Filing Receipt

Filing Date - 2024-03-18 05:01:18 PM

Control Number - 55999

Item Number - 22

PROJECT NO. 55999

REPORTS OF THE ELECTRIC RELABILITY COUNCIL OF TEXAS	**§**	**PUBLIC UTILITY COMMISSION**
	§	
	§	**OF TEXAS**

NOTICE REGARDING NEW SOUTH TEXAS EXPORT AND IMPORT GENERIC TRANSMISSION CONSTRAINTS

Electric Reliability Council of Texas, Inc. (ERCOT) submits this notice to apprise the Public Utility Commission of Texas (PUC) that it has established four new Generic Transmission Constraints (GTC) that will limit power flows over certain 345-kV transmission lines in South Texas during specific conditions involving high system-wide power demand.[1] The limits are necessary to mitigate a risk that certain contingencies could cause overloads that would lead to cascading outages that could threaten the integrity of the entire ERCOT System. While establishing GTCs will enable ERCOT's Security-Constrained Economic Dispatch (SCED) algorithm to manage generation dispatch within these limits the majority of the time, if sufficient generation is not available to be dispatched in some cases, ERCOT would need to direct firm load-shedding to ensure the limits are not exceeded. These limits are expected to be needed at least until the San Antonio South Reliability Project is placed in service, which is anticipated to be in Summer 2027.

In the interim, as further described in this notice, ERCOT is actively working to identify measures that could increase the transfer limits and reduce the need for firm load-shedding during these specific operating circumstances. Some measures could involve new ad hoc procurements that may require specific authorization by the PUC. If the PUC deems one or more of those measures appropriate, it may need to take formal action on an abbreviated timeline to address these risks ahead of the summer peak load season, when such risks are expected to be greatest. ERCOT will ultimately be seeking the PUC's direction regarding the range of options that may be appropriate to mitigate these risks.

[1] In this filing, ERCOT is purposely refraining from disclosing certain GTC-related information, including the contingencies that could cause line overloads that can lead to cascading outages, as this information would be considered ERCOT Critical Energy Infrastructure Information (ECEII). *See* ERCOT Protocols § 1.3.2.1, Items Considered ERCOT Critical Energy Infrastructure Information; § 2.1, Definitions (Definition of "ERCOT Critical Energy Infrastructure Information"). However, ERCOT can provide this information to the Commission confidentially under established procedures, as permitted by 16 Texas Administrative Code § 25.361(e)(1)(B).

I. Background

As explained in ERCOT's February 27, 2024 Market Notice, ERCOT has identified a reliability need to limit power transfers across certain transmission interfaces that deliver power from South Texas into the San Antonio region (the "export" scenario) and from the San Antonio region into South Texas (the "import" scenario) under certain conditions involving high system-wide demand. ERCOT has therefore established four GTCs to manage these transfers—two GTCs for the export scenario, and two for the import scenario.[2] The need for these special limits arises from the fact that certain contingencies could cause overloads on the lines that make up the export and import interfaces, which could lead to cascading outages. Because SCED does not evaluate the risks of cascading as part of its calculation of the appropriate level of generator dispatch, ERCOT must establish a GTC for each affected interface, which allows a limit below the level of the overload to be calculated by other ERCOT tools and provided to SCED for purposes of determining generator dispatch. ERCOT's policy of considering double-circuit lines that share towers for more than half a mile to be evaluated as a single contingency is not a factor in setting these limits.

The risk of cascading arises in both the export and import scenario. The reliability risk associated with the import scenario arises when demand in the part of the ERCOT System south of San Antonio exceeds available generation in that region, in spite of ERCOT operators having taken all available actions to minimize that import (for example, through the use of Reliability Unit Commitment). In that situation, ERCOT must import generation into South Texas to serve that load. If the flow on the lines affected by the GTC exceeds the calculated limit associated with that GTC, ERCOT would need to direct firm load-shedding in the South Texas region to avoid the risk of cascading that could occur in the event of a contingency loss of certain transmission lines affecting flows on the two import interfaces.

By contrast, the reliability risk associated with the export scenario would be attributed to a generation deficiency on the north side of the constraint. Because the part of the ERCOT System that is north of the constraint includes the significant majority of ERCOT load, this risk only arises when (1) the ERCOT System is experiencing a near-scarcity of generating reserves to meet overall system demand, (2) insufficient generation exists to meet demand in the area of the ERCOT System north of the constraint, and (3) an excess of generation is available to be exported from

[2] *See* Market Notice M-C022724-01, New South Texas Export and Import Generic Transmission Constraints (GTCs) (Feb. 27, 2024), available at https://www.ercot.com/services/comm/mkt_notices/M-C022724-01.

South Texas to the rest of the ERCOT System through transmission lines terminating in the San Antonio area. In these situations, the use of an export GTC limit is required to ensure that an unexpected transmission contingency that occurs while power is being exported along the transmission interfaces from South Texas into the San Antonio area does not result in cascading outages.

If the flow of power through either of the export GTC interfaces exceeds the GTC's limit, and other actions are not sufficient to address the overload, ERCOT would need to initiate system-wide load shedding to restrict flows to the GTC limit. While the reduction of demand in the region that includes the San Antonio and Austin metro areas would have the highest impact on relieving such an overload, system-wide load shedding is the most appropriate means to resolve these overloads because the most significant contributing factor to these conditions is that the entire system is nearing scarcity of reserves and does not have enough generation that can be accessed reliably. System-wide firm load-shedding typically only occurs in response to an ERCOT declaration of an Energy Emergency Alert (EEA) Level 3 based on certain frequency or reserve triggers. In the case of the South Texas import and export GTCs, however, any firm load-shedding directive would be based on whether the directive is needed to reduce or maintain the flow on the GTC below the established limit. In the event any such load-shedding directive is necessary, any ordered demand reduction would be carried out using the same processes and load-shed percentages used when ERCOT directs firm load-shedding under an EEA Level 3. ERCOT has estimated that a system-wide load reduction of 240 MW would be required per 5% overload on the relevant export constraints. If a peak load of 85,000 MW is assumed, this would amount to approximately 0.28% of system load that would need to be shed for each 5% overload on the South Texas export GTCs.

The conditions that could give rise to the need to limit exports from South Texas may be similar to those that led to the EEA ERCOT declared on September 6, 2023. As described in ERCOT's report regarding that event,[3] at around 7:15 that evening, SCED was relying on excess generation in South Texas to serve load in the rest of the system because solar generation output in West Texas had subsided and wind generation output in the Panhandle and West Texas was abnormally low, resulting in a deficiency of generation for the bulk of the ERCOT System located north of what is now identified as the South Texas export constraint. As the amount of West Texas

[3] *CY 2023 Reports of the Electric Reliability Council of Texas*, Project No. 54444, ERCOT's Final Report Addressing September 6, 2023 Emergency Event (Nov. 22, 2023).

generation declined, the loading on the South Texas export interface increased to a level that exceeded an acceptable limit, leading ERCOT to take manual actions to alleviate the overload. However, because SCED is designed to allow transmission overloads when necessary to serve system-wide power demand, ERCOT eventually had to declare an EEA and direct the curtailment of Load Resources in order to alleviate the overload and reduce overall system demand to a level that could be served by the generation accessible to SCED.

Because ERCOT has since determined that the South Texas export and import constraints are Interconnection Reliability Operating Limits (IROL), as defined by the North American Electric Reliability Corporation (NERC),[4] ERCOT is obligated by NERC Reliability Standards to develop a plan to avoid the exceedance of these limits.[5] Therefore, ERCOT must set a flow limit for each GTC that would require load-shedding before the limits of the lines in the interface are exceeded. Consequently, if similar conditions occur again this summer or at some other time in the near future, ERCOT would likely need to direct a limited amount of firm load-shedding in order to restrict power flows below the GTC export limit.

Conditions that could foreseeably result in a generation deficiency in the area north of the South Texas export constraint include some combination of reduced solar generation output, reduced wind output, dispatchable generation outages, abnormally high demand (including demand associated with additional load growth), and transmission outages that limit generation input. Depending on the occurrence and degree of any generation deficiency, if that is accompanied by an excess of generation south of the San Antonio area (for example, if coastal wind output is relatively high), ERCOT may need to shed load preemptively to avoid a post-contingency overload of the lines in either of the South Texas GTC export interfaces.

II. Potential Solutions to South Texas Export and Import GTCs

ERCOT has been investigating long-term, mid-term, and short-term solutions to the reliability issues associated with the South Texas export and import GTCs. A key part of the long-term solution to these GTCs will be the San Antonio South Reliability Project, which the ERCOT Board of Directors endorsed in August 2023. However, this project, which includes the

---

[4] *See* NERC Glossary (defining "Interconnection Reliability Operating Limit" as "A System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading outages that adversely impact the reliability of the Bulk Electric System."), available at https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf.

[5] *See* NERC Reliability Standards IRO-009-2, Requirement R2 ("Each Reliability Coordinator shall initiate one or more Operating Processes, Procedures, or Plans . . . that are intended to prevent an IROL exceedance, as identified in the Reliability Coordinator's Real-time monitoring or Real-time Assessment."); *see also* NERC Reliability Standards IRO-009-2, Requirement R3; TOP-001-5, Requirement R12.

construction of a new 345-kV double circuit line on new right-of-way, is not expected to be in place until Summer 2027. Until then, ERCOT intends to utilize other "near-term" (i.e., immediately available or potentially available with minimal effort) solutions to address this risk, and to pursue other "mid-term" solutions, which may require some additional time to develop, and in some cases, may require PUC authorization.

ERCOT is working with the relevant TSPs to implement near-term mitigation measures, which would reduce the frequency and duration in which the constraint would be expected to limit transfers across the South Texas export and import interfaces. These measures include:

1. **Adjusting transmission line ratings**: The relevant TSPs have conducted an analysis of the ratings of the transmission circuits most likely to be overloaded and have re-rated or bypassed the most limiting equipment. This has resulted in new ambient-temperature-adjusted dynamic line ratings on the most limiting transmission line, which significantly increased the line rating during cooler temperatures. However, the line rating is not improved when temperatures are over 85 degrees. The relevant TSPs are actively reviewing ways to increase this rating and other ratings that may affect the transfer capability of the interface.
2. **Switching actions**: The relevant TSPs may be able to open certain circuit breakers to re-route power flows in such a way as to divert power away from the most limiting transmission circuits. This option is still being evaluated with TSPs.

ERCOT is also considering the following mid-term measures to mitigate the reliability risk associated with the GTC export limits:

1. **Incentivizing new generation:** Adding new dispatchable generation north of the South Texas export constraint (i.e., in the San Antonio area or elsewhere in the system) before the San Antonio South Reliability Project can be energized in 2027 would allow load north of the constraint to be served by this generation rather than requiring large power transfers from South Texas to serve the load. To provide this solution as quickly as possible, the PUC may need to authorize the development of special programs to create these incentives.
2. **New demand response:** Similar to the addition of new dispatchable generation, adding new demand response capability north of the constraint would reduce the amount of load that would need to be served by the limited amount of generation available on that side of the constraint, mitigating the need to rely on generation in

South Texas to serve that load. Because a material part of the new load that is driving the need for new generation is attributable to the growth of large flexible loads in the ERCOT region (such as cryptomining and data centers), increased participation in ERCOT's Voluntary Curtailment Program for Large Flexible Loads could have a beneficial impact in relieving the constraint. However, the development of a special demand response product or other service that could be implemented during the period before the San Antonio South Reliability Project can be energized in Summer 2027 would provide greater certainty that this risk could be reduced.

3. **New series reactors:** ERCOT is currently working with TSPs to evaluate the feasibility and impact of installing series reactors or similar devices on the most limiting transmission circuits impacting the South Texas export and import constraints. Adding series reactors would have the effect of changing the impedance of the lines, which would cause some of the power to flow on other, parallel circuits. Depending on the size of the reactors, this could cause other transmission lines to overload before what is now the most limiting transmission line would be overloaded. This in turn could cause other, more localized transmission issues, including potentially local cascading conditions. ERCOT has not identified a series reactor solution that would not result in any circuits from being overloaded, but some of these solutions would result in fewer and/or less severe overloads. If this solution is feasible, it is unlikely it could be implemented before late 2024 at the earliest, and it may not be achievable until after 2025 summer peak. Similar results could be achieved with the use of phase-shifting transformers or "smart wires" technology, but these solutions would likely require at least as long to implement, if not longer. Of course, the TSPs would need to evaluate these solutions and confirm they are feasible.
4. **Increase the shadow price cap on Interconnection Reliability Operating Limits (IROL):** Another option would be to increase the shadow price cap for certain GTCs that could require system-wide load shedding to manage. Increasing the shadow price caps for these GTCs would require revisions to ERCOT rules. Raising the shadow price cap would reduce the need for manual actions by ERCOT control room personnel to manage the constraint and would allow SCED to manage the constraint such that load shed would only be required upon reaching system scarcity.

III. Conclusion

ERCOT appreciates the PUC's consideration of this information and looks forward to discussing this information with the PUC at the next available opportunity. ERCOT would be pleased to provide the PUC any information it may require in evaluating this issue.

Respectfully submitted,

/s/ Chad V. Seely

Chad V. Seely
Senior Vice President and General Counsel
Texas Bar No. 24037466
(512) 225-7035 (Phone)
chad.seely@ercot.com

Nathan Bigbee
Deputy General Counsel
Texas Bar No. 24036224
512-225-7093 (Phone)
nathan.bigbee@ercot.com

ERCOT
8000 Metropolis Drive, Bldg. E, Suite 100
Austin, Texas 78744
(512) 225-7079 (Fax)

ATTORNEYS FOR ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.