|  |  |  |  |
| --- | --- | --- | --- |
| PGRR Number | [120](https://www.ercot.com/mktrules/issues/PGRR120) | PGRR Title | SSO Prevention for Generator Interconnection |
| Date Posted | October 14, 2024 |
|  |  |
| Requested Resolution  | Normal |
| Planning Guide Sections Requiring Revision  | 5.2.10, Subsynchronous Oscillation (SSO) Prevention (new) |
| Related Documents Requiring Revision/Related Revision Requests | None |
| Revision Description | This Planning Guide Revision Request (PGRR) prevents generators from interconnecting to the ERCOT Transmission Grid if the generator would be radial to a series capacitor under N-1 conditions.   |
| Reason for Revision |  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 1 – Be an industry leader for grid reliability and resilience [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 2 - Enhance the ERCOT region’s economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission General system and/or process improvement(s) Regulatory requirements ERCOT Board/PUCT Directive*(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)* |
| Justification of Reason for Revision and Market Impacts | Certain generators are susceptible to Subsynchronous Resonance (SSR) and subsynchronous ferroresonance when connected to a transmission line with a series capacitor and this poses a risk to the ERCOT System. In addition to damaging impacts to the ERCOT Transmission Grid, SSR and subsynchronous ferroresonance-related issues can cause negative impacts to Resource Entities. Addressing such issues could cause delays or disruptions at any stage of the generator interconnection timeline, including the planning stage, commissioning, or even during commercial operation.Real-Time SSR events, including several in 2023, have occurred with generators interconnected on series compensated circuits under N-1 conditions, despite SSR Mitigation being in place. Below is a list of the historical SSR events in ERCOT:

|  |  |  |
| --- | --- | --- |
| **Year** | **Area of SSR Events** | **Number of SSR Events** |
| 2009 | South TX | 1 |
| 2017 | South TX | 2 |
| 2018 | South TX | 1 |
| 2023 | South TX | 3 |
| North TX | 1 |

Due to the risk SSR and subsynchronous ferroresonance events pose to the ERCOT System, future generators should not interconnect on a series compensated circuit such that an N-1 condition would cause the generator to become radial to a series capacitor.   Below is a list of the station locations of Transmission Service Provider- (TSP) owned series capacitors:

|  |
| --- |
| **Locations of TSP-Owned Series Capacitors** |
| ROMNEY - Romney Capacitor Yard 345 kV |
| KOPPERL - Kopperl Capacitor Yard 345 kV |
| KIRCHHOF - Kirchhoff 345 kV |
| EDISON - Edison 345 kV |
| OERSTED - Orsted 345 kV |
| GAUSS - Gauss 345 kV |
| CTT\_CROS - CTT Cross SC 345 kV |
| NEDIN - North Edinburg 345 kV |
| RIOHONDO - Rio Hondo 345 kV |
| CENIZO - Cenizo 345 kV |
| DELSOL - Del Sol 345 kV |

ERCOT proposes that this PGRR take effect no sooner than April 1, 2025, to allow for an appropriate window for in-process generator interconnections/modifications to continue under the current Planning Guide language before these restrictions are enforced. |

|  |
| --- |
| Sponsor |
| Name | Megan Miller |
| E-mail Address | Megan.miller@ercot.com  |
| Company | ERCOT  |
| Phone Number | 512-248-6672  |
| Cell Number |  |
| Market Segment | Not applicable  |

|  |
| --- |
| **Market Rules Staff Contact** |
| **Name** | Cory Phillips |
| **E-Mail Address** | cory.phillips@ercot.com |
| **Phone Number** | 512-248-6464 |

|  |
| --- |
| Proposed Guide Language Revision |

***5.2.10 Subsynchronous Oscillation (SSO) Prevention***

(1) A proposal to interconnect a generator, as described in paragraph (1)(a) or (1)(b) of Section 5.2.1, Applicability, will be subject to cancellation as described in Section 5.2.6, Project Cancellation Due to Failure to Comply with Requirements, if the number of Credible Single Contingencies causing the generator to become radial to a series capacitor(s) post contingency is not greater than one. Credible Single Contingencies will be determined as follows:

(a) Large generators shall have the number of Credible Single Contingencies that cause a generator to become radial to a series capacitor(s) determined during the topology-check in the Security Screening Study, as described in Section 5.3.1, Security Screening Study.

(b) Small generators shall have the number of Credible Single Contingencies that cause a generator to become radial to a series capacitor(s) determined by the TDSP.

(2) A proposal to modify a generator, as described in paragraph (1)(c) of Section 5.2.1, that is interconnected such that a Credible Single Contingency causes the generator to become radial to a series capacitor(s) shall be allowed only if simulations demonstrate that Subsynchronous Oscillation (SSO) is not observed.

(3) If any SSO is observed during operations, ERCOT may prohibit the generator from operating until it is demonstrated to ERCOT’s reasonable satisfaction that SSO has been fully mitigated.