Providing expertise in the field of HVDC transmission

Manitoba HVDC Research Centre has a highly experienced, multi-disciplinary team of experts that can provide specialized engineering solutions for the HVDC power system community worldwide.

The Manitoba HVDC Research Centre (MHRC) team specializes in providing unique services and has the international experience to perform a wide variety of HVDC services. With over 40 years of design, owner, maintenance, and operating experience, MHRC offers customized and reliable solutions in the field of HVDC transmission. Over the years, the team has gained comprehensive knowledge of the industry, including the capability to do system studies, prepare required specifications, perform HVDC planning and feasibility studies, and provide operations and commissioning consulting services around the globe.

With expertise in the area of HVDC transmission MHRC can assist at any stage of your project:

1. Planning & Concept
2. System Studies & Simulations
3. Conceptual Design
4. Prepare Specifications
5. Bid Evaluations & Negotiations
6. Design & Review
7. Factory Acceptance Testing
8. Post-Award
9. Commissioning
10. Operations & Maintenance

As a subsidiary of Manitoba Hydro, one of Canada’s largest utilities, Manitoba HVDC Research Centre (MHRC) were key participants in the landmark HVDC transmission projects of Nelson River Bipole I and II.
Past projects include:

MHRC has provided HVDC support for a multitude of new projects. We apply a unique perspective to assist clients throughout the process of acquiring HVDC technology and during the life cycle of the station. Our design review experience includes Protection and Control, Transformers, Reactors, Thyristor Valves, cooling systems, and AC remedial action schemes.

**HVDC Studies**
There are a wide array of in-house tools and capabilities to support a variety of simulation studies, including:

**MMC-VSC Model Development** — Develop models for new HVDC schemes based on the new multi-level voltage source converter technology. The models developed are used to perform system level feasibility studies, evaluation of protection and control schemes, AC system requirements, equipment ratings, and project costs.

**Energy Integration** — Studies for the integration of renewable resources using multi-terminal HVDC, VSCs and FACTS, as well as series compensation technologies.

**PSCAD™ Simulation Studies** — PSCAD, developed by the Manitoba HVDC Research Centre, is the tool of choice for all major HVDC vendors, including ABB, Siemens, and Alstom Grid.

**RTDS Simulation Studies** — Provide clients with support and advice on real-time electromagnetic transient simulations.

**Field and Corona Effects (FACE) HVDC Calculations** — A study tool was developed to perform field and corona effects on high voltage power lines. It has been used to perform a number of field and corona effect studies.

**Life Extension and Life Assessment**
Several life assessments of HVDC stations were conducted, which included: converter transformers, smoothing reactors, valves, equipment testing, HVDC controls, and post commissioning services.

**HVDC Projects**
Several HVDC projects were completed to assist with the studies, construction, and factory acceptance testing (FAT). Our factory testing extends to DC control and protection, transformers, reactors, and valves. Our team assists through the project in areas of supervision and system operation. We have also provided maintenance program implementation, procedures, commissioning, and support services.

**HVDC Specification Bids and Tender Evaluations**
MHRC has the expertise in providing support to clients evaluating HVDC specification bids and tenders. Our team, generally in close contact with the project owners, is available to answer technical questions throughout the bid process, review supplier specifications for equipment manufacturing, and negotiate with preferred suppliers to arrive at a final contract. We approach this area from a project life cycle perspective to provide technical support throughout the entire HVDC project.

**Ground and Sea Electrode Studies**
Many studies have been performed for the investigation of new ground electrodes in HVDC projects, replacement and upgrade of electrodes, and high level design of the electrode line and underground cables.

**HVDC Training**
MHRC offers a specialized HVDC Theory & Controls training program that has been well-received by vendors, utilities, and academic institutions worldwide. This course covers the fundamentals of HVDC technology and their applications. Topics covered included: HVDC fundamentals, controls, modeling, and advanced topics, including HVDC implementation and maintenance issues for HVDC systems. Over 200 people have attended our HVDC Theory & Controls and Advanced HVDC courses in the last four years.