

**Working Group on System Design
2005 IEEE/PES General Meeting
June 14, 2005
Draft Minutes
San Francisco, California**

John McDaniel, Vice Chair of the working group, called the first part of the meeting to order on June 14th 2005. Afterwards introductions were made. There were 38 members and guest present.

Part II of the meeting on June 15th 2005

The meeting called to order at 8:00 AM by Cheri Warren. Introductions were then made. There were 44 members and guest present. Minutes from the Vegas meeting were reviewed and amended. There was a motion by Charles Perry with a second by Val Werner to accept the revised minutes. Motion passed.

Cheri then asked for volunteers to be the secretary of the WG. Rodney Robinson volunteered to become the secretary of the group. Thank you Rodney!

Action items are shown in **green highlight** in the text below.

Task Force on Interruption Reporting

Chair – Rodney Robinson led the meeting. [Rodney L. Robinson@wr.com](mailto:Rodney.L.Robinson@wr.com)

The meeting was then turned over Rodney Robinson, Co-chair of task force. Rodney then passed out a copy of the draft PAR for task force and then explained the focus of the task force. There are three white papers planned for the task force. The first has been accepted to be published and a draft of the second paper was passed around for discussion. The third paper is being planned. The three papers will be combined into a Guide. The purpose of the papers is to get the discussion going.

There was a discussion on draft PAR. Don Hall went over the background of the PAR. The draft is just an idea and is open for comments.

Rodney then opened the discussion on the second paper. This discussion was focused on high-level ideas. He asked that editorial comments be sent to him off line. The purpose of the paper is to get consistency in benchmarking. Rodney then went through the paper section by section. He went over a high level overview of the sections.

The sections of paper are: I. Intro, II. Manual Collection Systems, III. Fully Automated Outage Management System, IV. Implementation of Various Automated Systems and V. Trending and Benchmarking.

Rodney pointed out the fact that when fully automated OMS are put in that their reliability numbers went up. This has been pointed out before. Don then pointed out that with fully automated systems that all customers are accounted for. Richard Brown suggested that a section be added on "Process". Don suggested adding something on validation and step restoration.

A general discussion on the different OMS systems and on each utilities different validation methods followed. Each utility handles it different. Each has different methods, flags and time frames for reviewing their outage data. It was ask who has automatic checks in their systems. Cheri asked if these processes were documented, just in case commissions audit the utilities data. Also asked, was there an audit trail to see who changed the data. Add a section on audit trails to paper.

Different companies have different needs. One size does not fit all. Cheri pointed out with Sarbanes-Oxley that audits trails need to exist.

Rich Christie then discussed benchmarking. He mentioned the fact that most are still comparing apples to oranges. The implication is that even if the systems are the same, direct comparisons are difficult to make because there are other differences. Richard Brown stated the difference between accuracy and precision. With regulators, need to point these differences. There was a discussion on systematic versus random errors. Rich Christie then went on to explain these differences.

Cheri interrupted the conversation to bring up the PQ folks that are going to come in to discuss 1250. They want to put typical values into 1250. (Editorial note – this did not take place due to time constraints with the 1250 folks).

Trending is an internal year-to-year comparison. Benchmarking is a same year comparison of different utilities.

With benchmarking, the more uncertainty that is taking out of it, the better off we are. Charlie Williams asked if a section should be added about weather. It was pointed out that weather was part of the first paper. This paper is on what systems are used to collect the data. Weather trending to be placed in third paper.

Next papers topic: trending (or called something else). Rodney asked if there should be any mention of data usage. We should work on it despite ant fears that we have about it.

AMR's have been mandated in Philadelphia and the customers charged for them. It was pointed out that it should be up to the utility, not the commission that mandates AMR's use. Don Hall pointed out that AMR's are not all that accurate when reporting an outage.

Talked about the draft PAR. Went over the purpose. Rich Christie asked if the purpose would cover just collection or benchmarking (it covers all benchmarking). It was brought up that we need to add trending to PAR, unless it is subset of benchmarking. Amend scope and TF title. Need to expand beyond collection to add benchmarking.

What needs to be included in the next paper? System performance, Equipment failure analysis, Focused improvement, etc.

In the absence of a Guide, commissions will mandate what they want and there will be 50 different rules. At least a Guide will give the commissions a basis for thinking about comparison.

Action Item: Would like to get adjoining room with 1250 for the next meeting (which meeting up to debate).

Bob Saint then went over the RUS bulletin on outage reporting. This is a federal document. Those that want to borrow money from government must report their reliability data to receive the loan. The RUS bulletin is trying to conform with the documents from this TF. It will include a spreadsheet to be able to calculate MED's. The bulletin will be submitted to RUS by this fall. Document being written by engineers from Co-Ops and

then reviewed by RUS. It is public information. It is for consistent information and reporting. There are also some requirements with this reporting. Also there is a RUS survey on how the co-ops collect their data, which Bob will share with the TF.

Motion to adjourn by Don Hall, second by Betty Tobin. Motion passed.

Task Force on Reliability Indices

Chair Cheri Warren (Cheryl.warren@us.ngrid.com)

Regulatory updates: Joe V stated Pennsylvania is working on Maintenance and Inspection standards. The PUC put out an advance rule making notice for comments. Exelon-PECO replied that there was no need for the rule. Tree trimming around transmission lines has gotten more notice in the past few years. PECO's reply was that the proposed rules were complex.

Oklahoma utilities are required to set 5 year SAIDI and SAIFI goals. It was pointed out that there could be problems setting goals that far out.

Lee Welch stated that he has been getting request for SAIDI and SAIFI request on specific feeders. Need to point out that these are system wide goals and not good for local areas.

Rhode Island has accepted 1366 conditionally. It will be in conjunction with the current rules.

Massachusetts is going through a docket. The current definition is that 15% of customers must be out to be classified as a "MED". Nation GRID is hopeful to get 1366 included. There are new staffers that need to be educated.

New Hampshire is starting to look at reliability. They have mandated a rule to report on any device that has seen more than 2 interruptions in a quarter.

Roy Billington gave an update on CEA. They meet on an annual basis and had their workshop in April to review the most recent survey. Continuing to discuss MED's, but there is still some concern to this method. This is due to the results that are being seen. All interruptions will be reported with some form of major events being reported, but the method will vary by utility. Don't want "sanitized" data being reported, why all interruptions will be reported. This will help with the benchmarking. Everyone is worried about the regulators, in part due to the turnover in staff. Some changes will be made to the annual report, as it is evolving. Overall the workshop was a good one and the members of this working group are invited to attend the CEA workshop. Cheri invited Rodney and Val to talk with Roy on this. Jim Bouford encouraged the members to participate in the CEA survey.

Questions from Mark Thatcher, KCP&L. Ice storm from last January, which was classified as a MED. For the next few days still had tree limbs falling, but were just under the threshold. They were still working on the initial storm and had problems in getting to these new outages. The question was asked how to handle. Charlie Williams commented on FL's hurricanes. (Action Item: Cheri to insert Marks question - this was Q6). See minutes from Vegas meeting for details that were worked out with FPSC. Rodney stated that Westar called all the days' part of the storm until the outages were restored. Had to re-initialize the events on a feeder basis because trouble system could not handle the volume. Richard Brown asked if for post-MED days, should we plug average into the days into the carry-over days? Lee Taylor - Duke has lots of data and they call it edge days. They still include these days in their analysis. Management was told that they need to live

with it. Most utilities already have agreements with their commissions on how to handle this. Jim Bouford reminded the group on how this all started. It was because there was no good way to define a storm or an abnormal operating condition. We keep getting hung up on how to calculate and the intermediary days. MED's are meant to take out the extreme variability in the data. This is a common method to be used for benchmarking! Benchmarking is one thing and deals with a commission are separate. Cheri does not support going back a changing data and supported Jim's comments. 2 different things involved - residual days and OMS systems creating new cases based on new calls. Companies are going to have to deal with the data and make sure that the data is as accurate as possible. Rich C - when you take MED out, need to put an average day in to get an annual average reliability. Cheri then showed 1366 D7 which had this in it. This method is self-correcting. Everyone seems concerned with the raising of Tmed based on these catastrophic events. Nothing is perfect.

Lee Taylor gave a SEE update. They have a meeting in 2 weeks. They spent 2 days in the past talking about 1366 and MED's. They wanted to go to a statistical method. With 1366-2003, some of the members adopted MED. The PQ and Reliability committee's consensus was that MED was what they should be using. Take a period of time to move to reporting all of the data using 1366. This year is voluntary, but next year all of the members will use 1366. There could be some difficulty in reporting different numbers from this survey versus is reported to commissions.

Many utilities are worried about which quartile they are in instead of looking at what their trend has been. They should be looking at trending and which direction they are headed. They should be concerned on how the customer perceives their reliability. WE Energy started WE cares calls. Customer satisfaction was poor. All management employees must make five calls a week to those customers who called in an outage. This is a follow-up call to let the customer what the cause was and asked them if they have any concerns. WE Energy customer satisfaction has gone up, but they have had good weather the past few years. They have an effort to restore customers quicker. When the Trouble Men enter the data, they now have two people to check the data.

Cheri then gave a benchmarking update. She will be sending out the results after she gets back to the office. 1366 addresses only a part of the issue. In 2004, 78 of the utilities provided data, with 56 returning supporting details. Most have details down to the transformer. Used the same classification as last year, for Rural, Suburban and Urban along with Small, Medium and Large. A total of 53 million customers are represented in this survey. Over the span of the surveys, 105 total companies have participated. First quartile for SAIDI is lower this year. Both 1366 and all days are reported. Action Item: Cheri is to correct CAIDI IEEE/CAIDI all number (they were the same). The group liked the graphs with the regional colors. Val asked to break it out into large, medium and small.

Cheri asked if the group wanted to see other things and if to continue. Joe wanted to see the Tmeds for each region. Cheri stated the Tmed is keyed to each utility and vary from utility to utility. Comparing them provides no insight into performance. Charlie wanted to see the number of MED's, but that would make as much sense as the Tmed. X-Y scatter plot of value vs. Tmed? Any statistical method there is the average and standard deviation. The threshold depends on the SD. Look at a window of a few years; this is the reason for the trend charts. The chart with 2003/2004 is like the JD Power data, which looks at customer survey. There is usually a relationship between cost and reliability perception. Is customer satisfaction based on MAIFI or SAIDI? CEA sends out 2 reports, one private with company names the other public without names.

Issues with catastrophic days. Hydro Quebec uses the 4beta method to exclude those very extreme days. Georgia Power still supports 2.5beta. But some of the sister

companies have concerns when there are the 1 in 100 year events. The amount of Tmed is very significant. Seeing a fluctuation of a third in Tmeds. What should be used for the beta multiplier? 2.5 was picked, as it was the best for all utilities. Jim Bouford reminded the group of the history of why 2.5 was chosen. Based on about 20 - 30 utilities data. Data is nearly log-normal so was the method that was chosen. The Tmed can double, but it will only affect a few days per year. Stop focusing on Tmed and focus on what is the end affect on SAIDI IEEE. Charlie Williams stated that local managers bonuses are being based on what is happening in their area and a difference in Tmed will affect their bonus. Heidi has a statistical person working on their data and they have found 2 outliers and they had a 25% impact on Tmed. But what was the impact on IEEE SAIDI. It will all depend on how liberal that the utilities were with excluded days before 1366-2003. Even though Tmed is changing, it does not have an affect on IEEE SAIDI. Rich pointed out that most are looking at the threshold on a linear scale, but it should be looked at on the log scale, where it is calculated! The desire to remove the outliers seems reasonable, but the actual number of MED varies from the theoretical MED. How are 1 in 100 year events really identified? But in the end it really does not affect the results in the end.

Presentation by Cheong Siew of BC Hydro. They did a customer survey to see how satisfied they were. Part was on reliability and there were a few other parts. Showed their Asset management plan. Reliability is high on the list. Touch points varied by customer class. What part of reliability is important? Survey and results may be shared with the group. Third quartile in SAIFI, but cost is low and customers like their reliability. But PQ is ranked low. The question was asked about the duration of outages (was not much of a concern, on average). Looked at what the customer expectations were, by class. Showed their framework to meet the customer expectations at the lowest cost, which leads to their asset management approach. Duke Power has also done something similar and got similar results. Jim B was interested in the swap in the commercial customer class in concerns.

Update on T&D panel session. The papers will appear on the conference CD.

Jim Bouford on Incremental Averages. Utilities see a step jump when a new OMS is placed online. Show one of Nation GRID's SAIDI's. Both overall and average reliability were getting worse. Showed several different methods of calculating average and before 1999, all of the averages came together. After 1999 it appears that there is a different data set. You need at least 5 years of data before and 5 years after. Very easy to see visually. Had set rates based on pre-OMS. After showing the data analysis, rates were changed.

Heidi Casewel on PacificCorp's Use of Statistical Methods to Evaluate OMS Impact on Reliability Indices. Gave an overview of the company. Acquired by Scottish Power in 1999 and implemented an asset management model. They were also going to improve the reliability numbers. They also implemented a new OMS system. There was going to be a 20% improvement. Pre-merger the outages were paper based without any type of linkage with automated systems. After automated system there was a robust linkage of systems with lots more information. The reliability numbers changed quite a bit. Looking at working with 5-year time periods. Established a method for segregating unusual events and clarified the difference between segregation and exclusion. Compared underlying indices against the number of trouble calls. Also compared pre and post implementation history of normalized and total SAIDI. Last was to assemble yearly historical perspective and set the target.

Richard Brown on Survey on OMS Experience. Richard showed some results of a past survey. Based on one utility based on a question by their states Attorney General. Interviewed about 60% of the large utilities in the US. Looked at how the data from an event ended up in reliability numbers. State wanted an audit trail for each individual

outage and its data. Showed the classification for each of the questions asked. This paper was sent to the members of the WG.

Charles Perry on the Effect of Outage Management System Implementation on Reliability Indices. Based on the work that EPRI Solutions did for a utility that implemented a OMS system. Reliability Indices got worse after the OMS system went in. On average there is a 25% increase in SAIFI and SAIDI. Analyzed the possible impacts of the OMS implementation on the calculation of reliability indices. Showed both customer interruptions by day and customer calls by day. Used 1366 definition for MED. There was a 26% uplift for SAIFI and 53% for SAIDI. Next step is a transaction paper on the method.

With new OMS system, the data is more precise. In most cases the reliability numbers go up, but not always.

The T&D Prize Paper award was presented to Rich Christie, Mani Venkata and Nagaraj Balijepalli, for their paper on "Predicting Distribution System Performance Against Regulatory Reliability Standards". Rich Christie also received his certificate for work on the definition of MED's (Rich was one of eight that worked on the definition for MED, the other seven received their awards in January, 2004 at the winter technical meeting in Orlando).

Action item for Cheri - send a copy of all of the presentations to the group.

Discussion on definitions of: Customer, Planned Interruptions, and Step Restorations.

Customer was not meant to include billboards, street lights, etc.... Some count every meter as a customer, even if it was a billboard. It's a quagmire. Dave Gilmer does not want to mess with the current definition due to the fact that each state defines a customer differently. Need to count the customers the same in the numerator and the denominator.

Action item for Cheri to get AIEC presentation from Lee Taylor. What about master meter versus sub-meters, which gets counted.

Planned Interruptions: Utility versus customer-planned outage. Utility planned included in the indices but not a customer request. Planned scheduled versus unscheduled (or planned safe work). Planned usually includes a customer notification. Planned outages can be deferred. Do we need to add a notification clause to the definition? Cheri asked if any one tracked a planned outage for safety.

Step restoration will be discussed at the next meeting due to the lack of time.

It was pointed out that the definition for CEMI(n) may be incorrect. Should be \geq . Changes were incorporated into the next draft issue (equation and words).

Motion to adjourn was made by Rich Christie with second by Betty Tobin. Motion approved.

Task Force on Reliable Design

Chaired by Charles Perry (cperry@epriolutions.com)

Charles Perry talked about the panel session The Effects of Distribution System Design on Reliability that this group is sponsoring at the IEEE/PES T&D Conference. Charles listed the panelist and their topics. The panelists and their topics are:

Richard Brown – Reliability Versus Risk in Distribution System Design
John McDaniel – Lightning Protection of Distribution Lines
Charles Perry – Effect of Over Current Protection on Distribution System Reliability
Betty Tobin – Radial Systems
Charlie Williams – New Protection Schemes

Don Hall brought up what was stated at the Distribution Automation WG that this TF might be moved to DA. But as Reliable is in the name, it will stay in this working group. Action Item: Cheri is to discuss this with Dan Ward.

Charlie then went over his topic. It was on Progress Energy's use of electronic sectionalizers. Went over what needs to be done to coordinate the use of these. Set the CB up to act as a 2-2 recloser. This decreased the number of permanent faults on the system, most of which were due to lightning.

Charles then went over his (or Tom Short's) presentation. IT was on over current protection. From Shanghi, about 75-80% of faults were transients from 5 years of data (old McGraw-Edison/Cooper "data" was 80%). It was pointed out that they need to reduce what is in the presentation (it will take up too much time as is).

You need to cover things that are not in books. That way people will know whether or not to attend. IEEE wants panels that are geared towards newer engineers.

Charles will give a 5-minute overview of what this panel is to cover. Also to say how it fits into the overall scheme of things. This panel is just the first step into passing knowledge on. There is always something to learn.

Should we go beyond then panel and put together a tutorial. Will not be drafting a guide. Maybe we will write a Technical Document instead.

Motion to adjourn by Betty Tobin, second by Val Werner. Motion passed

Working Group on System Design

Cheri mentioned the letter that Dan Ward sent out about splitting T&D. The leadership of T&D will be at the Distribution SC to discuss this.

Cheri then made a plea to vote in the PES election. Participation is generally low and PES is trying to increase it.

Next meeting. There is a motion to go to a winter technical meeting. Also there is an opportunity to meet at T&D Conference. Need inexpensive locations for this winter meeting. This meeting will be as far from DistribuTech as possible.

Motion to adjourn was made by Charlie Williams, second by Don Hall. Motion carried.