

**Draft SATS Meeting Notes  
Trico Electric Cooperative, Inc. Offices  
December 14, 2007**

Attendees:

Charles Emerson, Trico  
Bruce Evans, SWTC  
Jim Rein, SWTC  
Don Adams, K.R. Saline & Associates  
Don Hudgins, APS  
EvaMarie King, SWTC  
Ken Bagley, SSVEC/Genesee  
Jim Charters, WSES  
Milt Percival, WSES  
David Bryan, SSVEC  
Mark Etherton, SunZia  
Bill Stein, Ft. Huachuca  
Karen Cathers, Trico  
Mike Gazda, APA  
Andy Meyer, TEP  
Tom Wray, Southwestern Power Group  
Ron Belval, TEP

Agenda Items:

1) Welcome and Introductions

Ron Belval welcomed everyone to Trico's offices and briefly discussed the meeting agenda. Agenda item #4, WAPA ROW Report & Options Update will not be covered since Western was unable to send a representative to the meeting.

2) Review/Approve 10/24/2007 & 11/20/2007 Meeting Notes

The October 24, 2007 meeting notes are approved with the exception of the last bullet on page 11, which SSVEC has asked to be re-written. Bruce Evans and David Bryan will work on the wording and resend to the group as final.

The November 20, 2007 meeting notes were approved with the following comments by Gary Trent of TEP:

Page 3 Add "TO-NL-EL-VL" under "2-345 kV lines through Tucson" of the first bullet under Strategy A-A of Slide 1: **Strategies Evaluated.**

Page 4 Under the fourth bullet of Slide 3: **Common 345 kV Projects** (Vail

Transformer Additions), change “1 transformer parallel to the existing transformers” to “1 transformer parallel to each of the existing transformers.”

Page 6 The second sentence of the first paragraph under Slide 14: **Interpretation of Strategy C-A Power Flow Study Results**, should be changed to read: “Gary replied that some overloads may be mitigated by load shed.”

### 3) SATS First Draft Report - Review

Ron handed out a new draft of the SATS Report to the group for discussion. A question was asked about Western’s efforts to conduct a study of the Southeast Study Region (SSR). No one was able to offer any information as to whether the study has been done or is in progress. It was noted that in a previous SATS meeting, Leonard York of Western had stated that this study will likely be called the South of Casa Grande Study.

A suggestion was made that future drafts of the SATS Report show a draft # or a version # on the first page. Comments to each section of the draft Report are noted below:

#### 1. **Introduction and Overview**

The spelling of Sulfur Springs Valley Electric Cooperative in the last paragraph of page 1 is incorrect. The correct spelling is Sulphur Springs Valley Electric Cooperative. Tucson Electric Power (TEP) should be added to the list of participants in the last paragraph of page 1.

#### 2. **Participating Organizations**

The wording for the Arizona Corporation Commission under Section 2.1, Participating Organizations, should be changed to not mention any oversight. There are entities within SATS that are not under the jurisdiction of the ACC. It was suggested that Prem Bahl of the ACC be asked to write something up for this section or simply grab something off of the website that succinctly explains who the ACC is. Jim Charters agreed to find some appropriate language to use.

Bill Stein was asked to work on language for Section 2.4 Fort Huachuca.

It was also suggested that a colon be placed after the name of each participating organization mentioned in sections 2.1 to 2.14.

EvaMarie King will work on Section 2.7 Southwest Transmission Cooperative.

Mark Etherton will expand Section 2.11 SunZia and add information about the Bowie Power Station as well. A suggestion was offered to change 2.11 to the Southwestern Power Group.

A suggestion of a Definitions Section was offered and accepted. Certain phrases such as “RAS” need to be defined. Ron Belval will work on this new Section.

It was also suggested that some of the write-ups of the participating organizations be shortened, such as the write-up that was submitted for EPE. This prompted a question as to whether EPE, PNM and other organizations that have not actively participated in SATS should be included. It was suggested that a single sheet of paper be sent to these entities to either “opt in” or “opt out,” taking FERC Order No. 890 into consideration. Ron agreed to develop the paper with these options.

Jim Charters and Milt Percival agreed to work on a section for their company, Western States Energy Solutions, and state that they represent the interest of Renewable Entities in the Desert Southwest.

### **3. Study Process**

Ron expressed a desire in the future, once a SATS meeting has concluded, to get the agenda for the next SATS meeting out as soon as possible. However, he felt that overall, the aims of FERC Order 890 are being met with regards to meeting notification.

It was suggested that care needs to be taken in the Report of what SATS is representing to the outside world. There needs to be consistency in stating the goals of the group as it regards transmission investment, etc. This comment came about as a result of the third sentence of the second paragraph under this Section on page 7 which states “Opportunities to defer transmission investment required to import remote resources. . .” Ron explained that the intent is not to defer transmission that is required, but instead to come up with a plan of strategies that will allow entities in the SATS area to meet load, according to the NERC/WECC reliability criteria. The addition of local renewables could possibly defer transmission. Suggested language of “Opportunities to maximize the regional value of transmission investment to import remote resources. . .” was offered. Ron will revise this paragraph.

Another suggestion was offered to write the Report looking at the overall SATS area, which could include local generation inside of the SATS footprint. The Report should also be written to be readable to someone who is unfamiliar with the area.

The group also discussed the need to include all study processes in the Report, such as the work that is going on in Cochise County. Ron noted that the Report reflects what has been done by TEP to date, but that SWTC, Trico and SSVEC need to add their perspective also, so that it can all be integrated into an overall SATS Report.

A question was raised about the language of the Report as it regards the formation of SATS. Page 2 notes that it was formed through an announcement at the SWAT Oversight Committee Meeting on October 18, 2006. The group felt that perhaps this should be enhanced with language that discusses that all meeting notices of SATS are

on the WestConnect website at [www.westconnect.com](http://www.westconnect.com) and are forwarded to all entities within the WestConnect footprint via the SWAT e-mail blaster. The reference to the WestConnect website should be noted in the first paragraph on page 3 of the Report. The group also felt that it should be noted that the coordination that is taking place within SATS was occurring before the implementation of FERC Order 890.

#### **4. Study Goals and Objectives**

A major goal is to have a 20-year transmission plan covering the entire SATS area. Both TEP and SWTC are looking out 20-years for the development of long range plans.

Another significant goal is that studies within the SATS area are conducted under a “one-system” approach. The studies are based on the reliability criteria of NERC and WECC. It was suggested that information be added to the Report of local reliability criteria being used which is more stringent than the NERC/WECC reliability criteria. As an example, TEP evaluates more stringent contingencies for possible inclusion into its Tie Open Load Shed (TOLS) scheme. Ron stated that he would add a reference to the TEP criteria in the Report.

Further discussion resulted in a suggestion that a section of the Report be devoted to a discussion of the internal planning criteria of the entities involved in SATS. Ron pointed out that there already a section (Section 6) devoted to criteria, to be addressed today. It will provide an opportunity for each entity to describe their criteria and whether it is more stringent than the NERC/WECC reliability criteria. Information regarding TEP local criteria is found on page 15 of the Report but it was suggested that there be an agreement amongst the group as to what criteria should be identified in the Report for the overall SATS footprint. The criteria section lays out the SATS study criteria a simply conducting N-1 analysis. This is followed by discussion and tables regarding the TEP local criteria. The SWTC local criteria may be added in this section in the next draft.

With regards to TEP’s load shed program, it was suggested that care be taken in the description of this program so as to not be able to be compared to the load shed that occurred in Cochise County in early October, during an outage. Ron noted that the TEP TOLS is a controlled load shed scheme designed to avoid local area black outs and to prevent outages from cascading beyond its local area.

Ron noted that Section 6.3 of the Report is where information can be added that local entities may have criteria that exceed the NERC/WECC reliability criteria. Ron stated that he would address the SATS-wide criteria, then add in TEP’s local criteria as Section 6.4, SWTC’s local criteria as 6.5, etc.

The next draft of the Report will only incorporate the comments that have been discussed today. Ron has imposed a deadline of mid-January to get the Report in a final draft form, but that date could slip.

## **7. Study Methodology and Assumptions**

The studies that have been performed for SATS began with the SWAT 2010 and 2016 cases. TEP also developed alternative Saturation Study cases. Brief mention was made of the ratings that were used in the power flow cases and of the 2016 SWAT case preliminary results. The concept of “committed” and “planned” projects was explained by Ron and is consistent with what is being used in the WestConnect Transmission Plan. Committed refers to those projects that have been approved as part of an annual or longer term capital budget. Planned are projects that are under consideration but not yet committed.

As a result of the Saturation Study, TEP determined that new substations that had not been previously been identified should be added to the power flow model. For instance, the 2018 case, which was developed from the saturation analysis identified 11 more substations than were previously included in the 2016 case. Ron pointed out that this finding is one of the major advantages of longer range transmission planning that extend well beyond the 10 year planning horizon.

It was suggested that wording be added to Section 7.5 that the 2018 case is consistent with the 20 year load forecast. It was also suggested that the Saturation Study be added as an appendix to the Report.

A question was raised about the SATS Transmission Interface diagram on page 12. Should it show which connections exist and which are potential? Ron stated that that was a good idea to which Mark suggested that the diagram be expanded to show Bowie inside of the bubble. Ron agreed to send the Visio drawing to Mark who agreed to add in the Bowie Project.

## **5. Study Scope and Schedule**

It was suggested that Figure 1 on page 10 showing the SATS Scope of Study Footprint should highlight Cochise County. However, Jim Rein pointed out that the City of Safford, Town of Thatcher, Graham County Electric Cooperative and Duncan Valley Electric Cooperative have all been modeled in the study cases, but that no detail is shown of these systems on the map.

Tom Wray suggested a diagram or a chart showing buss voltages that define where the study stops. Ron pointed out that the Transmission Interface drawing shows this and Tom replied that it would be helpful to show what is going on inside of the bubble. Ron suggested that this topic be broached later and Mark suggested that we note it is as being 69 kV and above. Ron replied that that is exactly what has been

done, but nothing has been shown that is below 138/115 kV. He reiterated again the need to look at this a little closer later on.

Ron suggested that system one lines to be discussed later in the report may meet Tom's needs.

## **6. Study Criteria**

A discussion of the NERC/WECC standards again brought out the need to develop the wording in this Section for the SATS-wide area and add local criteria. With regards to 10 and 20 year planning, RAS schemes or load shed schemes will not be considered for the SATS-wide area, but may be considered by the participants. Ron will change the wording that is currently in Section 6.2 accordingly. The group agreed that this statement should be put as early into the Report as possible.

## **7. Study Methodology and Assumptions (Again)**

Ron noted that the chart on page 15 is TEP's local criteria (N-0) or N-1 system adjusted. He will add additional comments to this.

TEP will be concentrating on the 2018 and 2028 cases in addition to the work on the Saturation Study case.

Ron asked if Section 7.8 should be in the body of the Report or in the Appendix? The group agreed that a thorough synopsis would be needed in the body of the Report, with a reference to the Appendices for detail. It was also suggested that the write-up of this Section consider security issues.

Tom suggested that Section 7.7 and 7.8 be deleted. The group agreed to delete it. However with the deletion of Section 7.8.4 a statement is to be added that study work detail will be included in the Appendix.

## **8. Saturation Load Study**

The write-up in this Section is specific to TEP only. It was suggested that additional sections be created to discuss the SWTC, Trico and other areas. David Bryan stated that he would provide some language of future consideration for a Saturation Study for Cochise County. Charlie Emerson agreed to provide language for the Saturation Study that was done for the Trico area.

A discussion of Figure 4: Scenario Example Influence Diagram on page 20 prompted questions of whether it should be described in more detail. Ron pointed out that beyond 10 years out, there are no external models or cases of developed generation scenarios that exist within WECC to adequately provide additional detail. He explained that the thinking within SATS was to include the Mega-Projects, which are under consideration, for imports of various types of generation. Some of these

projects will be in the SATS area, and so this is a reasonable facsimile of what could come into the system from potential renewable or other resources from the NW, SE, etc. The paragraph describing Figure 4 should state that transmission scenarios could be different, based on the generation resource.

Another suggestion to Figure 4 is to label it as being typical of a TEP strategy. Ron agreed to add additional language that explains the Figure and noted that scenarios means uncertainty – we don't know what it is exactly, so we make assumptions. The use of balanced resources was an assumption of what will come into the SATS area, that was agreed to in previous meetings. The group agreed to pursue NW and SE resources and this leads to the transmission strategies that have been currently identified.

TEP is evaluating alternatives including building EHV through the middle of Tucson along with other options, such as the Western 115 kV corridor within the SATS defined area. Each these strategies then leads to a corresponding HV strategy. Mike Gazda suggested that instead of what is depicted in Figure 4, a better diagram would be a flow-chart that shows what is being suggested. Mike agreed to meet with Ron off-line as to how this should be done.

It was suggested that the paragraph below the diagram discuss scenarios, strategies, etc – explaining the flow of the diagram and what the diagram is trying to represent. Ron stated that he will add verbage about the strategies in a new Section, i.e. move it out of Section 8 (Saturation Load Study) and move it into its own Section.

## **9. Load Forecast**

Ron noted that all entities provided their load forecasts and that Figure 5: SATS 20 Year Peak Demand Forecast on page 23, shows this. However, diversity was not taken into account in this Figure. Figure 6 on page 24 shows the effects of the TEP Peak Demand Forecast and Saturation Load for the Tucson area. This forecast is being updated and could be lower than what is presently shown in the Figure. A more detailed explanation of Figure 6 is needed and it was suggested that the paragraph on the bottom of page 23 be expanded and placed underneath the Figure, instead ahead of it, instead of having to turn the page to see the Figure.

## **10. Scenarios**

This Section was briefly discussed by Ron and he asked the group to send suggestions for improvements directly to him. He stated that he is thinking of adding in the map of the work that was done for the SWAT Project Zia, and also add in the High Plains Express and SunZia Projects. Mark suggested a paragraph of what SunZia can bring to the area. Jim Charters volunteered to get a map of the High Plains Express project to Ron to incorporate into the larger map. A question was raised as to how to show both projects graphically and it was suggested that the WestConnect Transmission

Plan might have a map that could be used. It was also suggested to emphasize the conceptual nature of the projects on the map.

No comments were received regarding Figure 7: SATS Scenario Import/Injection Locations.

## **11. Alternative Projects**

This Section is an inventory of all projects under consideration. It is a starting point for analysis of the transmission planning strategies. Ron encouraged SWTC to add in its projects to the inventory.

## **12. Western 115 kV Transmission Corridor**

This Section was briefly discussed. Considerable work needs to be done on this Section, with help from Western.

## **13. Long-Term SATS and Individual Transmission Provider Strategies**

This Section currently focuses on TEP's efforts to date but needs to consider others, such as SWTC, Cochise County, etc. It should also include maps from these entities.

All TEP strategies will include the 500 kV option as it will be needed for Saturation, and will be shown on the maps as 500 kV. The actual decision as to whether it will be constructed for 500 kV or 345 kV depends in large part on sponsorship of this project. Hence projects such as these are considered "planned" and therefore subject to revision.

Figure 11: TEP HV Strategy C N-1 Configuration is based, so far, on N-1. N-2 may show additional lines being needed. A general comment about the Figure is that it is hard to read and a suggestion was offered to put it in an Appendix in an 11 X 17 page format. Or, leave it in the text, and refer to the larger size in the Appendix or state that a larger size is available upon request.

SWTC was encouraged to provide the same map detail as TEP for their write-up of study results for the Report. Ron noted that all strategies will have corresponding 138 kV maps.

## **14) Inventory of Projects**

Brief mention was made of the need to populate this Section.

## **15) Findings from Power Flow Analyses**

More will be added to this Section, which will cover the kinds of things that have been previously discussed in the SATS meetings.

Andy Meyer discussed the TEP upgrades. For the 2010 analysis, TEP has planned, in 2009, a quad circuit with 138 kV and 115 kV for SWTC, out of Tortolita. This is a major upgrade to the NW part of the system, along with the SVC that is planned for 2008, for load-serving capability. Figure 13: TEP 2008-2012 Capital Projects for the Tucson Area, demonstrates the upgrades discussed in this Section. No additional upgrades for Saturation are shown.

For the 2016 analysis, the Pinal West to Pinal South and Pinal South to Tortolita Projects are introduced. The 2016 case has been set up, as a result of the Saturation Load Study, to build a revised 10-year 2018 planning horizon case.

The SWTC analysis is needed in this Section also, with the detail to be placed in the Appendix. Mark volunteered to provide similar language for this Section for Bowie and SunZia in the 2010 and 2016 time frames. However, Tom felt that this level of detail is not needed. He stated that all that is needed is to show a node of service at the EHV level and sum up the loads. In this regard, Mark noted that the CATS-HV Study focused on only those projects that would go before the ACC Line Siting Committee. Participants at a buss were noted, but there was no detail, such as 69 kV.

If this level of detail is not needed, then the Report could be made shorter than it presently is. It was suggested that a listing of the substations could be put onto one page.

While Andy felt that something should be said about the 2018 load analysis, Tom noted that he felt that anything after 10 years should be dropped out of the Report as the ACC is only focused on 10 years out. It is okay to discuss the 20 year analysis as part of the Saturation Load Study, but there should not be any detail provided.

With regards to the 2018 study, Andy suggested that SWTC needs to consider doing 2018 studies or simply incorporate the TEP 2018 Study. David suggested combining both the 2016 and 2018 analyses. EvaMarie replied that she will incorporate the latest 2007 Forecast that SWTC has received from its Members and look at 2018.

Andy noted that 75% and 50% of the Saturation Load Study were conveniently at the TEP 10 and 20 year forecasted load levels. TEP took the Saturation Load Study forecast at these levels and studied the impacts to the system. However, there was no strategizing on whether one particular area would grow faster than another; the loads were simply spread evenly throughout the system.

## 17) **Developing a Flexible Plan**

Figure 14: Example Decision Influence Diagram, references a possible TEP Strategy. SWTC will need to develop similar strategies for its section of the Report. The

Figure emphasizes factors such as cost, project sponsors, load growth, etc. It says that if the load growth is high, Strategy A is the way to go, but if load growth slows, then start off with Strategy B or C, with the ability to get to A if load growth increases.

The group wondered again if there is a need to go to this much detail. Some felt that the Report should just discuss the solution – the facts and best solution to the problem. Strategies are something that the public doesn't need to know. A question was raised, however, if this kind of thinking satisfies FERC Order 890? Some felt that a discussion of alternatives is good, as it shows the difficulty of getting to a solution. Then, it can be shown in the next Section what the preferred solution is.

There was considerable discussion amongst the group about this Figure and how it is important to TEP and for information to provide to TEP management, but it may not be pertinent to SATS.

Ron explained some of the issues that TEP has been grappling with. For example, if the Tortolita to North Loop 345 kV line is built, then it will be necessary to spend approximately \$27M to build the next segment of 345 kV all the way to East Loop. All options must be considered and cost estimates must be developed and a decision reached for each sequence. These initial sequences are common to all strategies. If the load growth increases, then a shift to Strategy A can be done. As an example, Figure 15: Sample Flexible Plan Decision Tree, on page 49, is what TEP must do by 2013.

The group agreed that TEP is the best entity to tell what is in their plan and that everyone involved in SATS needs to do this as well, for the purposes of the overall SATS Report. A question was raised as to who is our audience? Ron replied that the plan will go into the WestConnect Transmission Plan and will be presented to SWAT.

Ron noted that he will consider the things discussed today as he works on the next draft of the Report. It is his desire to get this next draft out prior to our next SATS meeting, which should be held on January 14<sup>th</sup>, or just prior to the next SWAT/WestConnect Meetings which are scheduled for January 16<sup>th</sup> and 17<sup>th</sup> in Las Vegas.

## **18. Conclusions and Recommendations**

Conclusions and recommendations are forthcoming.

## **19. 2008 SATS Study Plan**

It was suggested that more detail be added to this Section for future BTA needs, i.e. something needs to be said with regards to Renewables. Mention should be made that the post BTA work on Renewables will receive more attention.

## 5) Cochise County Study Update

David briefly reviewed with the group that 7-8 options have been studied and that these have been narrowed down to 2, along with some short-term solutions. The goal for the January 9<sup>th</sup> meeting is to flesh out the two options:

- 1) Pantano – Kartchner – San Rafael 230 kV
- 2) Sloan – Sierra Vista 230 kV

David noted that the cost of each option is about \$40M. He stated that the 2<sup>nd</sup> option, which provides 3 delivery points into the Sierra Vista is the better plan. A rebuild of the Pantano to Kartchner 115 kV line to 230 kV would have to be done next to the original line, as it cannot be taken out of service.

The study work is not complete on the 138/115 kV ties with TEP. However, these options are only viable for a short-term solution; a long-term solution is what is being sought for the area. Bill Stein from Fort Huachuca commented that something could be worked out for temporary and permanent solutions.

APS has talked of a 230 kV line from San Rafael to Mural, but that is beyond the current planning horizon. David felt that they would be best served in the short-term by current and future ties with SSVEC.

David also noted that SSVEC is currently working on back-up to the Fort over their 69 kV system.

## 6) Action Items

1. Bruce to get with David on acceptable wording in the October 24<sup>th</sup> meeting notes and send to the group as final, along with the November 20<sup>th</sup> meeting notes.
2. Participants who have not developed their company descriptions in the Report are to provide them to Ron. Existing company description are to be scrutinized for brevity and toned down, if needed.
3. Ron to develop a Definitions Section for the SATS Report.
4. Ron to develop an “Opt-In” or “Opt-Out” paper for entities that have not been directly participated in SATS.
5. Jim Charters and Milt Percival will work on a description for their company, Western States Energy Solutions, which will state representation of Renewables.
6. Ron to incorporate comments from today’s meeting into a new draft Report and send out to the group prior to the next meeting.
7. Ron to send the Visio drawing of the SATS Transmission Interface diagram to Mark Etherton so that the Bowie Project can be added.
8. Suggestions to Section 10 of the Report, on Scenarios, to be sent directly to Ron.
9. Jim Charters to get a map of the High Plains Express Project to Ron.
10. Ron will delete Figures 14 and 15.

7) Next Meeting Agenda

The next meeting agenda will be the same as today's agenda.

8) Next Steps/Meetings

The next meeting of the group will be on January 14<sup>th</sup>, at 9:30 a.m. A meeting location will be determined later.