

**Regional Planning Group (RPG) Meeting Notes**  
**July 22, 2014**

**Agenda**

- Welcome and Antitrust Admonition
- Miscellaneous Updates
- West-North IROL Study Scope
- LCRA and CPS Transmission System Additions Projects
- Jones Creek Project
- Valley Import
- 2014 LTSA Update
- 2014 RTP Update

**Misc. Updates—Jeff Billo**

- ERCOT contracted PowerTech on the Small Signal Stability project. ERCOT expects to have PowerTech present the results to ROS in August.
- Q&A: Will ERCOT also consider presenting the results to RPG?
  - The vendor won't, but the presentation can be shared ahead of time, and ERCOT staff could come and provide a presentation if you're interested.
- Phoenix Project originally on agenda for today, but not ready to share results. Likely to have something at August RPG.
- Systems Strength workshop held on July 16, 2014.
  - ERCOT and Sharyland presented the concerns and challenges in a weak grid using Panhandle as an example. As requested by ROS to host the workshop, Sharyland will provide a summary to ROS in August.
  - Overall 50 MP participated the workshop (attended in person or through WebEx)
- Q&A: Regarding the operational limit issue, are you anticipating to establish criteria in advance as we get more data and refine the limits accordingly?
  - This was one of the key discussions at the workshop. One extra item we took first was to have a process, work closely with operations, and as we get more experience, we may refine the system strength criteria of 1.5 as we currently proposed for Panhandle area.
- Q&A: On the operational side, is someone from Operations going to be able to explain how Operations will manage the Panhandle limit?
  - Bill Blevins: We've been working with the Phasor Measurement Task Force. There are no PMUs yet in that area, so we don't have the measurements, but once we have them in place and have data, we should be able to get more experience and properly revise the system strength needs if necessary.
- Q&A: Wind, controllers, seems like a pretty easy fix, reprogramming the black boxes. If it's going to create requirements, you need to do it sooner rather than later.
  - Some as simple as software upgrade, some require hardware or firmware upgrades.
- Comment: If that's the case, probably should consider adding it in the binding document to require developers to install proper turbines for weak grid.
  - Jeff Billo: This is a discussion ROS should have and if they choose, they can assign it as appropriate.

## PLWG Update: Brad Bell

- ROS Activity
    - Passed PGRR036 allowing retirement of POI
    - Approved PGRR038 with the option that ERCOT will report overloads of 95%
    - Directed PLWG to develop a Generation Deliverability Criteria
  - Discussing model differences, direct from ROS to develop white paper with details
  - Also reviewing load scaling methodologies; why doing, why necessary, report back to ROS
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- Q&A: Is somebody from ERCOT Resource Adequacy going to be there to provide subject matter expert help?
    - I don't think we can get anyone there tomorrow, but I think that GATF was notified of the meeting and topic so we're hoping to have them present.
  - Q&A: Looking at system strength; ROS and then putting to Planning Working Group does not seem like appropriate next step if in fact there needs to be additional studies to understand what tradeoffs are.
    - ROS is the next step. If ROS decides that they would like PLWG to conduct that study, then that's at their discretion to decide that.
  - Q&A: With a weak system, interface going to move to somewhere else for the system analysis?
    - I think the weak system as we see it right now is the Panhandle, potentially could be other areas in ERCOT that are weak, but all we know today is Panhandle is weak system.
  - Comment: AEP has observed several Solar Interconnection projects may have similar weak grid challenges as discussed in the Panhandle region.
    - Bill Blevins: ERCOT had observed weak grid condition for an existing Wind Generation Resources connected to a remote 69 kV area in real time Operations. That particular location and Wind Generation operation challenge had been addressed through some controller adjustment.
  - Q&A: From an industry-wide point of view, control system stability issue is not new at all, but unique now.
    - Solar in far west Texas, very weak system, may become wide area problem if more solar projects propose to connect to the same area with weak grid condition.

## **West-North IROL Study Scope—Fred Huang**

- Study will evaluate West-North IROL and impact of series capacitors on west Texas export capability
- Expect to complete study in September 2014
  
- Q&A: Would any series capacitors be placed in service without Subsynchronous Oscillation issues?
  - ERCOT will identify those and include them properly in the analysis.
- Q&A: Are you saying there are no series capacitors that don't affect system generators?
  - ERCOT will identify those and include them properly in the analysis.
- Q&A: Are you studying transfer capability with the series capacitor we were turning off, is that the one you are talking about doing the study on?
  - Yes
  - Bill Blevins: what we're waiting for is the work that Isabel is doing, to find out what are the generators that would be at risk, what combinations and what kind of mitigation is going to be needed for system caps to be put in.
- Q&A: Isabel (Flores) negotiating with generators right now, right?
  - Ajay Pappu: Right now, various mitigation plans and procedures are being analyzed. They will be online after analysis and assessment is done. Discussions are ongoing.

## LCRA, TSC, and CPS Energy Transmission System Additions—Charles DeWitt, Eric Kasalika

- Bexar, Comal and Hays counties expected increase of 873 MW between 2015 and 2019, based on 2013 ALDR
  - 2013 RTP reported 345 kV overloads in 2018
  - J.T. Deely (850 MW) suspension of operation in 2018 announced in October 2013
  - Evaluated transmission performance under base case and generation retirement case scenarios using three power flow cases
    - 2018 Summer Peak (SSWG October 2013)
    - 2018 Summer Peak (ERCOT RTP August 2013)
    - 2020 Summer Peak (SSWG October 2013)
  - 8 alternatives presented in filing
    - Elements common to all alternatives
      - Add two 345/138 kV autotransformers at Howard Road
      - Add second 345/138 kV autotransformer at Marion
      - Rebuild Kerrville Stadium to Kendall 138 kV line
      - Upgrade Kendall to Comfort 138 kV line
      - Reconfigure the Skyline double-circuit to Marion and Elm Creek and the Hill Country double-circuit to Marion and Elm Creek to become a double-circuit from Hill Country to Marion and a double-circuit from Skyline to Elm Creek
  - Project planned in-service date of 2018
  - Request ERCOT consideration for Critical Designation
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- Q&A: If there are two circuits built on two ROWs, how much separation are you proposing between ROWs?
    - Sufficient separation so that it's no longer considered an ERCOT 1 contingency
  - Q&A: Is Howard Lane to become a new 345 kV substation?
    - Yes that's correct. It's in the west, southwest corner Bexar county.

## Jones Creek Project—Wes Woitt

- By 2017, Freeport area is projected to be served by 345/138 kV autotransformers and three long 138 kV circuits
- Freeport LNG has announced
  - Liquefaction and Export Project in Freeport Area
    - 721 MW load
    - Sign service extension agreement with CNP—3<sup>rd</sup> quarter of 2014
    - Operational 3<sup>rd</sup> quarter of 2017
  - Pretreatment Facility (PTF) North of Freeport
    - Build in conjunction with liquefaction and export project
    - 109 MW load, 82 MW generator
    - CNP CCN approved January 27, 2014
    - CNP Oyster Creek Substation—BP2017
- Phase 1 Study Case Results
  - CNP performed contingency analysis based on Section 4.1.1.2 of ERCOT Planning Guides
  - Several overloads and low voltages on 138 kV system in Freeport area
  - Some overloads higher than 150% on 138 kV lines serving as source to Quintana
  - Case does not solve under contingency loss of both Dow-Velasco autotransformers, indicating potential voltage collapse
  - Results show that significant reinforcement is needed
- Connection Options
  - Build additional 138-kV circuits—option rejected
  - Build new 345/138-kV substation: “Jones Creek Project”—preferred
- Summary
  - \$79.8 million Jones Creek Project recommended to serve 721 MW Freeport LNG load
  - Jones Creek Project energization planned for BP2017
  - Complete in time for Freeport LNG 1<sup>st</sup> train
  - Project only moves forward if Freeport LNG
    - Signs service extension agreement with CNP
    - Gives notice to proceed
    - Securitized project
    - All expected to occur in 3<sup>rd</sup> quarter of 2014
- Comment period for project ends 28<sup>th</sup>
- Q&A: On 721 MW of load, at 138 kV, is that 3000 amps?
  - Yes, it will be built at a 4000-amp capability.
- Q&A: Are there other loads on that line?
  - When we get to the proposed connection, you’ll see we’ve got the load served between Velasco and Jones Creek by itself on a single circuit; we will try not to add other customers on the circuit if at all possible.
- Q&A: How long is the line?
  - About 10 miles
- Q&A: Is it a dedicated loop?
  - It is a proposed dedicated loop between two proposed source substations
- Q&A: Does the load have to meet certain criteria?
  - It’s the same as our current criteria, motor start, switching, flicker criteria of less than 2%, they have to meet that. Substation specifications go into certain harmonics. Because of the size of motors, they are doing an enormous amount of study work to meet these harmonic requirements and motor start requirements. Any capacitor switching has to be sized so that they don’t violate the 2% switching criteria.
- Q&A: Is there a requirement for more redundant service than that due to liquefaction of natural gas?

- The problem is the substation's location. It's right on the island, next to the Gulf, with Dow Chemical located on the north side. It's really packed in. Freeport LNG has not requested us to provide a third source.
- Q&A: Is there room around Freeport LNG for supporting industries to move in and then have the load jump because of the supporting load?
  - There is a lot of activity from supporting industry, but not on the same scale. There will be additional load in the general area.
- Q&A: Quintana is served at 69 kV, correct? Loop with Freeport is that all going to be 138 kV?
  - Yes. Loop to Freeport, being converted from 69 to 138 kV.
- Q&A: Jones Creek substation cuts from STP to Dow Velasco. When the circuit from STP to Dow Velasco is out, will we see congestion on the other circuit due to looping in Jones Creek?
  - Yes, it will be highly-loaded, but we view that as more of an import issue and we'll need to address that separately rather than as part of this project.
- Q&A: Can you share the power flow case?
  - It is posted at RPG on the POI site.
- Q&A: Have you thought about only looping one line from Dow to STP then to Jones Creek?
  - Yes, but it didn't help with the single contingency issue. There were additional costs for looping the line over there. There's no need so we didn't include that.
- Q&A: How much is the additional cost if you loop two lines instead of one?
  - It's about ½ to ¾ mile from the 345 kV line to the substation site. The report says over \$5 million so I'd assume you double that. I'd guess you'd add about \$10 million to loop it over there.
- Q&A: How long is the line from Dow to Jones Creek?
  - Jones Creek isn't but maybe 4 or 5 miles. STP up to Jones Creek is approximately 50 miles, so it's not very far.
- Q&A: Will the Jones Creek substation only have one terminal for 345 kV, or multiple 345 kV terminals?
  - It will be planned out for multiple terminals.
- Comment: It seems like a tight timeframe for summer of 2017.
  - That's part of the reason why the project was submitted prior to the customer clearing the FERC hurdle. Normally we wouldn't do it this way but it's unique.
- Q&A: Looking at a situation where you're taking a 345 line out down to the coast, are you concerned about contamination?
  - Yes, we're concerned about contamination. There's no more room to expand at DOW.
- Q&A: Question was asked about long-term load forecasting.
  - ERCOT: We are to begin meeting with the TSPs, likely in September to gather information.
- Q&A: Would this involve an annual meeting with TSPs?
  - Yes, ERCOT would hold those annually.

## Valley Import Overview—Jeff Billo

- Study Case: 2016 Summer Peak (SSWG, March 2014)
- Base Case Condition
  - All Valley gas generation at Pmax
  - Lobo-North Edinburg 345 kV in service (with series capacitor)
  - North Edinburg-Loma Alta (Cross Valley) 345 kV in service
  - Valley wind output=10% dispatch
  - Railroad DC-tie no import/export
- Steady State PV Analysis
- VSAT Results
  - N-1/N-1 exceeds stability limit in 2016
  - G-1 /G-1 exceeds stability limit in 2017
  - N-1/G-1 exceeds stability limit in 2019
- N-1 + N-1 and G-1 + G-1 are significant contingencies
- ERCOT is working on dynamic stability analysis
- ERCOT will work with area TSPs and RPG to evaluate project alternatives to address the reliability need
- Railroad DC tie flow set to zero because ERCOT can cutoff flow to Mexico under emergency situations, but we don't want to depend on flow from Mexico in our reliability studies.
  
- Q&A: I thought the highest loads in the Valley were in the winter, but it looks like you're just looking at summer.
  - Historically, 7 out of 10 years summer is higher than winter, but in approximately 3 out of 10 years, winter is higher. We don't have a winter peak case, so we're looking at summer.
- What would a 90/10 winter forecast look like?
  - It will probably be a little higher than that in the summer. You're probably not going to see much difference between it and the summer peak.
- Q&A: Looking at stability analysis, would a different load mix (ac to winter load) change the results of the stability analysis?
  - Yes it would. Winter resistant heating, summer ac loads. Consideration needs to take place for different types of scenarios with the dynamic models for load.
- Q&A: Would there be different wind patterns for wind farms in winter vs. summer months?
  - There could be. We primarily looked at summer average when modeling wind. Can't recall anything we've looked at in winter.
- Are the wind farms close enough to the coast that they'd exhibit coastal wind?
  - I feel pretty good about the 10% number. It is coastal. If you look at RTP and analysis we've done, we've got coastal wind at 12% in the upcoming RTP. West Texas had 2-3% output.
- Does the agreement with utility in Mexico allow us to drop exports on that tie at a moment's notice if we have a contingency condition?
  - I'm not familiar with the language in the agreement. Protocols changed and asked ERCOT to treat that as firm load; however, ERCOT can declare a transmission emergency and can cut the tie at that point.
- Q&A: The combined cycle power plant in the Valley may have an emission limit if just running one CT. Does ERCOT get in details of these plants to run the plant partially?
  - We have contacted the resource owners for those combined cycle power plants to get details of plant operations.
- Q&A: Do you require they run continuously with the steam unit off?
  - We have asked those questions and are collecting their responses.
- Q&A: 345 lines in the Valley are series compensated. How are you factoring this into structural mitigation plans? Do we know if there is any power plant in the Valley area affected by series capacitors so you should not assume they're always in service?

- AEP: We've done all the SSO studies for Valley plants, and found absolutely no issues with any of the generation impacted by any of the series capacitors in the Valley. We still have some studies to do in the Laredo and San Miguel areas.
- Comment: If you make public, developers can have an idea of what kind of generation is needed to solve the issue.
  - Will do sensitivity analysis that shares that kind of information, similar to Houston ..... at this point don't know if one plant moves forward or multiple plants move forward, how much it will take to solve the issue. Or if they all move forward, all gas and wind, maybe have export problem at that point.
  
- Q&A: Is there a short circuit issue—what area?
  - No, it's more of dynamic stability issue in this area.
- Q&A: Will the coastal wind generation help the Valley issues?
  - Fred Huang: It depends. For example, under an N-1-N-1 condition, coastal wind will not have impact on Valley Import.
  - Jeff Billo: G-1 and G-1 it probably helps
- Q&A: Which dynamic case is ERCOT using to perform dynamic analysis?
  - Most recent available case, 2017 or 2016
  - AEP: Be aware on load models. AEP has found new load models implemented by PTI have errors in them. AEP has submitted trouble report to them, but you need to be leery when using the models.
    - Believe it's version 33, new load models based on WECC and EPRI
    - Fred Huang: Version 32 has the same model and ERCOT will perform the dynamic studies for Valley using version 32.
    - Not sure where the errors are—something built wrong or something within the model itself



## 2014 LTSA Update – Doug Murray

- 6 final forecasts, several items changed in most of the forecasts
  - Global recession load forecast is much lower than the others
  - Completed 9 scenarios, not sure going to do low global oil prices
    - still show natural gas as primary fuel
    - wind expansion continues
    - solar becomes major player in all areas
  - Scenario comparisons
    - Total capacity by fuel type in 2029
      - Wind total times 8.7%
      - Solar total times 70%
    - Total capacity by technology type in 2029
      - Wind total times 8.7%
      - Solar total times 70%
  - Scenarios selected include current trends, stringent environmental, high economic growth, global recession, and one more TBD
  - All scenarios and results at bottom of presentation. If you have time, go through it and give us feedback on if we've selected the right scenarios to move forward with. We would appreciate it. We have a month (two at the latest) before we need to finalize that list.
  - Early this month we sent out the county level load levels for the year 2024 and 2029 for the current trends scenario. We encourage everyone to please review these load levels and provide feedback on whether the numbers are reasonable.
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- Q&A: At the last meeting, you talked about the cost estimate for combined cycle and Brattle had suggested 25% increase in price. Did you find out why when other prices were steady or dropping?
    - Still trying to communicate with Brattle to see what is the basis for that assumption.
  - Q&A: The capacity factor you're using for solar is 70%. I saw a recent report saying solar is not as high as people expected it to be, what is 70% based on?
    - We looked at a number of curves from URS from all counties in Texas, and we developed 13 regions where we could put utility-scale solar. If you look at those 13 curves and the time of our peak, you can see that solar output is trailing off at approximately 1700. So at that time of the day, on average, is about 70% of the peak of what we see at 2:00 or 3:00 in the afternoon.
  - Q&A: Is it tracking solar?
    - Yes, single access tracking.
  - Q&A: Most new generation did not connect to existing buses. This assumes that we will be limiting ourselves to 345 kV buses.
    - Sandeep: We received this as feedback. Made changes to siting process: higher priority given to generators which meet PG 6.9 requirements and generators with signed interconnection agreement, if we still need more capacity then we go on to 3<sup>rd</sup> bullet, which is to identify new sites based on favorable LMP and resource availability.
  - Q&A: High LMP buses: are you doing those based on 345 only?
    - Generation siting work in progress right now. For time being we are limiting to 345 and 138.
  - Comment: Suggest limiting to only 345.
  - Q&A: I have concern about limiting to 345. A lot of solar going in areas where there's no 345.
    - Really the bulk system is what's at interest when doing this analysis. Primarily focusing on 345 overloads, not really focused on lower systems.

## **2014 RTP Update—Sandeep Borkar**

- N-1 SCOPF reliability analysis complete
  - N-1 secure case and list of placeholder projects posted for review
  - Working on generator and transformer outage (G-1 + N-1 and X-1 + N-1) reliability analysis
  - Posted transmission equipment upgrades based on N-1 SCOPF
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- Q&A: When you do the G-1, how do you adjust the case for the next contingency? The Planning Guide says there will be system adjustments done.
    - We developed a tool to screen generators for G-1 + N-1 analysis. Because there are so many generators to check, our tool first screens in DC then verifies in AC for generators that are flagged in the DC screen. Then we run a full AC analysis on any generators verified in the AC screen. Essentially any generator that we're checking in detail has a full AC SCOPF with that generator already out.
  - Do you take into account any SPS or mitigation plans?
    - If we have any approved SPS or mitigation plans in the cases, they'll still trigger. If we see issues associated with any plans we haven't modeled, we can model the plans and run the cases again.
  - Q&A: Aren't we trying to retire SPS? Would you propose any new SPS?
    - We'll certainly look at that. When you get to the G-1 analysis, all options are on the table in that regard. We will consider things like remedial action plans, etc. For the most part, you don't want to plan your system like that but if it is a prior outage condition then that might be something that operations is willing to live with a plan like that on the shelf.
  - Q&A: Where is the final RTP input assumption and scope document?
    - ERCOT will take an action item to post it soon. The scope document has been floating around the RPG mailing list. However, it has been finalized for some time now.

Next meeting is scheduled for August 19, 2014.