IEEE Standard 1159
Recommended Practice on Monitoring
Electric Power Quality

Meeting Minutes
January 8, 2007

The meeting convened on January 8, 2007 in Orlando Florida at the Wyndham Orlando Resort. The meeting was held in the Salon A. room.

The meeting was attended by 17 persons. The meeting attendance is available.

The Chair, Randy Collins was unable to attend the meeting. In lieu of his attendance, Tim Unruh chaired the meeting.

The Clause Chairs are listed below:

Clause Chairs
Clause 1-3 – Randy Collins
Clause 4 – Eric Gunther
Clause 5 – Tom Gentile
Clause 6 – Rich Bingham
Clause 7 – Tim Unruh
Clause 8 – Russ Ehrlich
Annex B – Randy Collins

The chair provided a list of items to be addressed. These items are attached to these minutes.

The chair also provided a power point presentation that was reviewed at the beginning of the meeting. This presentation had the following content:

Section 1: IEEE Standards Patent Notification Information
Section 2: Information on registering to ballot the standard
Section 3: Document Status

The document stands at about 90% complete. It has been formatted for IEEE Standards review and has been sent for preliminary review. Each Clause chair is to review the document and address the items provided by the chair as deficiencies (see attached document). The Chair requests that all documents be sent to him by February 1, 2007 with all changes completed.

Section 4: Review of items to prepare for balloting

The following information was provided by the chair on the status of the document.

IEEE P1159 Items needed to be addressed 12/2006

Compiled by: Randy Collins, Chair P1159 Working Group

Draft 9 of IEEE P1159 is complete. The draft is nearly ready to go to ballot, but there are some lingering problems that need to be addressed. These are outlined by Clause number below. Each clause chair needs to confer with his/her clause committee and resolve these issues. The bulk of the problems are related to: (i) references and (ii) figures.

I have made numerous edits in the text, some grammatical/punctuation and some involving re-writes or additional sentences. Each Clause committee needs to read through their clause carefully to make sure that everything is ok and that any changes did not adversely affect their clause. The Clause Chair has the MS Word document. The changes can be found by using the track-changes feature.

When making corrections, I would like each Clause committee to supply a single document to me. This will make it much easier to compile the corrections than to have them come in piece-meal. Please highlight changes to make them easy to see. You can refer to line and page number, or with highlighting.

Please read through the entire document to make sure your clause coordinates well with the rest of the document. If you see any corrections that need to be made, please contact the Clause Chairs directly. They are:

Opening Sections, Clauses 1 – 3, Annexes: Randy Collins
Clause 4: Erich Gunther
Clause 5: Tom Gentile
Clause 6: Rich Bingham
Clause 7: Tim Unruh
Clause 8: Russ Ehrlich

The draft has gone to the IEEE for technical editing. The next hurdles to be dealt with are “Mandatory Editorial Coordination (MEC)” and Balloting. We cannot move forward with the MEC until all of the items listed below are dealt with. I would like to get these resolved within the next 30 days. We have been talking about the references for a long time. Please help us get this completed so we can move on to other more important things.

If you have not logged into the IEEE Standards Association website and gotten yourself on the list for balloting, please do so as soon as possible. If you are unsure, you should double check. Make sure you dig down to the point where you know that you will be asked to ballot the power quality standards, which includes 1159.

The specific comments on 1159 are listed in the pages to follow by Clause number.

Opening sections:

- List of participants needs to be updated. If anyone has any changes (additions or deletions), please let me know.
- The keywords were the chair's "best guess." Comments?

Clause 1:

The scope and purpose exactly match those of the PAR and cannot be changed.

Clause 2:

The normative references are those required to be available when using 1159. We need to keep these to a minimum if possible. The only one required by the IEEE is Std 100.

Clause 3:

This is an entirely revised section. The definitions may only contain those terms that we are defining in 1159. The terms must not exist in IEEE 100 or the definition we require is not one of those listed in IEEE 100.

In June 2006, our WG went through the list of terms and decided which ones we wanted to define (or clarify) ourselves and which ones had acceptable definitions in IEEE 100. The list in Clause 3 are those that we needed to define. Of particular interest is the discrepancy of time duration of "momentary" (3 seconds) versus that of IEEE 1250, which is used in IEEE 100 (2 seconds). We need to be ready to defend our position on that.

Some additional salient items:

- I think we need the terms "long duration variation" as well as "variation, long duration," etc. in the dictionary. Therefore, I have listed it both ways. You see instances in IEEE 100 where the two variants are entered and they have two different definitions. This should eliminate this possibility.

- Similarly, IEEE 100 has definitions for "momentary interruption" using our 2 second definition (based on IEEE 1346). However, there is no entry for "interruption, momentary" and so forth. I have entered those into the definitions to make sure IEEE 100 picks those up.

- I am not sure if we can have references in the definitions. This will be caught by the IEEE editors, I'm sure. In the meantime, the reference for "electromagnetic susceptibility" needs to be checked and provided.

- We decided to use the 519 definitions for some terms, such as "interharmonic" and "harmonic." Since the new 519 has not been balloted and thus it is not provided in IEEE 100, then we will need to define it. We wanted to define "harmonic (component)". There are two terms in IEEE

100 that are pertinent: "harmonic" and "harmonic components." I have chosen the definition from IEEE 100 that I believe most nearly fits our needs and have included both of these terms in the glossary. If they are not in agreement with the new 519 definition, then we can coordinate with 519 by placing the "new" 519 definition in our Clause 3. If so, someone needs to provide that text to me.

Please see the Glossary comments for related issues.

Clause 4:

It appears that we can use sequential table numbering (1, 2, 3, …) or table numbering by section for "long documents" (4-1, 4-2, etc.). I will take the position that this is a long document and keep our table numbering as it was in the original 1159. That will help avoid confusion with the new release.

I see an error on line 19, page 4 where the word "chapter" has been used. I thought I did a global "find and replace" but I must have missed this one. Please check for similar errors.

All references in this clause need to be checked, updated, and provided. I have left them as originally provided (B1, B2, etc.). Please update these.

In Table 4-2, the column marked "Notes on Current" is potentially confusing to readers. Can you explain what you mean by that in the text. Terms such as "B2B" should be spelled out too.

On page 8, section 4.4.1, the comments related to Std 100-1984 need to be updated. Please check against the current version of IEEE 100 and update as necessary.

Figure 4-1 needs minor editing. The word "current" is clipped on the vertical axis and the units on the time axis are clipped.

Figure 4-3 needs the comment at the upper right corner edited or removed. The text rolls out of the text box into the ether.

See the comment at the bottom of page 11, lines 36-37 and address (mentioned previously).

See note on page 13, lines 19-21, and repair.

See note on page 14, lines 29-31 and address.

See note on page 15, line 20 and address.

See note on page 16, line 13 and address.

Page 16, section 4.4.4. Do we want to use the word imbalance here? Note also a definition issue here. Are we defining imbalance as the ratio of the negative to zero sequence only? We state that it is the "ratio of the negative or zero sequence component to the positive sequence component". Aren't those different numbers in general? Which is the correct answer? Shouldn't we just say neg/pos only? Or make some sort of clarifying statement? The IEEE 100 definition uses the statement "ratio of the negative or zero sequence component to the positive sequence component". If we are only going to use neg/pos, then we'll need to make this a definition and move it to Clause 3.

Which word do we want to use, unbalance or imbalance, throughout the document? I think we should use "imbalance" even though the use of the term "unbalance" is prevalent in the industry.

Figure 4-10 needs some help. Do we need the titles "PWMASD45…" and "DERIVED>VSRCA…" at the tops? How about text boxes with Max/Min/Average…? Should the text box "ASD Input Current" be removed? Can someone supply an edited version?

See comment on Page 20, line 13.

Check line 17, page 21. Does line 21 need to be changed to 1453 or 61000-4-3?

Clause 5:

Please locate all references and provide the correct/updated information.

Check line 48, page 27 and edit if appropriate.

Check lines 12-13, page 28.

Clause 6:

See the comment on Figure 6-1. Is this model well known or do we have a reference for it? Could we just eliminate the model? Is it needed?

See the comment on page 30, line 20, and address.

See the comment on page 31, lines 19-21. This applies to Figs. 6-1, 6-2, and 6-3. The comment is repeated on the Figure 6-2 and 6-3 captions.

See the comment on Page 32, lines 18-19, related to Table 6-1. Address these. Should this un-lined table be formatted differently?

Note that Table 6-1 has zero and neg over positive definitions for unbalance. We need to ensure consistency with Clause 4 and the definitions (Clause 3 and/or Glossary).

Address comments on Page 35, lines 2, 5-6, 45-46, 52.

Clause 7:

Address the comments on Page 42, lines 1 – 4, related to Figure 7-1.

Address comment on Page 44, lines 14-15 and line 38.

Page 45, lines 14 and 15. We need to make sure this is consistent with the status of 519 and its revision. Also, we need the reference for 519.1.

Table 7-1, page 45. Is the table format ok to you? Do the entries need centering?

Address comment on page 46, line 9.

See comment on page 47, lines 10-11.

Address comment on page 48, line 42.

We need references for lines 4-7, page 52.

Page 52, lines 18-19 need to be addressed.

Address the comment on line 36, page 52.

Review Table 7-2, page 53. Check references. Do you have a reference for the statements such as “voltage imbalance greater than 2% can affect equipment”?

Page 55, section 7.4.7.4. Are these the most recent are relevant references? Can you supply the precise reference information? See the comment on line 43.

Clause 8:

Check references throughout and supply updates.

Figure 8-1 needs some help. See the comments on Page 59. The plots look better on the screen than when printed for some reason, inspite of using a high-res printer. The axes need some labels. Please revise.

Address the comment on the caption to Figure 8-2, Page 60, line 4.

Address the comments on Figure 8-3, page 60 and 61. (The comment in on Page 61, line 1.) This figure needs some real help.

Double check the section reference of Table 8-2.

Figure 8-4, page 64 is ugly. Do you have a better graphic? Again, this looks better on the screen than when printed.

See reference comment on Line 34, page 64.

Figure 8-5 was supplied by me (Collins). I can get one that has an inverted color scheme.

See comments on page 66, lines 14-17.

Address comments on Page 67, lines 6 and 10.

Figure 8-6 needs some attention. Please do something with it.

Figure 8-7 on Page 68 needs labels on the axes.

See highlight on line 35, page 69. Do we need to specify what we mean by "zero axis"?

Page 71, lines 18 – 21. Should we show sample answers to these questions (and resolutions)?

There is a typo on page 72, line 13 that needs to be fixed.

Annex A, Bibliography:

In the original 1159, we supplied a bibliography of supplemental reference material. This is not required. So, should we supply a similar reference list this time, or will the actual references suffice? My personal (RC) feeling is that we do not include supplemental references; the only references should be those specifically referenced in the text of the Standard. Supplemental references have a way of becoming dated and superseded, and open the standard up to look out-of-date. Comments anyone?

Each Clause Chair is responsible for providing a list of references, properly formatted (see the IEEE Standard Style Manual for details), to me as soon as possible. Please make sure that your references are organized so that I can easily put them in the proper numerical and sequential order without getting anything mixed up.

The style manual is available at: http://standards.ieee.org/guides/style/

Annex B, Calibration and Self-Testing:

This annex is cut-and-paste from the original 1159. I have read through it a couple of times and it appears to be ok as is. Please read through and let me know if you have any suggestions.

Look at the references to ANSI C84.1 and make sure they are correct. Ditto Mil-Spec 45662B. I am not familiar with that one.

Annex C, Glossary:

The glossary contains terms that have been defined previously by other standards and are in IEEE 100. We are using the most current version of IEEE 100 (7^{th} edition), dated 2000. This glossary contains terms that we desired to be placed in the standard which have a definition that we agree with. The formatting of this section is possibly incorrect, but I'll let the IEEE editors tell me what we need to do formatting-wise. Note that many of these terms have multiple definitions. I have listed only the definition that we agreed matches our use in 1159. Additionally, the IEEE 100 often adds words in parentheses which denote the context in which the term being defined was used. In some cases, the context does not match our context, but the definition is ok. I included the parenthetical context to be consistent with its depiction in IEEE 100.

Please have a look at these. You will also want to use this list in conjunction with definitions in Clause 3. If there are any that you disagree with, please let me know. If you think any are missing, please let me know that too. I have a current copy of IEEE 100, but it is unfortunately hardbound (the IEEE does not have an electronic copy as of Fall 2006). I can look up alternatives for you if necessary. We need to coordinate this carefully with IEEE 519 to make sure we are in agreement with their upcoming new standard.

Here are some salient points to consider:

- The term "electromagnetic" is not in IEEE 100. The terms "electromagnetic compatibility" is, therefore this is the one that I used.
- I added the first definition (1) to "electromagnetic disturbance" since I thought it was applicable to 1159.

- The term “harmonic (component)” is not in IEEE 100. The terms “harmonic” and “harmonic components” are. I have placed both of those in the glossary and removed the term “harmonic (component)”.
- IEEE 1346 has provided definitions for “momentary interruption”, “sustained interruption”, and “temporary interruption” in IEEE 100. The time intervals match those of 1159. However, IEEE 100 has a definition for the term “interruption” that is based on the 1250 standard. The definition lists four time intervals: instantaneous, momentary, temporary, and sustained. I suggest that we list individually the following: “interruption, momentary”, “interruption, sustained”, and “interruption, temporary” and define each of them. I have done that in Clause 3. The definition would exactly match those of “momentary interruption”, “sustained interruption”, and “temporary interruption” already in IEEE 100. That way we don’t have a direct conflict with the definition of “interruption” in IEEE 100 (since we are not defining that term without a modifier) but our definitions appear in IEEE 100 beside the existing definition for the interested reader to see.
- We had defined the term “isolated ground.” IEEE 100 actually uses the term “isolated equipment ground” and that is what I have used. The term “isolated ground” does not exist in IEEE 100.
- The term “voltage imbalance (unbalance)” needs to be addressed globally in the standard. Our WG agreed to use the IEC definition, which is the one used in IEEE 100. However, I think this is problematic since it states that it is the neg/pos *or* zero/pos sequence. Well, which is it? Obviously, these are different and both give valuable information, but they are not the same number. Therefore, instrument and software developers could use either or both. Should we provide guidance? Should we use only one of these? If so, then we’ll be creating a new definition and we would need to put this in Clause 3. Should we use a modifier of some sort to distinguish which ratio is being used? How is this done in practice?