

**Regional Planning Group
Meeting Notes
August 18, 2015**

Misc. Updates

East Texas GTC: market notice that went out

Q: what is the change?

A: Chad: Friday afternoon, as of market notice, retired the East Texas constraint, due to improvements in area.

3 studies related to Panhandle

Q: If interface for short circuit ratio needs to be different would that result in you adopting a new interface?

A: This is somewhat of moving target. Is it pertinent for us to consider that? As studies come out and we get more comfortable with results and study assumptions, then we'll be open to modifying the interface as necessary.

Q: Are you potentially looking at two different interfaces or a modification of one to serve both purposes?

A: We'd prefer to have one. If we need two, then we can look into that, but at the moment we prefer one.

Q: Effort for operational limits underway, you've used the limit once, is this an effort to create a listing of all outage scenarios what limit would be?

A: Using table that's posted and getting some comfort with VSAT results. Would rather rely on VSAT to give us the limit similar to what we're doing for North to Houston, instead of relying on huge lists of tables like the retired West to North limit.

Q: So what is ongoing study right now?

A: ERCOT and its consultant are working on the detailed Panhandle study. The results will help to review and revise the existing system strength assessment method and its criteria.

Q: Operational stability limit was the result of outages. How many outages did you have that got you close to condition?

A: Couple instance in the spring where they took whole substation out for maintenance outage, so we had 4 or 5 lines out, plus the next contingency. It's not normal outage planning to do that, so our hope is that the fixes to the substations have been done and we won't have to take that out again.

Q: What is timeline for consultant to complete their Panhandle study?

A: Scheduled by end of year. Right now, the effort is to build the base case.

Update on SSO

SSR Analysis. Send out data request for selected GINR projects asking for SSR information. Got about 65% response, and we are in effort to perform frequency scan for those projects. We will continue to work with owners who have not provided data to us to try to get updated info from

them. The goal is to try to finish all frequency scans as soon as we can, with the condition that we need to have the adequate data to do the analysis.

Sun Wook Kang: 2015 RTP Update

2015 RTP: short circuit analysis, very close to finishing, will send out results to Transmission Operators and Generation Operators by end of September so they can review. We will post study results on MIS web site.

Sandeep Borkar: 2016 LTSA Update

RTP: response to TRE newsletter, statement about TPL standards and which ones will be used. TPL-001-4 will be used.

LTSA: Aug 6 sent out email with summarized scenarios. Request to review and provide feedback. Have received some feedback. If you have a chance, take a look and get us some feedback so I can consolidate and send out. Almost done with scenario development and getting ready to move on to load forecasting and generation expansion.

Prabhu Gnanam: West Texas Study Update

Last RPG presented a status update primarily describing the load model and the cases we were using, and showing the difference in load projections. Since then working on reliability analysis, have preliminary results which we have shared with West Texas TSPs. We are working with the TSPs on issues identified. Hope to have completed by end of the month. Once we have projects identified, we'll bring back to RPG and have a discussion. At this time, the cases are only available to West Texas TSPs. As soon as the NDA issues are resolved, we will share it with others.

Q: Seems like existence of CREZ lines has been helpful. Is it helping serve load and making things possible?

A: Yes, the TSPs will be in better position to answer that, they've seen the load growth and how they've utilized some of those CREZ lines. We do see some benefits, but it's still preliminary—we're looking at those from a high level.

Oncor Comment: Yes, the CREZ lines have given us options that weren't there before. Been a big benefit and West Texas is a lot more secure.

Q: Are you seeing reliability issues based on those that have already signed IA or what conditions?

A: No, more based on West Texas Load. But yes, we do model all generators with signed IAs; however, this is from more of a load perspective.

Evan Rowe Comment: The oil and gas producers provided us load data in process of going through round two on the load submission. It won't be part of Prabhu's study but it's a way of capturing what the oil and gas producers believe will be future load in the West Texas areas. Also, Energy Ventures Analysis is starting to coordinate West Texas companies to review the WTS load assumptions.

Panhandle Study Results (Huang)

Fred presented on the results of the PUCT-requested Panhandle Study.

Q: SLIDE 6: the small numbers

A: Numbers shown in the contour map next to bus are the normalized short circuit contribution at each bus.

Q: Why 1.5 and not 1.4 or 1.6?

A: There is no industry standard for the region-wide system strength requirement. WSCR of 1.5 is determined based on operational experience, various planning studies, the existing industry experience, and discussions with industry subject matter experts.

Q: Why are Rocky Mound series capacitors are not included in the study?

A: We discussed at previous RPG and got comments that other series caps are already constructed, and optimistic that SSR issues will be resolved and could be placed in service fairly quickly. We feel it was appropriate to have for this analysis. The Rocky Mound series capacitors have not been built and no plan to proceed with the implementation at this moment.

Q: Can we bracket the 90 and 100% as far as short circuit ratio. Can we consider if going to 1.4 takes you to 110%, is there room to consider maybe we don't have to do that 90% and do the 100% at the 1.5 level?

A: Apply 90% of the identified reliability limit in the economic analysis is to account for the operations practice. Once operators get more experience on the wind generation control and wind forecast in the Panhandle region, less margin may be used if appropriate.

Q: The synchronous condenser option looks like it moneys out from economic standpoint. You're providing this study to the Commission and you're going to wait for their feedback to proceed? Or you're going to try to initiate a project on this now?

A: We currently have a RPG project that is on-hold, the Phoenix project, so theoretically we could move forward with the recommendation. At this time, we're inclined to inform Commission the study results first and see if the Commission gives us any direction.

Q: The annual curtailment number, based off economic model?

A: Yes

Q: Do you use AWS wind profile?

A: Yes

Q: On both Scenario 1 and 2, what you've indicated is how they respond to the actual generation of 3604, but for instance, in Scenario 1 you could raise that 3604 installed and get up to your 2% curtailment level and that would indicate that there would potentially be even greater benefit from that scenario?

A: For Scenario 1, we consider synchronous condenser at 150 MVA per stage. Probably will require less synchronous condenser and will still be able to meet study criteria.

Q: So your criteria is that up to 2% curtailment is allowed?

A: The study criterion is to have the transmission options that should result in less than 2% curtailment in Panhandle.

Q: Will ERCOT propose to have synchronous condensers with just 150MVA size?

A: ERCOT is preparing the study report and we will portray this in the report is that this is what we assumed; however, there may be other ways to get the same thing. We assumed at 150 MVA, but we reserve the right to work with the TSP installing this equipment with proper specification of the equipment for the application.

Sharyland Comment: Other parameters like transformer design that could greatly improve short circuit contribution. What we (Sharyland) intend to do is get competitive bids for the equipment.

Q: Why is operating limit lower on slide 11 than previous slide?

A: The assumption of Panhandle wind generation output is proportionally dispatched based on its installation capacity. In scenario 4-2 and 4-3, more generation capacity is located at Panhandle loop where the system strength weaker. This can result in reduced overall Panhandle export to maintain system strength criteria WSCR of 1.5.

Q: If we look at annual curtailment, with the 2nd circuit with only 300 MW additional, it's a 1.25% curtailment, what would it have been if we had 400 MW added?

A: This scope is to identify the approximate additional generation capacity needed to have Panhandle second circuit meet the test economic criteria based on certain assumptions for the future wind generation projects. ERCOT doesn't consider to refine the exact additional capacity is feasible because of the uncertainty of the actual implementation (technology and location) of the future wind projects that can affect the results.

Q: Did the study for the 600 MW presume that you can add 600 MW to that western part of the loop without hitting a reliability limit?

A: In the study case with 600MW additional wind generation capacity, we do have synchronous condensers modeled in the study case as the base case condition. These synchronous condensers provide system strength and voltage support. The simulation results indicate the system strength is the most binding constraint.

Q: Was 600 MW addition a single plant or multiple?

A: We performed a sensitivity to test new projects at different locations and turbine technology, and turbine vendors. The additional capacity listed in the study results is based on these sensitivity tests.

Q: Operational limits in place, is it prudent to have those in the study?

A: Currently, in our economic analysis, we do not take planned or forced transmission outages. So that is not considered at this time.

Q: How was the synchronous condenser modeled? As an actual device as a synchronous condenser or a device that models vars?

A: Modeled as a synch condenser that only provides both system strength and reactive support. The auxiliary power consumption is not modeled in the study case. This is consistent with other transmission upgrade assumption that we don't consider O&M in the economic analysis.

Q: For the VRT requirement, were you looking at existing units RARFs or assuming anything with COD prior to January 16 are not compliant?

A: The models in the study are based on actual model information provided by the Resource Entities that either submitted the model in the RARF or in the interconnection studies.

Q: Slide 13: there have been proposals for condensers at different locations. Sharyland has studied need and location and we have advocated that these are the right locations. Are you in agreement with our studies and our recommendations and conclusions?

A: The results in our presentation are based on our simulation results that indicate synchronous condensers at Alibates and Tule Canyon can provide the most benefit. We tested several other locations as well.

C: Slide 13, two “no’s” in chart are different. Consider wording differently before submitting to Commission.

A: Thanks for the comments and we will consider it while preparing the report.

Solar Study Scope (Gnanam)

Prabhu presented the study scope for the solar study ERCOT is planning to perform.

Q: CDR wind output that shows 12% output for non-coastal.

A: Yes for West and far West we are using 12%.

Q: Would you do a high solar, high wind, low load case?

A: That would probably be a better case for looking at dynamic issue. We may also run an 8760-hour production cost analysis to capture that.

Q: Do you feel like you have a good handle modeling inverters?

A: We’re getting more information, this will involve more coordination with the developers.

C: We think you’re going to have both thermal and dynamic issues.

Q: What system strength studies are you going to do?

A: Haven’t looked that far yet. The focus is on Thermal/voltage issues, but that will evolve as we go.

Q: Other than load growth, are there reliability issues with all of the solar projects with signed IAs?

A: 1. RTP has incorporated solar info as of a few months ago, 2. As more plants interconnect, TSPs will be performing the interconnection studies and we’re watching that very closely. Not a lot of the FIS have been completed for the solar projects yet.

Q: WSCR included in this?

A: Depends on system, where it’s connected

Dan Lyons: AEPSC Hidalgo-Starr Transmission Project

Dan presented an overview of the RPG project that AEPSC submitted for the West Valley area.

Q: Numbers in 80 and 90s, showing 600 MW of growth does that depend on where load growth occurs? The assumption you're making is based on historical load growth or do you have info on where it will occur to get that number?

A: Scaled up all scalable load proportionally so that 600+ MW was scaled proportionally against the whole West Valley.

Q: How do you determine what margin is needed to ensure long-term solution vs. short-term. Some planners base on as long as no loading above 70%.

A: Yes, we'd like to see the numbers smaller for N-1. It would be nice to get in 70-range. Margin is built in that we're intentionally stressing the case to its very limits. Probability that it might not be that bad.

Q: Spring case – what are the ratings on that? Spring rating? Summer ratings?

A: Summer ratings

Q: How much new wind committed to connect between Del sol and North Edinburgh?

A: 970 MW

Q (to ERCOT): Do you consider loss of complete plants for the ones that are combined cycle trains? Are those included in your study?

A: We followed Planning Guide Section 4, for a prior outage condition, the G-1 we would follow what's in the RARF. For a single contingency then we would assume the entire CC train would be tripped. So G-1 + G-1 analysis, then the second G-1 would assume the whole train.

Q: Did you consider terminating the line at Railroad instead of Frontera?

A: We did not consider that option.

AEPSC Lower Rio Grande Valley Independent Review Study Scope (Gnanam)

Prabhu presented on the scope of ERCOT's IR for the LRGV project.

Q: Do you envision looking at contingencies that predominately look at the import path?

A: Looking more at import—that's the need for this project—to address the import constraints in the Valley.

Q: What will trigger those additional studies?

A: A combination of the time constraint and issues we see in the analysis.

Q: How does ERCOT anticipate incorporating dynamic load models?

A: We will use load models in the base case

Q: Long-term analysis looks at what?

A: Load perspective: see what is needed at 10 years out.

Jeff: Long-term analysis, something similar to Houston Import—NPV to quantify your bang for your buck. Different options with different levels of future year NPV.

Q: Future synchronous condenser at Serita to resolve voltage issues there. What is the assumption you'll use in the study?

A (AEP): Modeling issue, didn't want it to appear in the study, so put in synchronous condenser. There will not be synchronous condenser at Serita.

Q: Steady-state analysis and PV analysis—does the long-term look at voltage and thermal issues?

A: Yes

Q: When do you want comments?

A: Before next Tuesday—one week.

Comment: Conduct sensitivity analysis to include what else is being proposed in the area.

Q: Static var compensator—can those be approved now?

A: Still in early stages of study. Based on need, it could fall in a different timeline.