Centre Journal

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Manitoba HVDC Research Centre

Unexplained Nelson River HVDC Flashovers

Manitoba Hydro has experienced numerous unexplained (anomalous) flashovers since the inception of the Nelson River HVdc Transmission system. These flashovers occur over a large area, in northern Manitoba, on hot dry summer days, in the afternoon or early evening on the negative voltage HVdc line. What is causing these flashovers faults is not understood. All typical causes for flashovers such as lightning storms, pollution, etc. have been ruled out. The Manitoba HVDC Research Centre, together with Manitoba Hydro Research and Development, began investigating ways to capture an elusive image of these flashovers in 1996. The exercise can be described as looking for a needle in a haystack. The primary goal of the research was to capture and record one such flashover event on video tape, as well as local atmospheric conditions before and just after the flashover event. The problem is although there are about 10 unexplained events per year, the events are scattered over an approximately 200 mile line section between Grand Rapids and Radisson converter station. The Nelson River HVdc transmission line passes through some fairly remote isolated terrain. The challenge is to monitor a fairly large section of the transmission line with sophisticated monitoring equipment, without the benefit of ac power, and to do it economically.

HVDC Flashover

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Inside this issue:

For quality technical specialist support of your engineering needs contact the Manitoba HVDC Research Centre

PSCAD / EMTDC Version 3.03 Release

The electric network simulator PSCAD/EMTDC Version 3.0.3 is to be released mid January 2000. Watch for it and try it out by downloading from our website.

The new features include:

1. Improvements in the on-line plotting, printing and scrolling capabilities.
2. General "Bug" fixes resulting in a very robust simulator.
3. Curve labels and information stored with output file for easy use with external plotting programs such as MultiPlot and Electrotek Concept's TOP.
4. Line Constants program increased to 20 coupled phases and 100 conductors.
5. Four layer coaxial cable support in Cable Constants program.
6. A FIND command added to allow any text in the current project to be found.
7. Improved license manager.

Unexplained Nelson River HVDC Flashovers

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The remote location and lack of an available 120 Vac power supply required an innovative monitoring solution. The monitoring equipment had to be designed to be rugged enough or out of reach of the inquisitive bear population. A 20 mile section of the transmission corridor was identified by the System Planning department of Manitoba Hydro, as having the highest statistical probability of unexplained flashover occurrences. Twelve video camera sites were established, with each site being able to monitor between 4 and 6 tower spans. The VCRs have the ability to rewind at the end of tape and begin recording again. Each site requires a local power source. Solar panels, charging units, batteries and inverters were designed into a package for each site. An additional site to monitor the weather and electric field strength was also installed. All access to the sites was provided by helicopter, approximately 30 minutes from Thompson, Manitoba. After a flashover event occurs, there is a 24 hour period in which to recover the VCR tapes before the system overwrites the valuable data. A coordinated effort between Dorsey operating staff,

Lightning Strike Image

System Control, Thompson Line Maintenance and of course the rental helicopter is all necessary. The initial summer of monitoring in 1997 failed to capture this elusive event. The monitoring for 1998 was deferred due to the system not operating at its maximum DC voltage for most of the summer. The equipment was reinstalled in June of 1999. Two lightning related events, were recorded this year. Although the events captured were lightning related and not the fair weather flashover sought after, these events provided a wealth of information. The project is scheduled to continue the summer of 2000 with the intention of capturing a fair weather flashover and HVdc line fault.

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The exercise can be described as looking for a needle in a haystack.

Video Monitoring Site

Electrotek Concepts, Inc. officially adopts PSCAD/EMTDC

Electrotek Concepts has signed an agreement with the Manitoba HVDC Research Centre to market and support the Centre's PSCAD/EMTDC software in the United States and several other countries. Electrotek can offer an electromagnetic transients modeling application as part of its product line of software tools for power system analysis and simulation.

"This really helps complement our product line," says Electrotek spokesman Sandy Smith. "We have been looking for a transient simulation package to complement our SuperHarm software and our users group that supports harmonic and transient analysis. PSCAD/EMTDC is a quality product, and Manitoba HVDC Research Centre provides excellent development and application support."

Under the agreement, Electrotek will have non-exclusive representation rights for PSCAD/EMTDC in the United States, Argentina, Australia, Belgium, Brazil, Chile, Denmark, Finland, France, Germany, India, Ireland, Italy, Mexico, New Zealand, Norway, Pakistan, Poland, Portugal, Singapore, South Africa, Spain, Sweden, and the United Kingdom. Electrotek will market and promote the software, and forward orders to the Manitoba HVDC Research Centre for processing. Support for the software will be offered by Electrotek and the Research Centre.

Electrotek plans to offer the software at a significant discount to members of its Power Applications for Transients and Harmonics (PATH) Users Group, which

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An Introduction to PSCAD/EMTDC Version 3

Two courses by the Manitoba HVDC Research Centre
At Winnipeg, Manitoba, Canada
March 21 - 23, 2000, April 10 – 12, 2000

COURSE BENEFITS

PSCAD/EMTDC Version 3 is the new era simulator of electric power systems, distribution systems and power electronic systems. It is developed by engineers and scientists responding to the requests and suggestions of many international users.

This course with its hands-on workshops will help those unfamiliar with PSCAD/EMTDC V3 to develop proficiency in its use and applications.

Modern power, distribution and electronic systems are becoming increasingly complex. Traditional single frequency based study software and design tools are less able to deliver the needed precision you need to confidently deliver the best engineering solution. This course will help you increase your engineering skills for the new technologies in this rapidly developing and competitive world.

Fee $1200, includes Workbook, computer usage, break refreshments and CD with PSCAD/ EMTDC V3 Personal Edition. Fee reduction to $1000 if you provide your own laptop for the course. (Win 95, Win 98 or Win NT, with 30 Mb free hard drive space and CD ROM)

Accommodations: Your enrollment confirmation will include hotel information.

To Enroll:
Please mail, e-mail or fax the following information:
Name Title
Company Company address
Phone Number Fax Number e-mail address
Will you be providing your own Laptop computer? Yes/No

Please submit Money Order, Cheque, or Purchase Order made out to:
Manitoba HVDC Research Centre
and send to:
Manitoba HVDC Research Centre
400-1619 Pembina Highway,
Winnipeg, Manitoba, R3T 3Y6, Canada

Fax: +1 204 453 5074
e-mail: fsa@hvdc.ca

Note: If course is cancelled, course fee will be fully refunded. If attendee is unable to attend, fee will be refunded if 7 day notice is received before starting date. Substitutions may be made at any time.

COURSE OUTLINE

1st day 8:00 am Registration
1. Introduction to PSCAD/EMTDC V3
2. Building a new case
3. Measuring and plotting volts and currents
4. The Project Tree and the Message Tree
5. The On-Line Help System
6. Upgrading from V2 to V3
7. Simple AC System with Transmission Line
8. Use of Control Arrays
9. Use of Slider, Switch, Button and Dial
10. Multiple Run

2nd Day
11. Surge Arresters
12. Steep Front Modeling
13. Fast Fourier Analysis
14. Source representation
15. Synchronous Machines and Load Flow
16. Transformers, including UMEC model
17. Energizing a transformer with Remanence
18. Multiple Run
19. Transient Studies on AC Lines

3rd Day
20. Power Electronics with Interpolated Switching
21. Imbedding Controls in pages
22. Imbedding Circuits in pages
23. Controls for a STATCOM

13:00 Lunch

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RTP: Real Time Playback
The Portable Power System
Waveform Generator

www.hvdc.ca

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http://www.hvdc.ca/

If you would like to receive email notification of a new Journal in the future and not receive a copy in the mail, please send us your request by email to journal @hvdc.ca

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Fax: +204 453 5074

PSCAD/EMTDC : The Professional's Tool for Electromagnetic Transient Simulation

IEEE WINTER POWER Meeting In Singapore

PSCAD EMTDC

Visit us at Raffles City Conference Centre Exhibit at the 2000 IEEE Winter Power Meeting in Singapore.
Monday - Wednesday, January 24- 26 , 2000
From 9:00 am to 5:00 pm

The Centre will be sharing a Booth with PTI-ASIA

Centre staff will be presenting hands on demonstrations of PSCAD V3 and Real Time Playback. We invite you to bring your simulation needs for discussion.

RTP

Electrotek Concepts, Inc. & PSCAD/EMTDC

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provides application support for Electrotek's SuperHarm software and engineering support for investigation and correction of harmonic and transient phenomena.

For more information contact Sandy Smith at (423)470-9222, ext 141 or e-mail: sandy@electrotek.com.

Electrotek to market PSCAD/ EMTDC in US and other countries