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P.U.C. DOCKET NO. 36482

APPEAL OF COMPETITIVE WIND	§	
GENERATORS REGARDING THE	§	PUBLIC UTILITY COMMISSION
ELECTRIC RELIABILITY	§	
COUNCIL OF TEXAS'	§	OF
INTERPRETATION OF THE	§	
REACTIVE POWER PROTOCOLS	§	TEXAS
	§	

2008 DEC 16 AM 11:41
 Public Utility Commission
 Austin, Texas

APPEAL OF THE ERCOT LEGAL'S INTERPRETATION OF THE REACTIVE POWER PROTOCOLS

COMES NOW E.ON Climate & Renewables North America Inc. ("E.ON"), Horizon Wind Energy, LLC ("Horizon"), Invenergy Wind North America, LLC ("Invenergy"), Edison Mission Energy ("EME"), and AES Wind Generation, Inc. ("AES") (collectively "Competitive Wind Generators") and respectfully appeal the November 13, 2008 Legal Interpretation by Electric Reliability Council of Texas ("ERCOT") Legal addressing the ERCOT Protocols relating to reactive power (the "Interpretation"), to the Public Utility Commission of Texas (the "PUCT" or "Commission"). This filing includes the Exhibit 1 that was inadvertently omitted from the appeal filed December 12, 2008 and is in all other respects identical. Competitive Wind Generators respectfully show as follows:

I. INTRODUCTION

Competitive Wind Generators include renewable energy developers that have invested over a billion dollars in the ERCOT market. Competitive Wind Generators own and operate wind farms in ERCOT and have made substantial commitments to invest in new wind power projects in ERCOT. This appeal relates to the November 13, 2008 Interpretation of reactive power Protocols §§ 6.5.7.1(2) and 6.7.6(5) by ERCOT Legal. The Interpretation is inconsistent with the language of the Protocols, accepted operational practice of wind generators in ERCOT,

interconnection agreements approved by ERCOT, Generation Asset Registration Forms (“GARFs”) routinely accepted by ERCOT, and trade usage and industry standards for reactive power provided by wind generation. The ERCOT Legal Interpretation is already negatively impacting owners of wind generation within the ERCOT power region by creating immediate compliance issues for Competitive Wind Generators and ERCOT itself.

II. COMPETITIVE WIND GENERATORS

Competitive Wind Generators request that all correspondence in regard to this matter be sent to Competitive Wind Generators’ authorized representative and counsel of record:

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III. RESPONDENT

Respondent, ERCOT Inc., manages the regional power grid located wholly within Texas covering 85% of the geographic area of Texas.

To date, the following ERCOT legal counsel has been assigned to this matter:

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IV. JURISDICTION

Competitive Wind Generators are appealing ERCOT's official interpretation of certain Protocols to the Commission pursuant to PURA § 39.151(d) and PUCT SUBST. R. 25.503(f)(2)(A).. Under PURA §§ 39.151(d) and 39.151(d-1)(6), the Commission is entrusted with the obligation and authority to oversee and review rules adopted by ERCOT, and has the authority to resolve disputes between an affected person and ERCOT. PUCT SUBST. R. 25.503(f)(2)(A) specifically provides that if a market participant disagrees with any official interpretation of the Protocols, it may appeal an ERCOT official interpretation to the Commission. An appeal is necessary because the Interpretation of the Protocols at issue in this appeal is considered effective as of the time of promulgation of the relevant Protocols, and not as of any effective date of the Interpretation. Therefore, a Protocol Revision Request ("PRR") will not resolve the issues created by the Interpretation as it applies from inception of the Protocols to the date any such PRR might take effect.

Although ERCOT Protocols §§ 20 *et seq.* establish alternative dispute resolution ("ADR") procedures, such procedures are not required or even applicable here. Protocol § 20.1 provides in relevant part that the ADR procedures apply to "...all disputes between ERCOT and one or more Market Participants... relating to the ... interpretation of... these Protocols." However, this Protocol conflicts with, and is superseded by, PUCT SUBST. R. 25.503(f)(2)(A), which provides as follows:

If a market participant disagrees with any provision of the Protocols or any official interpretation of the Protocols, it may seek an amendment of the Protocols as provided for in the Protocols, appeal an ERCOT official interpretation to the commission, or both.

PUCT SUBST. R. 25.503(f)(2)(A) (*supra*) provides specific remedies in the event a market participant disagrees with an official interpretation of the Protocols, and neither of these available remedies include arbitration. Protocol § 20.1 stipulates that “[n]othing here is intended to supersede any dispute resolution process mandated by applicable law or regulation.” Thus, even the ADR Protocol concedes that it does not supersede the dispute resolution process established by PUCT SUBST. R. 25.503(f)(2)(A).

More importantly, because the Protocols were authorized pursuant to authority delegated by the Commission via PURA § 39.151(d), said Protocols cannot exceed the scope of the Commission’s delegated authority. Because the Commission has provided specific procedures for the resolution of disputes concerning official Protocol interpretations pursuant to its authority provided by PURA § 39.151(d-1)(6), it has not delegated the authority to establish such procedures to ERCOT.

Even if one were to assume that the Commission had delegated its authority to resolve disputes concerning official interpretations of the Protocols, Protocol § 20.1 specifically provides that arbitration is not compelled in this circumstance:

Nothing in this ADR Procedure is intended to limit or restrict... [t]he right of a Market Participant or ERCOT to file a petition seeking direct relief from the PUCT or any other Governmental Authority without first utilizing this ADR Procedure where an action by ERCOT or a Market participant might inhibit the ability of the affected party to provide continuous and adequate electric service.

Here ERCOT Legal’s Interpretation would inhibit Competitive Wind Generators’ ability to provide continuous and adequate electric service because the Interpretation is immediately effective and alleges that the service currently and previously provided by Competitive Wind Generators is inadequate, as will be more fully explained herein. Accordingly, Protocol § 20.1

provides that the ERCOT ADR procedures are not intended to limit the ability of wind generators in this circumstance to seek direct relief from the PUCT without first utilizing the ADR procedure.

V. RELIEF REQUESTED

Competitive Wind Generators respectfully request that the Commission enter an order declaring that the Commission grants the appeal and rejects ERCOT Legal's Interpretation, which shall be given no force or weight. Further, it is requested that the Commission determine that the Protocols, as written, require a minimum reactive capability that is in proportion to the real power output of a generator.

VI. BACKGROUND AND FACT SUMMARY

On November 13, 2008, ERCOT published a legal notice¹ to all ERCOT Market Participants² stating that an Entity had submitted to ERCOT a Protocol Clarification/Interpretation Request ("PIR") regarding ERCOT Protocol §§ 6.5.7.1(2) and 6.7.6(5). Specifically, ERCOT stated that the PIR sought clarification of issues surrounding reactive power provision requirements under the Protocols.

The Interpretation addressed whether a Generation Resource is required to provide reactive power at its Unit Reactive Limit ("URL"), regardless of how much real power the Generation Resource is generating. Protocol § 6.5.7.1 explains that the URL represents the quantity of reactive power a Generation Resource required to provide Voltage Support Service ("VSS") must be capable of producing at rated capability (MW) to maintain a Voltage Profile established by ERCOT. The question of whether a Generation Resource must provide reactive

¹ "Protocol Interpretation Request on Reactive Power Capability Requirements," M-D111308-01 Legal, attached as Exhibit 1.

² All capitalized terms not defined herein are meant to employ the given term as it defined within ERCOT Protocol § 2.

power at its URL at all times is significant because certain Generation Resource units, including Wind Generation Resource (“WGR”) units, produce reactive power at their URL only when operating at full output. These units produce less reactive power as real power output is reduced yet are able to maintain a power factor of 0.95. Likewise, some, conventional Generation Resources do not produce URL reactive power at lower real power output levels, although the number of affected conventional Generation Resources is not yet certain.

ERCOT’s Interpretation concluded that pursuant to Protocol § 6.5.7.1(2), all Generation Resources required to provide VSS must have and maintain a URL (which is based on a power factor capability of +/- 0.95 of the unit’s maximum capability) irrespective of the real-time operating capability of the unit. In other words, all VSS Generation Resources, regardless of whether they are capable of providing reactive power at the unit’s URL at lower real power output levels, must maintain reactive power as if the units were operating at full capacity, providing reactive power at the URL at all times.

This Interpretation creates a serious problem because WGR units and an undetermined proportion of conventional Generation Resource units do not satisfy the Interpretation’s requirement that reactive power always be available at the URL even when the unit is not generating real power output at its URL.

Importantly, the Interpretation was published without an effective date. It is Competitive Wind Generators’ understanding that the absence of a specific date reflects ERCOT Legal’s position that the Interpretation is effective retrospectively—that it represents what has always been the correct interpretation of the relevant Protocols and so the requirement has allegedly been in effect ever since the relevant Protocol provisions were made effective. As a consequence, all WGRs and some other conventional Generation Resource units may have been

in violation of the ERCOT Protocols for years. This is the case despite the fact that ERCOT has known and understood operationally that WGRs have always provided reactive power according to the capability of units, dependent upon the output of the units at a given time. Further, ERCOT has accepted Interconnection Agreements and GARFs for years that are inconsistent with the Interpretation. This Interpretation is also inconsistent with the industry standard for wind generators in every other market in the continental United States.

To the knowledge of Competitive Wind Generators, no formal studies or reports by ERCOT or findings of fact in any proceeding indicate that the ERCOT grid has suffered from an incident in which a deficit of reactive power created the need for ERCOT Legal's Interpretation. There are also no studies that demonstrate a reliability need for WGRs to provide reactive power in accordance with the Interpretation or that establish that conformance with the Interpretation would eliminate actual reliability problems. Given ERCOT's long history of accepting WGR reactive performance until November 13th, 2008, ERCOT's Interpretation is functionally tantamount to a retroactive amendment to the Protocols. However, the Interpretation was published without stakeholder participation. Accordingly, it lacks the weight of processes such as PRR proceedings where stakeholder input is crucial to vet the potential negative ramifications of a Protocol amendment or new Protocol, and which would produce the same level of impact as a Protocol Interpretation and would be immediately effective until repudiated or modified by the Commission. The Interpretation should be rejected as impractical, unreasonable, and counter to the intent of the Protocols.³

VII. APPLICATION OF LAW

The Interpretation

³ Code Construction Act § 311.002(3) presumes that a just and reasonable result is intended to rules adopted under a code pursuant to § 311.002(4).

The Interpretation stresses two Protocol provisions, Protocol §§ 6.5.7.1(2) and 6.7.6(5).

These Protocols state as follows:

§ 6.5.7.1 *Generation Resources Required to Provide VSS Installed Reactive Capability*

- (2) Generation Resources required to provide VSS except as noted below in items (3) or (4), shall have and maintain a URL which has an over-excited (lagging) power factor capability of ninety-five hundredths (0.95) or less and an under-excited (leading) power factor capability of ninety-five hundredths (0.95) or less, both determined at the generating unit's maximum net power to be supplied to the transmission grid and at the transmission system Voltage Profile established by ERCOT, and both measured at the point of interconnection to the TDSP.

§ 6.7.6 *Deployment of Voltage Support Service*

- (5) At all times a Generation Resource unit required to provide VSS is On-line, the URL must be available for utilization at the generating unit's continuous rated active power output, and Reactive Power up to the unit's operating capability must be available for utilization at lower active power output levels. In no event shall the Reactive Power available be less than the required installed reactive capability multiplied by the ratio of the lower active power output to the generating unit's continuous rated active power output, and any Reactive Power available for utilization must be fully deployed to support system voltage upon request by ERCOT, or a TSP.

Both provisions reference the term "URL". As explained previously, URL is defined in the ERCOT Protocols as the Unit Reactive Limit,⁴ and § 6.5.7.1 explains that the URL represents the quantity of reactive power a Generation Resource required to provide VSS must be capable of producing at rated capability (MW) to maintain a Voltage Profile established by ERCOT. At the maximum real power output of all Generation Resources collectively forming a unit (the "rated capability"), the full volt-ampere reactives ("VARs") available constitute the URL. Anytime the term URL is used, it must include both parameters: full output and maximum VARs. The two cannot be separated from one another because they are part and parcel of the URL.

⁴ ERCOT Protocol §2-39.

The Interpretation equates the term “operating capability” used in § 6.7.6(5) with URL without basis and inconsistent with other language in the Protocols. The Interpretation finds that Protocol § 6.7.6(5)’s requirements concerning “operating capability” are static, maximum amounts equivalent to the URL. URL is discussed in the first sentence in § 6.7.6(5) when referring to total VARs at the full output of the plant. However, the second half of that sentence specifically avoids use of the term URL as it discusses lower active power outputs. In the second half of the sentence, VARs are expected to be provided consistent with the “unit’s operating capability.” The operating capability of the plant has been known and understood by the industry as the facility’s operating level capability, or the level at which the plant is operating at a given time. The “operating capability” defines the level of reactive power it is capable of delivering at its current real power output level, which may vary at lower active power output levels than the URL. It is also clear that since existing WGRs cannot provide reactive power at the URL level when they are at lower output levels, this could not be the facilities’ operating capability—in particular since the unit is not capable of operating to that standard.

Where there is no statutory or regulatory definition of a term in a statute or regulation, courts will look to the common usage of a term – the term “operating capability” is not defined by the Protocols and has a use common to the industry that the Interpretation does not consider.⁵ The term “operating capability” in this context has acquired a technical and particular meaning and should be construed accordingly.⁶ Further, trade usage and industry standards in all other domestic markets reinforce that meaning as being consistent with FERC Order 661-A, *i.e.* that

⁵ *State v. Kost*, 785 S.W.2d 936, 939 (Tex. App.—San Antonio, 1990, petition for discretionary review refused).

⁶ TEX. GOV’T CODE § 311.011(b). (“Words and phrases that have acquired a technical or particular meaning, whether by legislative definition or otherwise, are construed accordingly.”)

operating capability and corresponding VARs mean the VARs that can be provided at a given output level, and not the URL.⁷

The industry's understanding of "operating capability" requirements being tied to design limitations is also consistent with Operating Guide § 3.1.4.1, which in relevant part provides that "ERCOT has the right and obligation to Dispatch the reactive output (VARs) of each generation facility **within its design capability** to maintain adequate transmission voltage in ERCOT." (Emphasis added.) The Interpretation declares that a facility's "reactive power capability" is its maximum possible URL-level output, and that this level of reactive power "...must be available at all MW output levels." However, the Interpretation does not, and cannot point to any Protocol provision to justify this determination, as there is no Protocol language that supports it. Such a reading directly conflicts with Operating Guide § 3.1.4.1 which does not require units to perform at a level of which they are not capable. Operating Guide § 3.1.4.1 also specifies that ERCOT must approve any equipment changes prior to implementation that would decrease the reactive capability of the generating unit below the required level. ERCOT has approved all of the WGR registrations, without any reference to any inability to meet the Interpretation's standard. Further, it seems unlikely that it was the intent of the drafters of the Protocols to use "operating capability" to impart the same meaning as a defined term, "URL," especially when URL is used in the first portion of the sentence and there corresponds to when the plant is at full output. The second half of the sentence relates to operating capability and specifically refers to lower active power output levels but does not reference URL.

In providing reactive power, certain generation resources including wind Generation Resource units produce reactive power proportionate to the real power produced; such facilities

⁷ The standard Large Generator Interconnection Agreement ("LGIA"), Appendix G, §A.ii.

are not “capable” of producing constant VARs at the URL when the output of the unit is not the full output required to meet the URL standard. Further, some conventional generation facilities also do not produce constant level reactive power at URL levels unless they are at maximum operating capability, although the number of affected conventional facilities has not yet been determined.

Statutory and rule provisions bearing on the same matters must be given consistent and harmonious meaning.⁸

The Interpretation contravenes § 6.7.6(5), which provides as follows:

At all times a Generation Resource unit required to provide VSS is On-line, the URL must be available for utilization at the generating unit’s continuous rated active power output, and Reactive Power up to the unit’s operating capability must be available for utilization at lower active power output levels. **In no event shall the Reactive Power available be less than the required installed reactive capability multiplied by the ratio of the lower active power output to the generating unit’s continuous rated active power output**, and any Reactive Power available for utilization must be fully deployed to support system voltage upon request by ERCOT, or a TSP. [Emphasis added.]

The Interpretation notes that reactive power must be available up to the Generation Resource unit’s “operating capability,” which the Interpretation implies is synonymous with the Generation Resource unit’s URL. However, if these terms are synonymous, then everything in boldface above is superfluous and without meaning. As a result, there would be no apparent justification for using the term “operating capability” when consistent use of the defined term “URL” would have been appropriate. The Interpretation assumes that reactive power can never be lower than the facility’s URL even though § 6.7.6(5) stipulates that reactive power shall be no less than the URL multiplied by a specific ratio. The only way to harmonize the Interpretation

⁸ *Texas Citrus Exchange v. Sharp*, 955 S.W.2d 164, 169 (Tex. App.—Austin, 1997), citing *Gulf States Utils. Co. v. Public Util. Comm’n*, 784 S.W.2d 519, 524 (Tex. App.—Austin 1990), *aff’d*, 809 S.W.2d 201 Tex. 1991).

with this Protocol is to read the ratio as always being a one-to-one ratio, which makes the exercise of multiplying the URL by this ratio utterly meaningless.

The Interpretation claims that the second sentence "...merely accounts for situations in which a Generation Resource encounters equipment-related issues or other unforeseen circumstances that may cause the reactive power capability to be less than the requirement in Protocol § 6.5.7.1(2)." However there is nothing in the Protocol that supports this justification; there is no language about equipment-related issues or unforeseen circumstances as excuses or modifications of the reactive power requirement that the Interpretation claims is set at the URL in Protocol §6.5.7.1(2). Nothing in the Operating Guides lends support to this position. In fact, the Interpretation itself declares in reference to § 6.5.7.1(2) that "...this [constant URL reactive power provision] capability must be maintained - no exceptions are provided." The Interpretation's later claim that the second sentence of § 6.7.6(5) only applies to certain undefined permissible equipment "issues", presumably not including the physical inability to comply based on the equipment at issue not being designed to perform to provide URL at lower active power output levels, is without support and contradicts the Interpretation's assertion that no exceptions to the URL-level requirement are available. It also presents a formulaic exception that directly conflicts with Operating Guide § 3.1.4.1.

Unanticipated Regulatory Liability

Under principles of statutory construction, including the language of the Protocol provisions at issue and industry usage, the relevant Protocol provisions indicate that only at the URL, when the unit is running at full active power output, is the unit responsible for providing all corresponding VAR capability to the grid. The Interpretation effectively finds that Generation

Resources must constantly be able to provide reactive power at the given Generation Resource's URL. The Federal Energy Regulatory Commission ("FERC") standard for the provision of reactive power that applies to the rest of the continental United States is for thermal and wind generation to provide VARs at its current operating capability—that is the power factor range standard which takes into account "any limitations due to voltage level, real power output, etc."⁹ This variable reactive power availability standard is well understood and consistently assumed in ordinary trade usage by market participants in the United States power generation industry. The ERCOT Interpretation now creates a material exception to this nation-wide industry norm.

Given that many wind developers that have come into Texas to invest billions of dollars in the Texas economy were active outside the state and entered the market based on the Protocol language as written, the language is particularly important. With the industry standard being FERC Order 661-A, unless the Protocols specify that the reactive power available at URL must be provided at all times, market participants will read the language with an eye toward trade usage. The new Interpretation does not track through the specific parts of the language that refer to URL and those that do not, nor does the Interpretation deal with the ratio multiplied against the URL to determine VARs. As will be discussed in more detail below, the investment-backed expectations of both wind and conventional generation developers is that VARs correspond to output and under the new Interpretation, those investment-backed expectations will be harmed.

The impact of the Interpretation would be that almost all wind generation facilities, and many conventional generation units, are not currently in compliance with the reactive power Protocols and that ERCOT has not enforced what it now claims are violations of the reactive power Protocols for many years. Moreover, this requirement is inconsistent with at least 70

⁹ FERC Order 661-A Appendix G A(ii) at p. 4.

interconnection agreements entered into by wind and other generators that do not require or contemplate that the VARs available at the URL be available at lower active power output. ERCOT has reviewed each and every one of these interconnection requests and have accepted the interconnection agreements without a reactive power requirement that the URL VARs be available at all operating capabilities. Further, such interpretation runs counter to the GARFs that ERCOT has repeatedly accepted from wind generators over the years that demonstrate exactly the manner in which reactive power is made available.

Physical Limitations of Equipment

Wind generation facilities in Texas, and all other parts of the United States, provide reactive power in a “cone” shape, where reactive power increases in availability relative to increases in real power output, rather than in a “rectangle” shape, where reactive power remains available as if the unit were at its URL. As a result, all existing wind “cone” Generation Resource units are incapable of complying with the Interpretation’s standards without significant and expensive modification.

In order to comply, all existing wind Generation Resource units would likely need to undergo expensive retrofitting to incorporate new equipment and operating systems that would allow them to maintain constant reactive power regardless of operating capability. Requiring retrofits for wind generation and conventional generation resources prior to the Low Voltage Ride Through (“LVRT”) study may mean that retrofits done to meet the standard set through the Interpretation are stranded investments when the LVRT Study determines that other or different retrofits may have been needed, or no retrofit at all was required because no reliability problem needed to be addressed. Since ERCOT Legal determined that no effective date should be

included as part of the Interpretation, this Interpretation appears to apply retroactively such that there may be years of violations and related sanctions that have already accrued for WGRs, conventional generators, and ERCOT.

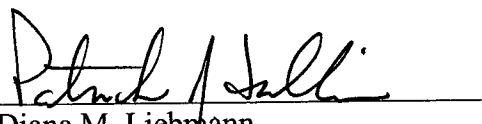
For affected wind and conventional generation, the Interpretation would present a sudden and unexpected exposure to unforeseen regulatory liability, likely millions in retrofit expenses that may be stranded once LVRT retrofits are determined, and inefficient operating choices with no practical alternatives. The generators that built the facilities in question did not contemplate these additional regulatory standards created by the Interpretation and the Interpretation would ultimately increase the costs to generators after many projects have been project-financed, when recovery of these additional costs is uncertain. Further, these additional costs will ultimately have to be passed on to consumers. Significantly, the Interpretation was not driven by a particular reliability need, but only by a question a wind generator posed, and it has no definable reliability benefit of which Competitive Wind Generators are aware.

ERCOT Staff raised this issue for the first time in August 2008, when it was discussed during a workshop, and again in November 2008 at a meeting of the Wind Operations Task Force. Either of these venues would have been appropriate to begin drafting a Protocol Revision Request (“PRR”) to clarify the Protocols and to define any need for particular reactive capability. It is more appropriate to address it in a PRR, rejecting the ERCOT Interpretation and allowing stakeholder participation. Competitive Wind Generators support the need for a PRR and will promptly initiate such process to ensure the requirements are clear and responsive to system needs. However, the Commission must now address the issues raised herein because generators face possible compliance violations dating back from the initiation of the Protocols until a PRR could take effect. If the Interpretation is rejected, a PRR process, informed by a modified LVRT

study to actually understand what, if any, reactive power issues need be addressed and in what manner, would inform ERCOT and the stakeholders so that if a problem exists, meaningful progress toward a resolution can be made. If the Interpretation is allowed to stand, the retrofits required to meet this new standard may very well be obsolete once the LVRT study is completed. Worse yet, investments in technology for reactive power may ultimately be duplicative of other technology later determined to be needed for LVRT.

WHEREFORE, PREMISES CONSIDERED, Competitive Wind Generators respectfully request that the Commission issue an order granting the relief sought in this Appeal, including rejecting the Interpretation or revising the Interpretation consistent with this Appeal, and that Competitive Wind Generators be awarded all other and further relief to which they may show themselves entitled.

Respectfully Submitted,



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ATTORNEYS FOR COMPETITIVE WIND
GENERATORS

Certificate of Service

I hereby certify that on the 16th day of December, 2008, a true and correct copy of the above and foregoing was delivered by first-class mail or fax to the entities identified in this pleading.

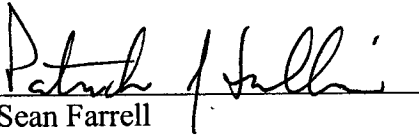

for Sean Farrell

EXHIBIT 1

“Protocol Interpretation Request on Reactive Power Capability Requirements,” M-D111308-01 Legal

From: ERCOT Client Relations <ClientRelations@ERCOT.COM>
To: ROS@LISTS.ERCOT.COM
Sent: Thursday, November 13, 2008 5:35:40 PM
Subject: M-D111308-01 Protocol Interpretation Request on Reactive Power Capability Requirements

NOTICE DATE: November 13, 2008

NOTICE TYPE: M-D111308-01 Legal

SHORT DESCRIPTION: Protocol Interpretation Request on Reactive Power Capability Requirements

INTENDED AUDIENCE: All ERCOT Market Participants

LONG DESCRIPTION: An Entity has submitted to ERCOT a Protocol Clarification/Interpretation Request (PIR) regarding subsection (2) in Protocol Section 6.5.7.1, Generation Resources Required to Provide VSS Installed Reactive Capability, and subsection (5) in Protocol Section 6.7.6, Deployment of Voltage Support Service. Specifically, the PIR seeks clarification on issues surrounding Reactive Power capability requirements.

ERCOT provides the following guidance to the questions submitted by the Entity.

1. **Clarify if the power factor capability of +/- 0.95 is required at all levels of generation.**

Yes. Protocol Section 6.5.7.1(2) sets the Reactive Power capability requirement for all Generation Resources that provide Voltage Support Service (VSS). The section states that a Generation Resource is required to have and maintain an Unit Reactive Limit (URL) with a power factor capability of +/- 0.95, determined at its net max output to the transmission system, and that this capability must be maintained – no exceptions are provided.

2. **Clarify the minimum reactive capability requirements at lower levels of generation and exactly how this is calculated.**

There is no minimum Reactive Power capability requirement. The Reactive Power requirement is set forth in Protocol Section 6.5.7.1, *Generation Resources Required to Provide VSS Installed Reactive Capability*. Specifically, subsection (2) states:

Generation Resources required to provide VSS except as noted below in items (3) or (4), **shall have and maintain a URL which has an over-excited (lagging) power factor capability of ninety-five hundredths (0.95) or less and an under-excited (leading) power factor capability of ninety-five hundredths (0.95) or less**, both determined at the generating unit's maximum net power to be supplied to the transmission

grid and at the transmission system Voltage Profile established by ERCOT, and both measured at the point of interconnection to the TDSP.

As described in the response to Question 1, Protocol Section 6.5.7.1(2) states that a Generation Resource must provide the MVAR requirement (+/- 0.95 power factor) calculated at the maximum net output to the ERCOT Transmission Grid, and that level must be available at all MW output levels.

ERCOT, or TSPs designated by ERCOT, have the right to instruct Generation Resources to make adjustments for voltage support within the URL capacity limits. However, dispatching a Generation Resource within a URL range is the right of the system operator, and is unrelated to, and does not affect a Generation Resource's obligation to maintain a power factor capability of +/- 0.95 when dispatched by ERCOT or TSPs.

Protocol Section 6.7.6(5) confirms the power factor capability requirement in Protocol Section 6.5.7.1(2). Specifically, the first sentence reads:

At all times a Generation Resource unit required to provide VSS is On-Line, the URL must be available for utilization at the generating unit's continuous rated active power output, and **Reactive Power up to the unit's operating capability must be available for utilization at lower active power output levels.**

Therefore, under this Protocol as well, the power factor capability requirement does **not** decrease with decreasing generation output. A Generation Resource must be able to maintain the MVAR capability requirement as described in Protocol Section 6.5.7.1(2) even with decreasing power output.

The second sentence in Protocol Section 6.7.6(5) states:

In no event shall the Reactive Power available be less than the required installed reactive capability multiplied by the ratio of the lower active power output to the generating unit's continuous rated active power output, and any Reactive Power available for utilization must be fully deployed to support system voltage upon request by ERCOT, or a TSP.

This sentence does not conflict with the power factor capability requirement in the first sentence or Protocol Section 6.5.7.1(2) by establishing a minimum reactive capability requirement. In fact, as described above, the requirement in 6.5.7.1(2) is confirmed in the first sentence of this section. The language in the second sentence of this section merely accounts for situations in which a Generation Resource encounters equipment-related issues or other unforeseen circumstances that may cause the Reactive Power capability to be less than the requirement in Protocol Section 6.5.7.1(2). If the Reactive Power is less than the calculation described in the second sentence, then the Generation Resource's ability to support system voltage may jeopardize the reliability of the ERCOT Transmission Grid.

3. Clarify the definitions for “generating unit’s maximum net power” as indicated in Protocol Section 6.5.7.1(2) and “the generating unit’s continuous rated active power output” as indicated in Protocol Section 6.7.6(5).

Both references above refer to the Net High Capability Limit provided by the Generation Resource to ERCOT through resource registration. Net High Capability Limit is the net high MW generation output based on the rating of plant equipment minus plant Load.

CONTACT: If you have any questions, please contact your ERCOT Account Manager. You may also call the general ERCOT Client Services phone number at (512) 248-3900 or contact ERCOT Client Services via e-mail at ClientRelations@ercot.com.

If you are receiving e-mail from an ERCOT distribution list that you no longer wish to receive, please follow this link in order to unsubscribe from this list: <http://lists.ercot.com>.

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