever practical, please provide copies electronically, except for drawings. Drawings should be provided as paper copies of sufficient size (ANSI “C” or “D”) such that all details are legible.

11. A brief presentation describing your electric power system design and typical electrical transmission and distribution system alignments; OPC design schemes installed to detect, alarm and actuate; bus transfer schemes; and maintenance and surveillance requirements.

12. Plant layout and equipment drawings for areas that identify: (a) the physical plant locations of major electrical equipment used in your open phase condition solution; (b) the locations of detection and indication equipment used in the open phase condition sensing circuits. Electrical drawings showing interfaces between your open phase condition solution and plant equipment, including the main one-line diagram(s).

13. If OPC actuation circuits are required, provide documentation that demonstrates continued coordination with the other protective devices in both the offsite electrical system and the onsite electrical system

14. Access to locations in which open phase condition equipment is installed or planned (i.e. switchyard, transformer yard, etc.)

15. Copies of documentation or testing that demonstrates your OPC solution minimizes spurious actuation or misoperation in the range of voltage imbalance normally expected in the transmission system that could cause undesired separation from an operable offsite power source.

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION, UNITS 1 AND 2 – NRC INSPECTION OF TEMPORARY INSTRUCTION 2515/194, INSPECTION REPORT 05000498/2018010 AND 05000499/2018010 – JANUARY 14, 2019

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