



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

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

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498 and STN 50-499
Supplemental Response Regarding Bulletin 2012-01

References:

1. Letter from NRC to All Power Reactor Licensees; "Request for Additional Information Regarding Response to Bulletin 2012-01, Design Vulnerability in Electrical Power System"; December 20, 2013; ML13351A314.
2. Letter from G.T. Powell to NRC Document Control Desk, "STPNOC Response to Request for Additional Information regarding Response to Bulletin 2012-01, "Design Vulnerability in Electrical Power System"; January 30, 2014; NOC-AE-14003077; ML14043A117.

By Reference 2, STP Nuclear Operating Company (STPNOC) provided a response to the NRC request in Reference 1. STPNOC completed the analysis initiated in Reference 2 regarding the Class 1E loss of voltage and degraded voltage relaying systems. STPNOC determined that the relaying systems can detect and protect against a consequential Open Phase Condition and no modifications to the plant are required. Further technical explanation is provided in the attached Enclosure.

There are no commitments in this letter.

If there are any questions regarding this letter, please contact Zachary Dibbern at (361) 972-4336 or me at (361) 972-7743.

Roland Dunn Jr.
General Manager, Engineering

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Enclosure: STPNOC Response to Follow-Up NRC Information Request

cc:

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STPNOC Response to Follow-Up NRC Information Request

Please note that Open Phase Condition (OPC) responses previously provided for STP Units 3 and 4 are no longer applicable because the Construction and Operating Licenses for those units have been cancelled, and therefore this response only pertains to STP Units 1 and 2.

The information in this correspondence provides additional technical information to accurately reflect the STP Nuclear Operating Company (STPNOC) OPC resolution strategy.

STP has three independent offsite power sources which are the unit auxiliary transformers via backfeed from the main transformers and the two standby transformers. For a single open phase without a ground fault on the high-voltage side of the main transformers, the main transformers recreate the lost phase on the secondary side of the transformer due to the wye-delta configuration and their large Megavolt Amp (MVA) rating. For a single open phase on the high-voltage side of the standby transformer or a single open phase with a ground fault on the high-voltage side of the main transformers or standby transformers, the Class 1E loss of voltage or degraded voltage bus relaying will trip the Class 1E 4.16 kV buses, which then automatically realign to be powered by the Emergency Diesel Generators. NRC Bulletin 2012-01 (ML12074A115) discusses the possibility that an open phase condition, with or without accompanying ground faults, located on the high-voltage side of a transformer connecting a General Design Criteria (GDC) 17 offsite power circuit to the plant electrical system could result in a degraded condition in the onsite power system. The requests and industry schedules provided in NRC Bulletin 2012-01 and Nuclear Energy Institute (NEI) OPC Industry Guidance Document (NEI 13-12, December 2013) have been met as documented in STPNOC's January 30, 2014, response (ML14043A117) to the NRC's December 20, 2013, Request for Additional Information (RAI) (ML13351A314). STPNOC's RAI response stated that a vulnerability study and calculations were to be completed in accordance with the NEI 13-12 (December 2013) schedule as part of STPNOC's strategy for resolving this issue. STPNOC performed calculation 14PK007 and determined that no modifications to the plant were required to address the industry OPC issue.

STPNOC calculation 14PK007 demonstrates that the existing Class 1E 4.16 kV bus loss of voltage and degraded voltage relaying will detect and protect Class 1E loads from a consequential single open phase condition. In addition, this calculation demonstrates that if there is a single open phase on the high-voltage side of the generator step-up transformers (also known as the Main Transformers), then the lost phase will be recreated on the secondary side of the transformers without adversely impacting Class 1E loads. Therefore, based on the calculation 14PK007 results, STPNOC concluded that no modifications to the plant were required to address the open phase condition industry issue.

There is no vulnerability on the high-voltage side of the Main Transformers. Specifically, STPNOC calculation 14PK007 demonstrates that if there is a single open phase on the high-voltage side of the Main Transformers, then the lost phase will be recreated on the secondary side of the transformers without adversely impacting Class 1E loads. ANSI/IEEE C50.41 recommends maintaining a voltage imbalance of less than 5%; therefore, the acceptance criteria in STPNOC calculation 14PK007 for negative sequence bus voltage is less than 4% voltage imbalance. Given these calculation results, STPNOC concluded that no modifications to the plant were required to address an open phase condition on the high-voltage side of the Main Transformers and the existing relays were adequate in detecting and protecting against an OPC.

There is a vulnerability on the high-voltage side of the Standby Transformers. Specifically, STPNOC calculation 14PK007 demonstrates that if there is a single open phase on the high-voltage side of the Standby Transformers, the Class 1E loss of voltage or degraded voltage bus relaying will automatically trip and protect the Class 1E 4.16 kV buses from a consequential OPC. With respect to applicable testing and monitoring programs, the existing Class 1E 4.16 kV bus loss of voltage and degraded voltage relaying already have previously established periodic testing, calibrations, setpoint verifications, and inspections. In addition, the surveillance requirements for the existing Class 1E 4.16 kV bus loss of voltage and degraded voltage relaying are already in the STP Units 1 and 2 Technical Specifications.

Based on the results of calculation 14PK007 and the existing Class 1E 4.16 kV bus loss of voltage and degraded voltage relaying detection and protection capabilities, STPNOC concluded that no modifications to the plant were required to address an open phase condition on the high-voltage side of the Standby Transformers.