The meeting of the P1547.7 working group was called to order by Robert (Bob) Saint, chair P1547.7 (Annex A – Attendees). The agenda (Annex B) for the two-day meeting was presented and the IEEE SA bylaws on patents in standards and other guidelines were reviewed and discussed (see PDF 311 KB at URL http://grouper.ieee.org/groups/scc21/1547.7/1547.7_archives.html). The statuses of other 1547 series working groups were discussed, as was the status of a potential new standard - IEEE Std 1547.8. IEEE Std 1547.8 is envisioned to be a recommended practice of enhancements to IEEE Std 1547 and could address DR technologies greater than 10 MVA, allow for voltage regulation, address high penetration and take into consideration issues identified by IEEE Std P2030.

The group then discussed issues such as PV applications interconnected by using a 110 volt outlet, vehicle-to-grid applications, storage, and high penetration of DR, and how these applications could impact IEEE Std 1547.7 and IEEE Std 1547.8.

The working group then reviewed the scope and purpose of P1547.7. Bob Saint focused attention on the following excerpts of the scope and purpose.

This guide describes criteria, scope, and extent for engineering studies …

Distribution system impact study scope and extent are described as:
- functions of identifiable characteristics of the distributed resource,
- functions the area electric power system, and
- functions the interconnection.

Criteria are described for determining the necessity of impact mitigation.

Establishment of this guide allows … a described methodology for:
- when distribution system impact studies are appropriate,
- what data is required,
- how they are performed, and
- how the study results are evaluated.

The intended audience and limitations clauses were then reviewed and modified. The group discussed that the limitations clause will need to be reviewed and updated throughout the development process for the guide.

The group then reviewed and updated the IEEE Std 1547.7 outline. As part of this process, the group brainstormed all of the technical issues that arise during an interconnection and which study categories these issues are addressed by. The group also brainstormed all of the DR operating...
modes/configurations and study types. All of these formed the basis for a new outline that was developed. (see Annex C).

On February 5, the outline was further refined, and volunteer assignments were made to address various clauses via small writing groups that will meet via webcasts. (assignments and schedule are shown below).

**Assignments**
Clause 5. Assessment Methodology [Siira, Stec]

Clause 6. Data Requirements [existing group, wait to get started until later]

Clause 7. Operating and Configuration Issues [Gajda, Cleary, Sun, Sheehan]

Clause 8. Preliminary Review [Sheaffer]

Clause 9. Routine Distribution Studies [*Morton, Gajda, Stec, Hambrick, Lemke, Sun, Gauthier, Tolentino]

Clause 10. Special System Impact Studies [*Faruque, McDermott, Arritt, Morton, Hambrick, Saint, Katirael]

**Schedule**
First writing group webcasts to develop plan on how to proceed

Clause 5 writing group (WG) On own – 2 members
Clause 7 WG Feb 24, 11:00 EST
Clause 8 On own
Clause 9 WG Feb 25, 11:00 EST
Clause 10 WG Feb 22, 11:00 EST

New draft of these clauses WGs Apr 30
Post clauses for review Apr 30

Comments due on clauses May 28

New draft of these clauses WGs Jun 25

Integration of new clauses into draft 4 Sheaffer Jul 2
Post draft 4 for review Jul 2

Comments due on draft 4 Aug 2

Next full working group meeting Aug 12/13 (tentative)

Please send your inputs in a separate word file to:
We would appreciate if you can provide as complete text and figures as possible so we may easily drop them into the next version. However, please include “considerations,” e.g., bulleted items if you don’t fully complete your inputs as detailed as you would have liked to. Contributors are responsible for providing copyright release as applicable, and full citation when submitting documents, references, or Web links.

There are a number of clauses without information or a writing volunteer – if you would like to submit information for one of these clauses, please send a note to the listserv and submit the information per the instructions above.

Some of the documents requested at the meeting can be found on the IEEE website for 1547.7 under 1547.7 WG Special Topics (password protected):

http://grouper.ieee.org/groups/scc21/1547.7/private/special_topics.html

The next P1547.7 meeting is tentatively scheduled for August 12-13, 2010 in the Denver, Colorado area.

Respectfully submitted,

Bob Saint, P1547.7 chair, and Tom Basso, P1547.7 secretary

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Annex A – Attendees  
P1547.7 Working Group Meeting, February 4-5, 2010 – Las Vegas, Nevada

<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Institution</th>
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<tbody>
<tr>
<td>Arritt, Robert</td>
<td>EPRI</td>
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<tr>
<td>Bassett, David</td>
<td>PPL Electric Utilities</td>
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<td>Basso, Thomas</td>
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<td>Beach, David</td>
<td>Portland General Electric</td>
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<td>Cleary, James</td>
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<td>Daley, James M.</td>
<td>Facilities Electrical Consulting Services</td>
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<td>Farmer, David</td>
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<td>Faruque, Md Omar</td>
<td>Florida State University</td>
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<td>Gajda, John</td>
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<td>Grant, Angela</td>
<td>Senior Engineer, Georgia Power</td>
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<td>Morton, B. Zinn</td>
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<td>Raborn, Bruce</td>
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<td>Rajda, Janos</td>
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<td>Siira, Mark</td>
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<td>PG&amp;E</td>
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<td>Tom McDermott</td>
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<td>Zgonena, Tim</td>
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Annex B – Agenda
P1547.7 Working Group Meeting, February 4-5, 2010 – Las Vegas, Nevada

Thursday, February 4, 2010 (8 AM – 5 PM)

8:00 AM       8:30 AM       Check-in and registration
8:30 AM       8:45 AM       Opening of meeting
  • Welcoming of attendees
  • Housekeeping issues
  • Review of IEEE required meeting statements
8:45 PM       9:00 AM       Review of agenda, changes if needed, and motion to approve;
                        Review and approve last meeting minutes
9:00 AM       9:15 AM       Summary presentation of IEEE P1547.7 draft 3 outline
9:15 AM       10:00 AM      Review draft of clauses 7, 8 and 9
10:00 AM      10:20 AM      Break - refreshments
10:20 AM      12:00 Noon    Continue review of clauses 7, 8 and 9
12:00 Noon    1:15 PM       Lunch on your own
1:15 PM       3:00 PM       Complete review of clauses 7, 8 and 9
3:00 PM       3:15 PM       Refreshments
3:15 PM       5:00 PM       Review of clauses 5 and 6.

Friday, February 5, 2010 (8 AM – 3:00 PM)

8:00 AM       8:30 AM       Check-in and registration
8:30 AM       9:45 AM       Gap analysis – review of incomplete sections and assignments
9:45 AM       10:00 AM      Break - refreshments
10:00 AM      12:00 Noon    Gap analysis – review of incomplete sections and assignments
12:00 Noon    1:15 PM       Lunch on your own
1:15 PM       2:30 PM       Gap analysis – review of incomplete sections and assignments
2:30 PM       3:00 PM       Summary of meeting and volunteer assignments; adjournment
1. Overview

1.1 Scope

1.2 Purpose

1.3 Intended Audience

1.4 Limitations

1.5 Document Structure

2. References

3. Definitions, acronyms and abbreviations

3.1 Definitions

3.2 Acronyms and abbreviations

4. General Considerations

4.1 Potential System Impacts of DR

4.1.1 General System Impacts

4.1.2 Penetration Concerns

4.2 Classes of impact studies

4.3 Classes of tools for studying impacts [should address model accuracy]

4.4 Reliability Perspectives Related to EPS and DR

4.5 DR owner perspective [maybe add something about study of customer's power system from the addition of the new DR]
5. Assessment Methodology (Description of assessment Strategy) [brings in the old 5, 6, and 9] [*Mark Siira and Wayne Stec]

5.1 Assessment Sequence

5.2 Assessment Information

5.3 Preliminary Review

5.4 Routine Distribution Study

5.5 Special System Impact Study

6. Data Requirements [*old group, wait to get started until later]

[Intro-short discussion on data needs; models; etc.]

6.1 Proposed distributed resource

6.1.1 Technical characteristics

6.1.2 Operational characteristics

6.2 Existing and planned area EPS

6.2.1 Technical characteristics

6.2.1.x Effect of Other DR (previously integrated DR)

6.2.2 Operational characteristics

6.2.2.x Effect of Other DR (previously integrated DR)

6.3 Proposed interconnection equipment and system integration

6.3.1 Technical characteristics

6.3.2 Operational characteristics

6.4 Specialty Studies

6.5 General considerations

6.5.1 Other DR (DR currently under review, anticipated DR)

6.5.2 Non-DR changes are made to the area EPS and this requires a new impact study on the existing DR
6.5.3 Assure future planning of the distribution system incorporates existing DR

7. Operating and Configuration Issues [check EEI 29 issues to make sure they are here] [*Gajda, Cleary, Sun, Sheehan]

7.1 DR Issues

- Slow controls
- Variable power
- Operating mode of DR - customer export, peak shaving, etc.
- DR - single phase vs. three phase
- Transformer connection type
- Dispatchable [need to define] or controllable 7.3.1.5
- Power generation technology at the PCC
- Type of transition - closed greater than 100 ms
- Energy storage

7.2 Area EPS Issues

- Communication infrastructure
- Weak versus strong system - fault current and stiffness
- Number and type of existing customers on circuit
- Large existing loads - large motors

8. Preliminary Review [*Sheaffer]

8.1 Tools

- System/site overview (area EPS)
- Application for DR interconnection review
- DR characterization
- Screens
- Supplemental review

8.2 Technical Issues

- Existing DR location and size
- Interconnection type
- Safety - unintentional energization of lines
- Shared secondaries

9. Routine Distribution Studies  [*Morton, Gajda, Stec, Hambrick, Lemke, Sun, Gauthier, Tolentino]
9.1 Tools

Stead state power flow 7.1.1, 7.2.1, 7.3.1, 7.3.1.1
Short circuit 7.1.2
Protective coordination 7.2.2, 7.3.2, 7.3.2.3, 7.3.2.4, 7.3.2.5, 7.3.2.6,

9.2 Technical Issues

Circuit reclosing coordination {short}
Fault detection and sensitivity {short}
Ground fault current
Equipment ratings - continuous and interrupting
Operational characteristics – loading, load shedding, etc. 7.3.1.4
Over-current protective settings for DR
Over-current protective settings for the EPS
Reverse power flow
Short circuit level with DR
Voltage imbalance 7.3.1.3
Voltage regulation - primary and secondary 7.3.1.2

10. Special System Impact Studies [*Faruque, McDermott, Arritt, Morton, Hambrick, Saint, Katirael (Quanta)]

10.1 Tools

Reliability 7.2.3.6
Dynamic 7.1.4, 7.2.4.2
Transient (sub-cycle) 7.1.5, 7.2.4.3, 7.3.1.6, 7.3.3.7
Harmonic 7.1.3, 7.2.3.1, 7.3.3.1

10.2 Technical Issues

Adequate DR model
Adequate EPS model
DC Injection 7.3.3.2
Ferroresonance 7.2.3.3, 7.3.3.3,
Flicker 7.2.3.4, 7.3.3.4
Harmonics load flow
Harmonics resonance
Interaction of different types of DR
Low/high frequency operation
Reliability indices 7.3.3.6
Temporary over-voltage 7.3.2.2
Transient angle stability
Transient issues from old-style inverters
11. Using the results of impact studies

11.1 Mitigation of system protection concerns

11.2 Mitigation of steady-state performance concerns

11.3 Mitigation of power quality concerns

11.4 Mitigation of system stability concerns