

DRAFT MINUTES

IEEE PES HVDC AND FACTS SUBCOMMITTEE MEETING

Time: 13:30 - 16:30 on Wednesday, July 20, 2016
Location: SB Hampton in Sheraton Boston, Boston, MA, USA

Chair: Andrew Isaacs, Electranix ; Vice-chair: Dr. Brian Johnson, University of Idaho

Agenda:

- 1) Welcome and Announcements: Andrew Isaacs
Call to order at 1:30pm by Andrew Isaacs, 42 members and guests attended
- 2) Restructuring of PES Technical Committees:
The decision was announced that the “HVDC and FACTS Subcommittee” will continue to stay within the IEEE T&D Committee.
- 3) Introductions: Attendees introduced themselves.
- 4) Approval of the July 2016 Meeting Agenda
Moved by Udaya Annakkage and seconded by Wayne Litzenberger; approved by acclamation
- 5) Approval of the Minutes of the July 29, 2015 subcommittee meeting.
Moved by Girish Behal and seconded by Wayne Litzenberger; approved by acclamation
- 6) Working Group Reports
 - a) *WG 15.05.02 Dynamic Performance and Modeling of HVDC Systems and Power Electronics for Transmission Systems*
Ram Adapa reported: The working group met on Monday, July 18, 2016 at 2:00 PM. There were 38 attendees.
Andrew Isaac commented that all position papers must be completed by the end of December 2017.
 1. Status of Position Papers
 - i. EMTP-type Models for Conventional DC Systems / Line Commutated Converters. An outline was prepared by Dennis Woodford.
Action: Dennis Woodford to contribute. End of August deadline for completion and end of September 2016 for submission. Modeling guidelines and cases will also be provided. Will liaise with Modelling WG.
 - ii. EMTP-type Models for VSC based FACTS: work in progress.
Rajiv Varma and Brian Johnson have agreed to lead this effort. Others were requested to provide contributions to this document. Topics shall include VSC multilevel converter models, STATCOM, SSSC, UPFC, and IPFC.
Action: This will be led by Brian Johnson, Rajiv Varma, Kyeon Hur, and Univ. of Manitoba. Submission by end of 2016.

iii. EMTP-type Models for VSC based DC Transmission: Dennis Woodford's latest draft near completion.

Action: A. Gole to coordinate. To add MMC base case (possibly RTDS). Peter Lehn to contribute. To be submitted by end of September 2017.

iv. Prepare final paper to release 12 bus system as a benchmark test system. (Udaya Annakkage to coordinate)

2. Other Position Papers (Completed)

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

Action: Present this work at the future IEEE DC and FACTS Subcommittee Meeting.

vi. Reduced WECC system with about 107 buses: completed

This test system data is already available from EPRI. Ram Adapa sent this test system data to all the WG members by email and this will be posted on the IEEE WG website location.

3. Presentations:

i. Utilization of PV / Solar farm Inverter as STATCOM (PV-STATCOM): PSCAD/EMTDC Studies – by Dr. Rajiv Varma, The University of Western Ontario, London, Ontario, Canada.

ii. “IEEE Test System with TCSC Using PSCAD/EMTDC and PSS/e” – by Dr. Brian Johnson, University of Idaho, Moscow, Idaho, USA. Dr. Varma made this presentation on behalf of Dr. Johnson.

4. Panel Session based on FACTS/HVDC Test System to be investigated for 2017.

b) *WG 15.05.08 HVDC Economics and Operating Strategies*

Paul Marken reported. 70 persons attended the working group meeting.

i) The WG discussed the tutorial on July 17th, 2016. The tutorial was well attended with 37 registrations.

ii) The working group then discussed the potential topics for the panel for 2017

- Everything Old is New Again
- HVDC Optimization
- HVDC/FACTS Device Interaction
- Others

The working group also discussed potential special publications over the next few years by the working group.

c) *WG 15.05.14 Education on HVDC and FACTS*

Rajiv Varma presented on behalf of Brian Johnson; 6 persons attended the combo meeting of the WG 15.05.14 and WG 15.05.17.

i. Brian gave introductory remarks about Panel Sessions on HVDC and FACTS organized by the WG. The WG typically organizes panels every two years in the IEEE T&D conference. The previous two hour panel session on HVDC at the IEEE T&D Conference was very well attended with about 120 attendees.

ii. IEEE PES webinar on HVDC and FACTS is being considered.

Action: Permission will be sought from Edwina about how many webinars can be delivered.

iii. Wayne Litzenberger proposed a panel session on “What is new about HVDC?”. He also offered to contribute.

d) *WG 15.05.17 Bibliography of HVDC and FACTS;*

Rajiv Varma presented; 6 persons attended the combo meeting of the WG 15.05.17 and WG 15.05.14.

i. Rajiv mentioned that the WG has published a total of 52 IEEE Working Group Papers on Annual Bibliographies as follows:

- 16 papers on Bibliography of HVDC for the period 1998-2014
- 36 papers on Bibliography of FACTS for the period 1998-2014

ii. Rajiv stated that IEEE has now made a policy not to publish Bibliography papers in the Conferences any more. It has therefore become difficult to motivate graduate students to volunteer for preparing Bibliography papers.

iii. A suggestion was made to publish WG Bibliography papers on behalf of the Subcommittee like PSRC Bibliography papers.

iii. It was requested that the HVDC and FACTS Subcommittee may write a letter to the Technical Council conveying this concern and requesting IEEE to allow publication of these papers with the objective of encouraging power engineering education in HVDC and FACTS.

iv. Stig Nilsson advised that he is preparing a CIGRE Green Book on HVDC, in which a Chapter can be devoted to HVDC Bibliographies prepared by the WG including ground-breaking papers on HVDC.

Furthermore, the Bibliographies could possibly be published as CIGRE Colloquium Paper every two years.

e) *WG 15.05.18 HVDC Economics and Operating Strategies*

Simon Teeuwsen reported. 22 persons attended the working group meeting.

i. Brief review was done of the ongoing work in other working groups (outside IEEE)

ii. The tutorial given on Sunday 17/07/2017 was discussed. It was decided to prepare a new tutorial for IEEE (not just simple update). Potential contributors to the new tutorial were identified.

iii. A preparation of a webinar from the tutorial would be possible as well

- iv. Focus of WG is now back on the flow charts and the study descriptions.
- v. Deadline for the preparation of study descriptions is 01/01/2017
- vi. It was discussed, how the study descriptions can be used within IEEE, e.g. preparation of a working group paper, technical guideline, etc.

Next Steps:

- i.. Update of e-mail distribution list
- ii. Assignment of group members to study descriptions (if not done already)
- iii. Submission of study descriptions until 01/01/2017 (drop box upload)
- iv. Assignment of reviewer on the next meeting in early 2017
- v. Start of review in early 2017

Next meeting of the working group will be in January/February 2017 in UK together with working group 15.05.19.

f) *WG 15.05.19 Practical Technologies for VSC HVDC Systems*

Dirk Van Hertem reported.

- i. A physical meeting was held in Leuven Belgium on January 27, 2016. 20 persons attended the working group meeting.

The upcoming tutorial on “Planning and Integration of Flexible HVDC into Today's Grid” in the 2017 IEEE PES GM was discussed.

The Tutorial will include different presentations to teach the power system planners about the merits of HVDC. The titles, contents and schedule of all presentations were finalized.

This Tutorial was indeed a success with 37 participants.

- ii. Meeting at the PES GM on 20/7/2016: There were 48 attendees.

The focus of the meeting was on ancillary services of VSC HVDC. The goal is to make a review paper on the topic by early 2017.

A request was made to investigate hardware in the loop testing. Although this topic is outside the domain of this working group, but was considered to be valuable to investigate.

7) Discussion about potential new Working Groups:

- i. Need for Real Time and HIL simulations of HVDC Systems
- ii. Refreshing Ram's WG with a new name and new set of office bearers; WG to have this complete by the 2018 GM.
- iii. Stig Nilsson suggested to have a WG on Modeling of FACTS; Mike Henderson did some previous WG Report; Ram Adapa's group does 12 bus FACTS system modeling. This WG on FACTS should include TCSC; Haroon from Smart wires indicated his willingness to participate; Ram supported.
- iv. Ram Adapa: Need for a WG on HVDC Grids

- v. Dr. Hingorani suggested: Identify leader of the WG and propose the scope.
- 8) Discussion was held on the re-structuring of WG 15.05.02.
- 9) Plans for panel sessions or tutorials for 2016
- i) Modified HVDC Tutorial based on feedback for next year
 - ii) Panel proposed by Girish Behal
 - iii) Panel from HVDC
- 10) HVDC and FACTS Subcommittee Website Update
- Brian has a volunteer who is updating the website.
- 11) Award Committee Updates: Dennis Woodford provided his comments.
- a) Uno Lamm Award Committee: Need to seek memberships from China, India
 - b) Nari Hingorani Award Committee
 - c) New IEEE Fellows from subcommittee Mike Henderson and Robert Nelson were congratulated
- 12) Report from Ben Mehraban on the National Committee:
- The CIGRE USNC met on July 18 and presented the following 2016 CIGRE awards:
- a) USNC Atwood Associate Award--- Recipients were Terry Boston, Mike Heyeck, John McDonald, Andrew Ott, and Damir Novosel
 - b) USNC Phillip Sport Award—Receipts were Anjan Bose and Don Russell
 - c) CIGRE Medal - The CIGRE medal will be presented to Dr. Narain Hingorani during the 2016 CIGRE opening ceremony in August in Paris.
- The subcommittee congratulated Dr. Hingorani.
- 13) HVDC Project Listing Update: This has not been updated since 2013. However, recent information is available on Wikipedia. It was agreed that the subcommittee would no longer maintain this list.
- 14) Reports of Substation Subcommittee
- Subcommittee I0, WG I4, WG I5, and WG I9
- a) Joe Warner reported: New Tutorial proposal on “Hybrid Solutions to Shunt Compensation” is being submitted.
 - b) Proposal for a joint Tutorial between HVDC and FACTS Subcommittee and Substations Committee, possibly on SVC
- NGH suggested: clarify difference between STATCOM configurations that can or cannot accommodate Energy Storage
- 15) Liaison Reports
- a) Overhead Lines - HVDC Line Design Guide TF: Ram Adapa reported. He described the HVDC line design report
 - b) CIGRE B4: Dennis reported.

Mark Reynold suggested writing a report on Grounding; commissioning guide on VSC; DC Filtering with VSCs; HVDC guide;

Andrew suggested a report on Wind Farm with weak systems (B4.62)

Dirk suggested a report on grid codes

- c) General Systems Subcommittee: - TF on Electromagnetic Transients Modeling and Analysis of FACTS and HVDC VSC Converters. Advice being sought from the T&D Committee on this TF.

16) Creation of a list of Potential Awards at Subcommittee Level was discussed:

- i) Outstanding Service
- ii) Best WG
- iii) Best Panel Presentation
- iv) Best Papers from HVDC and FACTS
- v) Younger professionals
- vi) Any other

17) Awards Nomination Committee. Mark Reynolds agreed to chair this committee.

18) Subcommittee Endorsements for IEEE Fellow nominations: the Subcommittee will be willing to provide Endorsements for Awards when requested.

19) Rotation of office bearers of the subcommittee. T&D Operations and Procedures manual prescribes two year terms.

20) Presentations:

- i) 3:00PM---3:20PM, Dale Osborn, “The Macro Grid and the NREL-DOE-WECC-Eastern Interconnection Study”
- ii) 3:20PM—3:40PM, Matthias Walz, “HVDC PLUS Full-Bridge an enabler of an energy grid with high renewable generation”
- iii) 3:40PM—4:00PM, Matt Pugh, “Distributed Hybrid STATCOM for AC Transmission Systems.”

21) General Reports on HVDC and FACTS Projects/Developments

22) New Business Items

23) Location of the Next Meeting

24) Adjourn

Respectfully Submitted by,

Dr. Rajiv K. Varma
Secretary,
HVDC and FACTS Subcommittee
The University of Western Ontario
London, ON, Canada
rkvarma@uwo.ca