# Approved Minutes from Webex Session on March 12, 2002

**To:** Working Group on System Design

**CC:** Dan Ward, Dan Sabin

**From:** Cheri Warren

**Date:** 3/12/02
**Re:** Minutes from the Working Group on System Design meeting held via Webex on 3/12/02

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30+ members and guests attended the meeting, which took place from 2 – 3 Eastern Standard Time.

The meeting was held to attempt to finalize the working group's thinking on the Major Event definition. Several members analyzed their data using the $3\sigma$, $3\beta$, and $2.5\beta$ methodologies. The group decided to use the beta methodology. The remaining question is whether to use 2.5 or 3 as the metric. Also, do we segment any events greater than $6\beta$?

Beta Methodology

This process is used to identify major event days (MEDs). Its purpose is to allow major events to be studied separately from normal operation, and to better reveal trends in normal operation that would be hidden by the large statistical effect of major events.

A major event day is a day in which daily SAIDI exceeds a threshold value $T_{MED}$.

In calculating daily SAIDI, interruption durations that extend into subsequent days accrue to the day on which the interruption occurs.

The major event day identification threshold value $T_{MED}$ is calculated at the end of each reporting period for use during the next reporting period as follows:

1. Collect values of daily SAIDI for five sequential years ending on the last day of the last complete reporting period is collected. If fewer than five years of historical data are available, use all of the available historical data.

2. If any day in the data set has a value of zero for SAIDI, replace it with the lowest non-zero SAIDI value in the data set. (This permits taking the logarithm of every day.)

3. Take the natural logarithm (ln) of each daily SAIDI value in the data set.

4. Find $\alpha$ (Alpha), the average of the logarithms (also known as the log-average) of the data set.

5. Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.

6. Compute the major event day threshold, $T_{MED}$, using the equation:

$$T_{MED} = e^{(\alpha+2.5\beta)} \qquad \text{(renumber eqns)}$$

Note that this value should in theory give, on average, x major event day every two years. In practice, higher numbers of major event days per year are seen.

7. Any day with daily SAIDI greater than the threshold value $T_{MED}$ that occurs during the subsequent reporting period is a major event day.

Once the threshold has been established, the major event days are removed and placed into a separate category. The remaining days are used to calculate the normalized reliability indices. Using this approach should smooth the trends and allow utilities and regulators to set goals.

Member Thoughts

Jim Bouford (james.bouford@us.ngrid.com) discussed the issues surrounding 3β vs. 2.5β. Jim used the data provided by members to test 2.5 vs. 3 beta and found that 3β does not provide enough segmentation to account for variations that smaller utilities might encounter. The 3β parameter seems to be a good segmentation value for large utilities, but not for smaller utilities and therefore Jim argues that the group should settle on 2.5β. The net result is that a few more days will be removed thus smoothing indices even more, but not significantly more. In theory, 2.5β will yield 2.5 MEDs per year while 3β will yield 0.5 MEDs per year. Long tails on the right can cause more days per year (i.e., due to severe weather).

We went around the electronic room and asked each member to comment on their findings after analyzing their own data.

Ken Lau – PGE – Approx 5 million customers served. Used the 3β method and predicted 28 MEDs. The method worked very well for them. Using the 10% of customers rule their SAIDI had jumped 40% last year. This method brings them back to"normal"

Dennis Hansen - PacifiCorp – Will provide data later.

John McDaniel – DTE – Checked both 2.5 and 3 beta. 3 beta provided the best answer for them while 2.5 beta seemed to identify too many. Not sure what newly calculated indices are after segmentation. Used a 5-year period.

Clay Doyle – EPE – agreed to provide additional data.

Joe Viglietta – Exelon PECO – Nine years of data. Checked both 2.5 and 3 beta. 3 beta predicted 3.6 MEDs per year while 2.5 beta predicted 7 days per year. He prefers 2.5β but thinks 3β is more likely to be accepted by senior management and regulators.

Dan Kowalewski – Exelon ComEd – 3.5 million customers served with 4 years of data. $3\beta$ provides an average of 4.5 days per year while $2.5\beta$ yields an average of 8.5 MEDs per year. Compared results of both methods with ICCs 10,000 customers over 3 hour rule and found $2.5\beta$ matched better. He is concerned about moving from 3 to 2.5 because he thinks it will be difficult to sell 2.5 to regulators. Why not 2.75 or some other number?

Jim Bouford – National Grid – 3 million customers with 7 years of data. Asked the group to plot SAIDI per Day with 60 days by 30 SAIDI per Day. This type of plot will show where operations get overwhelmed. He argues that if we don't go to 2.5, the small utilities will be harmed by the method because nothing will ever fall out.

Dave Gilmer – YVEA – Serves 20,000 customers. Will provide data that may help make the final decision.

Jim Cheney – APS – 5 years of data. With $3\beta$, 4 days are segmented and they find this method to be much better than $3\sigma$, however, they still have concerns about statistical methods.

Rodney Robinson & Gary Stout – Western Resources – Five years of data with a MAJOR ices storm. $2.5\beta$ method provides results close to their current method of determining major events. Using the $6\beta$ segmentation would not have removed the Major ice storm, but WR sees this storm as a 25-year storm.

The group agreed to review data provided by Dave Gilmer as our member with the smallest number of customers served before making a final decision. The group also agreed to put together a sales pitch for use with executives and regulators.

The WG plans to move to review of other fundamental definitions at the summer power meeting such as customer, step-restoration, cause, etc.