

IEEE PES HVDC & FACTS SUBCOMMITTEE MEETING

2007 IEEE PES Joint Technical Committee Meeting

Minutes of Meeting

10 January 2007, Orlando

IEEE PES HVDC AND FACTS SUBCOMMITTEE
2007 IEEE PES JOINT TECHNICAL COMMITTEE MEETING

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**IEEE PES HVDC AND FACTS SUBCOMMITTEE
2007 IEEE PES JOINT TECHNICAL COMMITTEE MEETING**

1 MEETING INFORMATION

Time: 8:30AM-12:00PM, Wednesday January 10, 2007
Location: 2007 IEEE PES Joint Technical Committee Meeting
Wyndham Hotel
Orlando, Florida, USA

2 WELCOME AND ANNOUNCEMENTS

Ben Mehraban, Chair, distributed the meeting agenda and welcomed everyone to the meeting.

The next meeting is scheduled for June 27, 2007 in Tampa, Florida.

3 INTRODUCTIONS

The attendees at the HVDC & FACTS Subcommittee meeting made introductions, and the sign-in sheet was sent around. The list of attendees is provided in Appendix A.

4 JUNE 21, 2006 MEETING MINUTES

It was suggested that the approval of the June 21, 2006 meeting minutes, which were disbursed prior to the January 10, 2007 meeting, be deferred to the 2007 Summer meeting in Tampa.

4.1 Business Arising from the Minutes

Deferred.

4.2 Approval of the Minutes

Deferred.

5 SUB-COMMITTEE GENERAL BUSINESS

5.1 HVDC & FACTS Website Update

Brian Johnson provided an update on our subcommittee website.

Brian requested the following information:

- WG Chairs to provide the scope and other relevant information for each of their Working Groups.
- The WG Chairs are also to indicate if any of the documents are to be password protected.

The IEEE PES HVDC & FACTS Subcommittee data has been posted at the following address temporarily: <http://www.ece.uidaho.edu/hvdcfacts/>

The website will be posted to the “proper” location prior to the Summer 2007 meeting

The Summer 2006 and Winter 2007 meeting minutes will be posted as “draft” until the minutes are approved at the Summer 2007 meeting.

Kudos to Brian!

5.2 Status of WG 15.03.13 Transmission System Application Requirements for FACTS Controllers Document

This document was lost by the IEEE for almost 2 months, and is now being printed. Hopefully the document will be available at the Summer 2007 meeting in Tampa.

Action: Ben to confirm if this is a T&D or PES publication.

6 WORKING GROUP REPORTS

6.1 WG 15.05.02 - Dynamic Performance and Modelling of HVDC Systems and Power Electronics for Transmission Systems

The working group met on Monday, January 8, 2007 at 1:30 PM in Orlando, Florida at the IEEE Joint Technical Committee Meeting. Dr. Ram Adapa chaired the meeting. There were 8 persons in attendance.

Status of Position Papers

EMTP-type Models for Conventional DC Systems. It was resolved to solicit contributors of this paper.

EMTP-type Models for FACTS (not including VSC-Voltage Source Converter based) paper is complete. IEEE accepted this position paper and it was published in the IEEE Transactions. This WG received the T&D best WG paper Award for this work.

EMTP-type Models for VSC based FACTS: work in progress. Mariesa Crow is preparing the draft. Others were requested to provide contributions to this document. Topics shall include multilevel converter models, STATCOM, SSSC, UPFC, and IPFC.

The EMTP-Type Models for VSC based DC Transmission paper is near completion. Dennis Woodford's latest (near-final) draft was to be circulated for comments by the WG membership.

A new position paper on Models Related to Inclusion of Wind Generation in Power Networks was discussed. The principal focus is on the power electronics circuits and controls. Dennis Woodford, Gene Wolf and Brian Johnson will take the lead on this. Peter Lehn has also agreed to provide contributions to this document. There was a discussion about any other IEEE Committees / WGs developing these types of models. It was also suggested that we invite manufacturers of wind generation such as GE Wind to make a technical presentation to this group. Some work was done by Bjonne Anderson for CIGRE. Doubly-fed induction machines need to be considered.

Steady State Comparison without FACTS was also discussed. Preliminary comparison of small signal and EMTP type models including small signal stability. A technical paper was submitted by the University of Manitoba to IEEE T&D Conference, May 2006 and was accepted. It is decided to write a WG paper on this Test System with more contributions from various WG members. Mariesa Crow will work on simulation of SSSC using this test system. Brian Johnson will work on TCSC simulations using this test system. University of Manitoba will provide the test system data to other WG members who are interested in performing simulations using this test system. The action arising from this discussion is to write an IEEE paper based on this test system and publish it as an IEEE Benchmark Test System.

6.2 WG 15.05.08 - HVDC and FACTS Economics and Operating Strategies

This working group did not meet in Orlando as the Chair, Mark Reynolds was unable to attend.

6.3 WG 15.05.14 - HVDC and FACTS Devices Education

This working group met on Tuesday, chaired by Brian Johnson, with 8 members and guests in attendance. The following items were discussed:

- Report on HVDC Systems Solutions panel session at the 2006 PSCE meeting in Atlanta.
 1. Three presentations over a 3 hour block
 - a. Mike Bahrman (ABB)—overview of HVDC technologies
 - b. Wayne Litzenberger (then of BPA)—brief history of the Pacific HVDC Intertie.
 - c. Mike Henderson (ISO-NE)—Planning issues for HVDC systems

2. Approximately 40-45 people in attendance.
 3. The session may have needed more of a basic introduction to HVDC, but the audience seemed happy with the session. There seemed to be a wide mix in their background knowledge in HVDC.
- Bill Long also put a special section of the IEEE Power and Energy Magazine (March/April issue) on HVDC transmission. Three of the papers were based on the panel presentations plus an introductory article and an article on 800kV HVDC transmission.
 - Brian was contacted by a representative of IEEE Press about working with the panelists to write a book. Everyone in attendance encouraging pursuing this since a new book on HVDC would be useful. There are two other HVDC books in progress (one in South Africa and one from EPRI). There was a suggestion that this would be more widely available.
 - Future Panel Sessions:
 1. Mark Reynolds worked on a panel on for the 2007 PES General Meeting on HVDC refurbishment or upgrades. He had trouble getting commitments from authors to write summaries and ran out of time. Some discussion about how to sell topic next time. Whether there would be suitable topic or whether audience would be too limited. Some suggestions from audience for people to contact for speakers. Possible people from EPRI task force.
 2. Also talked about possibly doing a joint panel session related to reactive compensation for wind with the renewables subcommittee.
 3. Also discussed repeating some of the past sessions such as the FACTS fundamentals since there are a lot of new engineers entering the industry.

6.4 Awards Committees

6.4.1 Uno Lamm Award

Dave Fletcher, Chair of the Uno Lamm Committee, reported that the committee was to meet on Monday, but he was the only member in attendance. He requested that members provide nominations for candidates, especially from China or India. Nominations are due at the end of November, and the procedures will be posted on the website shortly.

6.5 WG 15.05.15 - Use of Power Electronics in Major Grid for Generation Requirements

There were 8 members and guests in attendance at the meeting chaired by Geza Joos.

Reviewed draft 3 of the proposed Table of Contents entitled “Use of Power Electronics in Major Grids for Wind Generation Projects.” Draft (skeleton) to be developed by the June meeting and the final is to be complete by the end of the year. The aim of the “Use of Power Electronics in Major Grids for Wind Generation Projects” will be a guide.

A new subcommittee was formed at the Summer 2006 meeting to fall under the T&D Committee, titled “Integration of Renewable Energy into Transmission and Distribution Systems.” It was proposed that this

working group would become a joint working group under this new subcommittee and HVDC and FACTS Subcommittee. This is to be discussed between Ben, Geza, Gene, and Satish. This subcommittee will be sponsoring a panel session in Tampa – “Strengthening the Grid with the Use of Renewables” and “Power & Quality of Wind Farms.” The Wind Organizations (AWEA, CanWEA, etc.) will be invited, and are expected to attend the June 2007 meeting. Topics to be addressed include items such as integration, modeling, etc.

6.6 WG 15.05.17 - HVDC and FACTS Bibliography

Four papers on HVDC and FACTS Bibliographies for the year 2004-2005 were already published last year in the IEEE 2006 GM Proceedings.

These papers have resulted from the hard work of four graduate students.

The HVDC and FACTS Working Group would like to sincerely appreciate the financial contributions from Electranix, AEP, and Areva. Financial commitment has been gratefully received from EPRI through Dr. Aty Edris. A formal grant application has to be made, though.

We continue to look for nominal funds from industry for supporting this valuable activity.

6.7 HVDC Projects Listing

Robyn Taylor distributed paper copies of the January 2007 version of the HVDC Projects Listing. The following suggestions were made:

- Divide the list between actual (in service) projects and planned (under construction or future) projects
- Add Owners
- Use the abbreviation VSC instead of TRA

ACTION from Summer 2006 Meeting: Dennis to request that this Subcommittee be provided with the authority to link our website to the CIGRE B4 Compendium. Dennis will also coordinate our activities with the CIGRE SVC/FACTS device information lists.

7 SUBSTATIONS SUBCOMMITTEE

Chair: George Karady

Vice-Chair: Chris Horwill

Secretary: Hubert Bilodeau

Subcommittee Activities I0

The Subcommittee has not met during this session. The next meeting will take place during the Substations Annual meeting in Bellevue (Seattle) next April.

WGI4 Static Var Compensators

Task Force Meeting

TF1WGI4 revision of guide 1031-2000 Functional Specification of Transmission Static Var Compensators (Chair: H. Tyll) . The expected time for submission to NESCOM is March 2009. The Task Force met on Monday afternoon. 14 members attended this second meeting. Progress is estimated at 5% including revisions of Chapter 1, 2, 3 and 4.

TF2WGI4 revision of guide 1303-1994 (R2000) Static Var Compensator Field Tests (Chair: C. Horwill) – The Task Force met on Monday morning with 17 people in attendance. The PAR for P1303 was approved on 7 December 2005 and the IEEE Standards Board approved the project until 31 December 2009. Fifty per cent of the document has been revised. The next meeting will be at the PES General Meeting in Tampa in June.

Working Group meeting

The working group met all day on Tuesday. The main activity of this working session has been the preparation of a tutorial to be given at the Substation Committee Annual meeting next April.

Other WG activities were reviewed.

Reliability Survey - The number of respondents to the survey has been increased to 30. An invitation letter has been in 2006. The response was not as good as expected. Several contact persons did not respond due to retirement. The list of respondents will be reviewed and they will be contacted once more before the end of March.

SVC Refurbishment – The objective is to publish a document on SVC refurbishment centered around the cases represented in the Panel Session in Toronto. A complete draft document will be submitted for comments and reviewed at the next meeting in April .

SVC Users List - The list for 2006 is in the process to being updated.

WG I5 Voltage Sourced Converter

The final draft is ready and will be sent to R. Varma and G. Joos for final editing. One month will be given for the editing. The document will be sent to IEEE for publication. The objective is to have it published before the meeting in Tampa.

A summary of the document has been submitted to IEEE for a panel session in Tampa.

WG I8 Power Electronics Building Block Concepts

The accomplishments of WG I8 include:

1. Task Force 2: Published IEEE PEBB Document
2. Organized 4 Panel Sessions in PES, 2 in Power Electronics Society, and 1 in Industrial Application Society
3. Task Force #1 Define Power Electronics Control Architecture (Work in progress)
4. Task Force #2 Design Tools for PEBB Based Systems (Work in progress)

Minutes for WG meeting in Montreal were approved

Task Force 1 and 2 reported on their activities. Paul Bishop acted as Secretary of this meeting and agreed to continue as Secretary for future WGi8 meetings. Paul will setup Sharepoint site, which can be seen at <https://bishopgroup.org/ieee> and will load the documents soon.

Next Meetings of the Working Group and its Task Forces will be scheduled during 2007 PES General Meeting 24-28 June, Tampa Convention Center, Tampa, Florida 33602 USA

WGI8TF1 Task Force 1

The meeting was held on Monday Jan. 8. Significant progress was made with line-by-line review of sections 1-3 and assignments made for completion of the remaining Sections. In addition a panel session is proposed on Power Electronics Control Architecture, during 2008 PES General Meeting. WG Chairman will request approval of this Panel Session from PES 2008 Meeting organizers.

WGI8TF2 Task Force 2

The meeting was held on Tuesday Jan. 9. Task Force document was discussed and significant progress made. It was resolved to keep both the PEBB Block modeling as well as the system level modeling in the

document. It was also resolved to include additional material on methods for the control design and stability analysis of the larger network containing the PEBB. Issues include the level of detail of the PEBB required for this approach and the use of eigenvalue based analysis. Further assignments were made.

The Stations Subcommittee report was submitted by Hubert Bilodeau, Secretary SC10

8 LIAISON REPORTS

No liaison reports were provided during this meeting.

9 PRESENTATIONS

9.1 The Digital Utility

Gene Wolfe provided a presentation entitled “The Digital Utility”. A copy of this presentation is provided in Appendix C.

10 GENERAL REPORTS ON HVDC AND FACTS PROJECTS

The members and guests at the meeting provided the following information:

- **ABB**
 - Three Gorges Shanghai
ABB’s 3rd 3000MW HVDC project in China (4th totally in China)
Finished 6 months ahead of schedule
 - Estlink
HVDC Light
300MW Estonia- Finland
Land and submarine cable
 - Orders received in 2006
 - Skagerrack 1&2 control replacement
Control upgrade
Received in February 2006, and will go into operation June 2007
 - Valhall
HVDC Light
Feeding the Valhall Oil Platform complex
Power from Shore
78 MW, 150 kV, 292km
 - Sapei
1000 MW bipole submarine cable
Sardinia to Italian mainland

- 420 km, deepest cable at 1500 m
- Apollo
 - South Africa
 - Control and valve upgrade
 - 1920 MW inverter station of the Cahora Bassa HVDC link
 - The new valves are capable of 2600MW
 - That can ultimately be extended to 3960MW
- Outaouais
 - Canada Quebec – Ontario BtB
 - Two blocks totally 1250 MW
 - Orders under construction
- NorNed
 - Norway - Netherlands
 - 700MW (overload 1000MW)
 - ±450kV, mid point grounded
 - 600 km submarine cable
- Sharyland BtB
 - Mexico - ERCOT
 - 150 MW
 - Bypass breaker gives black-start capabilities
- MJU Korea
 - A review of exiting HVDC projects is being conducted in Korea
- Mitsubishi
 - A 278 MVar SVC in southwest Utah was commissioned in November 2006
 - A -120/+200 SVC for Southern California Edison is scheduled to be commissioned in June 2007
- Siemens
 - SVC Devers
 - An SVC connected to a 275 kV system is under construction
- Areva
 - The KontiSkan I has been commissioned, and is in service
 - The deicer for Hydro Quebec is being commissioned, and is scheduled to be in service in Spring 2007
 - The Gulf Interconnector, 3 – 600 MW B-B rings, are due for completion in approximately 3 years time
- Teshmont
 - TransPower New Zealand are looking to replace the mercury arc valves and building a new pole with thyristors
 - 800 kV dc work in China
 - Presenting at the 800 kV conference in Beijing in November 2006
 - Impact of weather on Bipole 3 report that was recently completed
 - Bringing power to offshore oil rigs South China Sea

11 ADJOURNMENT

The meeting adjourned at 12:00.

APPENDIX A
LIST OF ATTENDEES

IEEE HVDC & FACTS Subcommittee Meeting
Chair: Ben Mehraban, Vice-Chair: Robyn Taylor

No.	Name	Affiliation	E-mail Address	Member	Guest
01	Robyn Taylor	Teshmont Consultants LP	rtaylor@teshmont.com	√	
02	Neil Kirby	Areva T&D	neil.kirby@areva-td.com	√	
03	David Fletcher	Retired	davidfletcher@mts.net	√	
04	Hans Bjorklund	ABB Power Systems	hans.bjorklund@se.abb.com	√	
05	Gene Wolf	PNM	gwolf@pnm.com	√	
06	Heinz Tyll	Siemens AG	heinz.tyll@siemens.com	√	
07	David Monkhouse	National Grid	david.monkhouse@uk.ngrid.com		√
08	Chris Horwell	Areva T&D	chris.horwell@areva-td.com	√	
09	Geza Joos	McGill University	geza.joos@mcgill.ca	√	
10	Hubert Bilodeau	Hydro Quebec	bilodeau.hubert@hydro.qc.ca	√	
11	Anthony Ho	BC Hydro	anthony.ho@bchydro.com		√
12	Brian Johnson	University of Idaho	b.k.johnson@ieee.org	√	
13	Ben Mehraban	AEP	bmehraban@aep.com	√	
14	Dan Sullivan	MEPPI	dan.sullivan@meppi.com	√	
15	Waldemar Ziomek	Pauwels Canada	waldemar.ziomek@pauwels.com	√	
16	Byung Han	Myongji University in Korea	erichan@mju.ac.kr	√	
17	George Becker	United Illuminating	george.becker@uinet.com		√
18	Mike Cullum	Power Engineers, Inc.	mike.cullum@powereng.com		√

APPENDIX B
HVDC PROJECTS LIST

**The HVDC Projects List has been appended to the e-mail
as an Excel document.**

APPENDIX C

“THE DIGITAL UTILITY” – GENE WOLF