

MINUTES

IEEE PES HVDC AND FACTS SUBCOMMITTEE MEETING

Time: 13:30 - 16:30 on Wednesday, July 19, 2017
Location: Room S-Ontario in Sheraton Grand Chicago Hotel
Chicago, IL, USA

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

AGENDA

1) Welcome and Announcements

Call to order at 1:30pm by Andrew Isaacs, 29 members and guests attended.

2) Introductions

Attendees introduced themselves.

3) Approval of the July 2017 Meeting Agenda

- Approved by acclamation

4) Approval of the Minutes of the July 20, 2016 subcommittee meeting

- Approved by acclamation

5) Proposed New Subcommittee Executive:

- Election by acclaim of incoming subcommittee Secretary (effective Jan 1, 2018)
 - Stephen E. Williams, Principal Engineer, Power Quality & Energy Storage, S&C Electric Company, Franklin, WI, USA
- Introduction of incoming Chair and Vice-Chair (effective Jan 1, 2018)
 - Chair: Brian Johnson, Professor, University of Idaho, Moscow, ID, USA
 - Vice Chair: Rajiv Varma, Professor, The University of Western Ontario, London, Canada
- The Subcommittee thanked and applauded Andrew Isaacs for his exemplary commitment and service to the Subcommittee over his entire tenure.

6) Working Group Reports

I. 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 17, 2017 at 2:00 PM. There were 26 attendees.

1. Status of Position Papers

All these following papers are nearly complete. It was decided that the papers would be released immediately, before the end of October, either for publication in IEEE Trans or as guideline documents in WG website.

- i.* EMTP-type Models for Conventional DC Systems / Line Commutated Converters. An outline was prepared by Dennis Woodford.
- 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.
- iii.* EMTP-type Models for VSC based DC Transmission: near completion Dennis Woodford's latest (near-final) draft.
- iv.* Prepare final paper to Release 12 bus system as is as a benchmark.

Other Position Papers (Completed)

- v.* EMTP-type Models for FACTS (not including VSC-Voltage Source Converter based): completed. 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. This work will be presented at a future HVDC 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

2. Presentations:

The following presentations were made (will be available on request)

- i.* *Ani Gole, Univ of Manitoba: EMT based Frequency Scanning.*
- ii.* *Rajiv Varma, University of Western Ontario: Using a Solar Farm at night as a PV- STATCOM.*

3. Future directions and potential new mandate

Future mandates could include emerging systems with new topologies:

- Hybrid HVDC Systems (LCC+VSCHVDC)
- DC grids
- Use of emerging tools (e.g., co-simulation – transient stability plus EMTP) in simulation of HVDC Systems.

II. WG 15.05.08 HVDC Economics and Operating Strategies

Paul Marken reported. 60 persons attended the working group meeting.

- Mike Henderson will continue as Chair (as Paul Marken might not be able to rotate in)
- Girish Behal will be the co-vice chair of the WG; Francisco Gomez (Electranix) will be the incoming secretary
- The WG discussed their joint Tutorial with WG 15.05.19 on July 16th, 2017. The tutorial was well attended with 16 registrations.
- About 150-180 attended the Panel session organized by the WG this year
- Potential topics were discussed for the panel for 2018, with about 12 presenters
- The WG requested to keep similar meeting and panel times for the PES GM 2018

III. WG 15.05.14 Education on HVDC and FACTS

Brian Johnson presented; 7 persons attended the combo meeting of the WG 15.05.14 and WG 15.05.17.

- Brian explained how previous panel sessions organized by the WG were well received with attendance of about 150.
- "VSC based HVDC and FACTS" was discussed as a potential topic for panel session in T&D Conf 2018
- The intent is to present a broad based coverage of the technology considering the audience being mainly from utilities.
- The coverage may include concepts, planning, construction, operation, etc.
- The proposed panel may complement the panel on operating experiences of HVDC/FACTS systems organized by Substations Committee.
- eLearning Tutorial: Brian will seek information from IEEE about preparing an eLearning Tutorial from the proposed Panel in the next T&D Conference.

IV. WG 15.05.17 Bibliography of HVDC and FACTS

Rajiv Varma presented; 7 persons attended the combo meeting of the WG 15.05.17 and WG 15.05.14.

- Rajiv mentioned that the WG has published a total of 52 IEEE Working Group Papers on Annual Bibliographies on HVDC and FACTS covering the period 1998-2014
- There is a need for these Bibliographies as about 45% of the papers are not available on IEEE Xplore. Moreover, many utilities and vendors have limited access to IEEE Xplore.
- Graduate students are involved in preparing these Bibliographies, without any financial support. Their motivation is only that these Bibliographies will be published as IEEE Conference papers.
- Over the past three years, IEEE has decided not to publish Bibliography papers as a matter of policy.
- It as become very hard to motivate students for preparing Bibliographies.
- Discussions were held on how should the WG move forward.
- Different options were proposed for preparing Bibliographies which were not simply a listing of papers.
- One option was to prepare Bibliographic reviews of focused topics of value to HVDC and FACTS industry.
- Ask HVDC and FACTS subcommittee members for guidance on topics to emphasize

V. WG 15.05.18 HVDC Economics and Operating Strategies

Simon Teeuwsen reported. 34 persons attended the working group meeting. Working group 15.05.18 is concerned with studies to be performed during the planning process of HVDC systems.

Discussion and Decisions:

- The tutorial given on Sunday 16/07/2017 was discussed (about 16 attendees present)

- The proposal for a new tutorial in 2018 was presented and discussed (Multi-Infed HVDC Studies: Interaction Phenomena in Power Systems)
- The existing flow charts and study description material were discussed, and assignments were made for new study descriptions
- Once there are enough study descriptions available, the review process will start

Next Steps:

- Update of e-mail distribution list
- Further assignments to study descriptions
- Submission of study descriptions (drop box upload)
- Assignment of reviewer
- Preparation of tutorial material after successful approval by IEEE

Next meeting of the working group will be very likely in January/February 2018 in Leuven / Belgium together with working group 15.05.19.

VI. WG 15.05.19 Practical Technologies for VSC HVDC Systems

Dirk Van Hertem reported. 34 persons attended the working group meeting.

- Dirk Van Hertem gave a presentation on HVDC ancillary services
- Dirk presented and discussed an Excel sheet prepared to include the various features associated with all HVDC lines around the world.
- Dirk will provide a description of each of the features.
- Volunteers are required to fill out the Excel sheet.
- It was mentioned during the meeting that there is a CIGRE group that is already involved in such a study. Their input can be utilized.
- It was also mentioned that there is an IEEE subcommittee working on preparing an updated list of existing HVDC links.
- Concern was brought up during the meeting regarding the dissemination of the list.
- Discussion was held regarding a new IEEE Transactions on HVDC. The issue will be brought up during the HVDC & FACTS Subcommittee.
- Dirk is leading the preparation of a paper on HVDC ancillary services. He will share the outline of the paper. Volunteers interested in contributing to the paper can contact him.
- The panel session on Integration of (VSC) HVDC in existing power systems was discussed.
- The panel session for 2018 was discussed. One suggestion is a session on model requirements for different HVDC studies. Andrew, Simon and Vijira volunteered to contribute to the session.
- Contributors from TSOs and DSOs are required. Chandana and KEPCO volunteered.
- With Subcommittee's approval, this will be a 4-hours slot.
- Location of next meeting was discussed. Dirk offered to host the meeting in Leuven.

- The meeting will be held at the end of January or early February with working group 15.05.18.

7) New Working Group business

Re-structuring of WG 15.05.02 (Ani Gole) was discussed

- New chairs and new terms of reference will be decided by next year
- Send out an RFP for new topics within

8) Plans for panel sessions or tutorials for 2018

- Dragan (not with a WG): Characterization and testing of DC circuit breakers (4 hr)
- Dirk's WG: requested a panel session for 4 hours (or at least 2 hour)
- Mike's WG: 4 hours
- Ram WG: would like to do a 2 hour panel
- Tutorial from Simon and Dirk

9) HVDC and FACTS Subcommittee Website Update

Coleman Smith, whom Brian has requested to volunteer for this work, provided website updates, and eventual plan to move to IEEE website hosting.

<http://www.ece.uidaho.edu/hvdcfacts/>

10) New Business

The IEEE Standards Committee informed that SGCC, China, would like to propose new standards related to UPFC

- New UPFCs already installed in China in 2015, two more expected this Fall
- Maybe one in India planned
- An old guide is being updated and three new guides are proposed to be written.

11) Award Committee Updates

- Uno Lamm Award Committee (Dennis Woodford)
 - The Uno Lamm Award was given to Zehong Liu
 - Dennis asked to recommend potential candidates
 - Subcommittee needs to be proactive finding people for this award
- Narain Hingorani Award Committee (Rajiv Varma)
 - Custom Power award given to Dr. Bhim Singh, IIT Delhi, India
 - FACTS award not given
- New Fellows from subcommittee (Rajiv Varma)
 - Dr. K.R. Padiyar, Emeritus Professor, Indian Institute of Science, Bangalore, India, selected

12) Report on CIGRE-US National Committee

Ben Mehraban reported.

13) Reports of Substation Subcommittee

- Subcommittee I0, WG I4, WG I5, and WG I9

John Chahwan reported

 - I4: SVC:
 - A Tutorial was presented on 16/07/2017: on "Shunt Compensation for Transmission – Principles, Planning, Operational Experience and Future Trend" This Tutorial also included coverage on STATCOM and was very interactive.

- (b) The activities of its two Task Forces were described
- 2) I5: VSC:
 - (a) Preparation of the guide for STATCOM functional specifications.
 - (b) The WG held its last meeting this week and has decided to disband. Its members are moving to I4 and new I10
- 3) I10: HVDC: converter stations and equipment. The WG is considering:
 - (a) Reissue 2 Standards:
 - (b) Commissioning of LCC
 - (c) Reliability of HVDC
 - (d) PAR for Guide for Functional Spec for VSC HVDC (converter stations)
John Chahwan is the chair and looking for volunteers.
- 4) I9: Protection of SVC
The ongoing activities were described.

14) Liaison Reports

- a. Overhead Lines - HVDC Line Design Guide TF
 - i. Ram Adapa attended the meeting. The guide is largely completed guide, being reviewed and will be published soon.
- b. CIGRE B4
 - i. 2017: Meeting scheduled in Winnipeg in first week of October
 - ii. New B4.76: DC/DC converters, looking for a few more people
 - iii. C2/B4 Working group on operational implication of using HVDC as part of a network.

15) Old Business

- a) Awards Nomination Committee (Mark Reynolds). Rajiv Varma, Neil Kirby, Orestes Macchione, and Dragan Jovcic volunteered to help Mark Reynold in this task.
 - i) Suggestions were invited for candidates for the Uno Lamm award, Hingorani awards or the ones below,
- b) Creation of a list of Potential Awards at Subcommittee Level:
 - i) Outstanding Service
 - ii) Best WG
 - iii) Best Panel Presentation
 - iv) Best Papers from HVDC and FACTS
 - Dragan volunteered to help Mark
- c) Subcommittee Endorsements for IEEE Fellow nominations:
 - The Subcommittee will be willing to provide Endorsements for Awards when requested.

16) Presentations:

The following presentations were made:

- “Alegro HVDC project” by Dr. Simon Teeuwsen, Siemens, Germany.
- “DolWin3 Offshore Link” by Mr. Neil Kirby, GE USA
- “Status of INELFE VSC Interconnection between France and Spain”, by Mr. Orestes Macchione of Siemens USA.

17) General Reports on HVDC and FACTS Projects/Developments

The attendees described the HVDC and FACTS projects in which they were involved.

18) Next Meeting:

The next meeting will be held in the IEEE PES General Meeting at Portland on 8th August, 2018.

19) Adjourn

Prepared and respectfully submitted by,

Dr. Rajiv K. Varma
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