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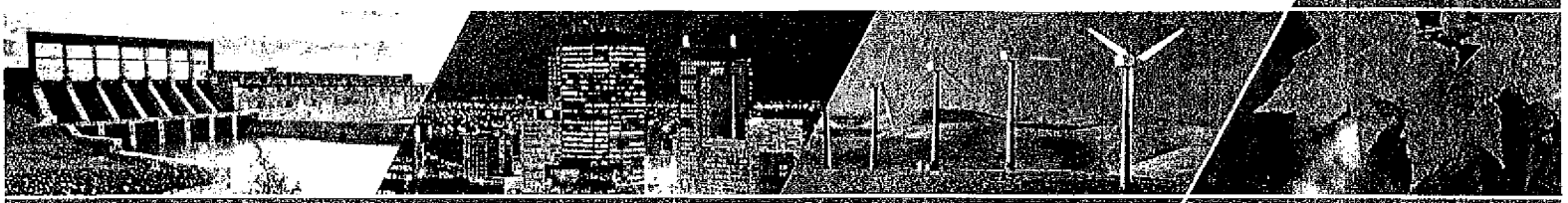
Proposal: Professional Services to Review and Report on Two Generation Expansion Alternatives – Island of Newfoundland Interconnected Electrical System

Newfoundland and Labrador Board of Commissioners of Public Utilities

RFP NO. 2011-001



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Client: Newfoundland and Labrador Board of Commissioners of Public Utilities

RFP Number: 2011-001

Proposal Prepared by:

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Or

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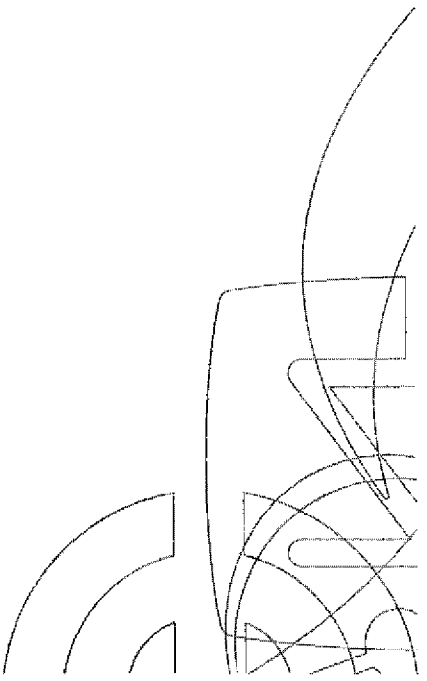

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June 26th, 2011

Board of Commissioners of Public Utilities
120 Torbay Road
St. John's, NL
A1A 5B2

Subject: Technical Proposal – Professional Services to Review and Report on Two Generation Expansion Alternatives – Island of Newfoundland Interconnected Electrical System

Manitoba Hydro International Ltd. (MHI) is pleased to submit this Proposal for the provision of the above referenced services.

MHI has a long and positive history in Canada, the United States, and various countries throughout Africa, Asia, Europe, and Latin America. Since 1985, MHI has provided electric utilities, funding agencies, and governments with services in planning, design, construction, management, and operation of generation, transmission and distribution facilities, as well as technical assistance in economic analysis, power sector reform, utility restructuring, tariff studies, financial management, human resources development, and export market studies. Working as the international subsidiary to a Crown owned utility has allowed the firm to develop a keen understanding of different stakeholders and conditions and has allowed us to become a valuable resource for guidance and support. For all projects, MHI assembles a highly experienced team of international experts from within its parent electric utility, from across Canada, and internationally.

We have endeavoured, through this proposal, to highlight the different aspects of our association, staff, previous experience, approach, and methodology that are most relevant to this project.

Thank you in advance for your consideration.

Kind regards,

Paul Wilson
Managing Director Subsidiary Operations
Manitoba Hydro International Ltd.

Manitoba Hydro International Ltd.

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211 Commerce Drive, Winnipeg, Manitoba, Canada R3P 1A3

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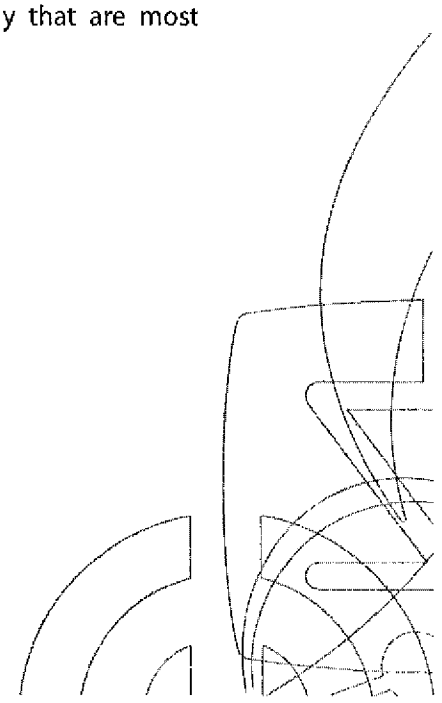

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1.0 Introduction

This proposal is in response to an enquiring from the Board of Commissioners of Public Utilities, Newfoundland and Labrador Request of Proposals 2011-001. The headings below highlight the specific capabilities of MHI which will allow us to successfully complete this project.

Power Systems Expertise

MHI's parent company, Manitoba Hydro, is an operating utility with over a hundred years of experience in Generation, Transmission, and Distribution. Manitoba Hydro owns, operates, and maintains over 5,500 MW of generation and over 11,000 km of transmission lines. For the past 25 years, MHI has translated this experience into domestic and international consulting work which has encompassed all facets of power systems planning, analysis and operations, design and construction, and protection. This expertise will ensure that MHI is amply capable to work with the Newfoundland and Labrador Board of Commissioners of Public Utilities to devise the most cost effective, sustainable, and appropriate generation expansion alternative for the region. Lastly, working as the international subsidiary to a state owned utility has allowed the firm to develop a keen sensibility for understanding different stakeholders and conditions and has allowed us to become a valuable resource for guidance and support when providing expertise for state-owned energy systems. The System Planning group we plan to utilize is comprised of about 40 engineers and technical support staff with many years of accumulated experience in all aspects of power systems engineering related to distribution, sub-transmission, network, generation machines and controls, EHVAC and HVDC transmission. MHI can provide the following Power System Planning services: power systems engineering, expansion planning, economic studies, systems reliability studies, pricing and deregulated industry issues, system technical studies, and simulations and analysis.

Generation Planning Expertise

For all Generation projects our experts have managed the complete development lifecycle including feasibility studies, alternative evaluations, cost estimations, site exploration, design and construction of numerous projects within the Province of Manitoba and abroad. In addition to the technical components of generation planning, MHI also possesses extensive experience in stakeholder engagement, public involvement processes, partnership development agreement, impact benefit agreements, adverse effects agreements, and regulatory and licensing processes. The Generation Planning and Resource Planning groups are comprised of about 25 engineers and technical support staff with many years of experience in planning and preparing conceptual designs for new generation as well as rehabilitation and life extension of existing facilities.

Wind Generation

MHI's associate, MCW/AGE Consultants, amongst other services provides Wind Generation expertise. The services they offer include but are not limited to the coordination and design of interconnection requirements, the preparation of feasibility studies, budgeting, financial modelling, interconnection applications, and system impact assessments. MCW has provided these services across North America with their most expansive project exceeding 400 MWs.

HVDC Expertise

MHI has at its disposal 30 years of experience in all areas of High Voltage Direct Current (HVDC) transmission, from planning and design, through to the operation and maintenance of two large HVDC bipoles. These bipoles, with a capacity of 3800 MW and operating voltage of +/- 500 kV direct current, transmit approximately 75% of Manitoba's energy supply from the Nelson River in northern Manitoba to the load centers located 900 km away in and around Winnipeg. As a consequence MHI has available a number of highly qualified technical managers and engineers who have detailed knowledge in all areas of HVDC transmission planning, design engineering, project management, and operation and maintenance.

The HVDC Research Center, a division of MHI, provides engineering design expertise related to all aspects of HVDC installations. Engineering staff are skilled in all phases of project development, including design, implementation and commissioning. Project experience includes development of scope and definition, preparation of tender documents, tender evaluation, contract negotiations, preparation of budgets, preparation of schedules and project management.

Technical and Economic Expertise

MHI can assist utilities in making informed decisions by evaluating and providing sound technical and financial data analysis through fully integrated conceptual studies which address all technical, environmental, economic, socio-economic and any other pertinent issues. This information forms the basis for complex business models, economic analyses, and scenario planning, which enable organizations to make better informed decisions about allocating their capital and operating funds. Additionally, throughout this process we are fully equipped to liaise with all stakeholders and make certain that their various needs are addressed.

Due Diligence Expertise

As a long-time utility operator with international expertise, MHI has considerable experience conducting technical and financial due diligence activities, both within Canada, for Manitoba Hydro's acquisitions of Centra Gas and Winnipeg Hydro, and in

various countries in order to evaluate and decide upon various capital expenditures. MHI's due diligence services fall into the following categories: valuations, condition assessments, estimating capital requirements for infrastructure improvements, technical assistance with respect to generation, transmission, distribution, and customer service matters, financial modelling, owner/investor advisory and oversight services, and preparation of analyses and associated reports and recommendations.

Experience in Project Management

With countless completed projects domestically and internationally, our staff has considerable experience in project management. For all our projects, we use effective project management protocols including the establishment of clear guidelines, policies, and procedures. Determining the client's requirements and needs serves as the initial focal point for every successful project. We establish realistic milestones for the completion of activities and develop schedules that when used in conjunction with the appropriate action plans, financial and progress reports, provide the groundwork to allow a project to succeed. We combine these fundamentals with senior management guidance and well-qualified Project Team Leaders to ensure that all of our projects are completed fully to the client's satisfaction.

Expert Staff

MHI possesses a roster of extremely well-qualified personnel to draw upon for this assignment. In particular MHI's staff has been engaged in generation planning projects in several countries throughout the world and can count on the support of Manitoba Hydro's 6000 plus employees. Our wide human resources capabilities are available to cover all disciplines and tasks required for the successful completion of this project. We are proposing various experts to meet the requirements of this important work, all of which have worked extensively in their relevant fields (see Appendix I).

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2.0 Consultant's Organization and Experience

2.1. Manitoba Hydro International

Manitoba Hydro International Ltd. (MHI) assists power utilities, governments, and private sector clients worldwide to deliver electricity efficiently, effectively, and in a sustainable manner. As a wholly-owned subsidiary of Manitoba Hydro, one of the largest and oldest electric power utilities in Canada, MHI has provided utility infrastructure management, consulting, and training services to over 60 countries worldwide.

MHI has established itself as an ethical, environmentally responsible provider of high-quality utility services to the international power sector for the past 25 years.

2.2. Manitoba Hydro

Manitoba Hydro was established in 1880 and currently holds assets in excess of $12.3 billion, with $1.9 billion in annual revenues, and over 6,000 employees. It is a major power utility, involved in the planning, design, construction, operation, and maintenance of all elements of power infrastructure. As a utility operator, Manitoba Hydro serves over 532,000 electricity customers and 264,000 natural gas customers. In addition, Manitoba Hydro exports up to 40% of its energy production to the North-American marketplace, which includes over 35 utilities and marketers in the mid-western USA, Ontario, and Saskatchewan.

Manitoba Hydro is a very successful and efficiently run electric utility, with electricity rates among the lowest in North America. It consistently maintains exceptional customer satisfaction indices, and scores high when benchmarked against other utilities in the various categories of generation, transmission, and distribution performance measures.

Since 1985, MHI has successfully delivered Manitoba Hydro's expertise to electric utilities, governments, and donor agencies worldwide in the form of consulting, training, and management services.

2.2.1. Manitoba Hydro International Corporate Structure and Human Resources

Manitoba Hydro International has the distinct advantage of being affiliated with a solid, efficient, operating utility. Its strong organizational capability has allowed it to perform work in over 60 countries, in addition to the numerous projects that have been performed within Canada.

As a result of its large resource network, home office support staff, and time-tested internal procedures and guidelines, MHI is able to quickly mobilize appropriate technical and management staff for international and domestic assignments, and to provide an exceptional level of administrative, logistical, and technical support to its project teams.

2.2.2. Manitoba HVDC Research Centre

Founded in 1981, the Manitoba HVDC Research Centre is a Division of MHI. The Centre has become a world leader in electric power system simulation, applied power systems analysis, and related technologies. The Centre develops and markets an array of products and services worldwide including the renowned power system simulation software PSCAD® (PSCAD®/EMTDC™). PSCAD®, commercially available since 1993, embodies years of continuous research and development from 1988 to the present. This product is currently used in over 1,700 commercial and research facilities in nearly 80 countries.

The Manitoba HVDC Research Centre has a highly experienced team of multi-disciplined power systems and simulation specialists that provides specialized engineering services to the power system community. The teams' intimate familiarity in developing and applying analytic power system tools, including PSCAD®, has proven to provide clients with a distinct advantage in resolving the complex problems facing today's power systems.

The Centre's analysis tool kit is comprised of a wide range of leading commercial software packages for power flow and stability studies, including additional specialized in-house software and hardware tools for harmonic analysis, reliability and risk analysis, corona and field effects, and real-time testing of protective and control devices.

The Centre is equipped with state-of-the-art training facilities, where numerous courses are offered to international and domestic Clients on an ongoing basis by the very experts that design and work with the systems themselves.

2.3. MCW Consultants Ltd.

MCW Consultants Ltd. (MCW), a wholly owned private Canadian Corporation, is a fully integrated mechanical and electrical engineering consulting services company with more than 40 years of consulting experience. The company is structured in a shareholders arrangement with a total of 22 Partners.

In 1999, MCW Consultants Ltd. acquired AGE Engineering in an answer to the changing demands of the electrical market place by our Industrial, Commercial and

Institutional clients to provide an encompassing electrical infrastructure design package. With continued diversification of expertise, MCW has expanded their services to include the Electrical Utility market through their division, MCW/AGE Power Consultants. Specific expertise includes but is not limited to AC power transmission and distribution design, protective relaying, grounding, alternative power generation, technical studies and power quality.

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2.4. *MHI Relevant Experience*

Assignment Name: Technical due diligence for the 2075 MW Cahora Bassa Hydroelectric Generating Station, Dam and HVDC Transmission system	**Approx. value of the contract (in current US$ or Euro):**
Country: Mozambique **Location Within Country:** Province of Tete	**Duration of Assignment (Months):** 8
Name of Client: Hidroeléctrica de Cahora Bassa	**Total No of Staff-months of the Assignment:** 15
Address: Maputo, Mozambique	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: April 2006 **Completion Date:** December 2006	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Nigel Wills – O&M Specialist Allan Derry Turbines and auxiliaries Specialist Silvio Marineli – Generator and Auxiliaries Specialist

Narrative Description of Project:
The two shareholders of HCB: the Government of Mozambique and the Government of Portugal required a comprehensive review of the company covering various facets of its technical and operational status. To this end, the scope of work assigned to Nippon Koei/MHI includes the necessary field audit work in order to prepare and deliver to the Client reports covering the technical matters arising from the due diligence of HCB.

Description of Actual Services Provided by your Staff Within the Assignment:

- The technical due diligence covers all aspects pertaining to the technical and operational status of the Dam structure, the Power House, the HVDC Converter Station and the HVDC transmission lines, including the following principal tasks:
- Review the background studies and other relevant documentation, including any asset appraisals or analogous reports;
- Prepare and issue detailed questionnaires to HCB in order to obtain accurate and detailed information on the technical standards of operation and asset condition namely conducting spot checks and tests of asset condition;
- Review any applicable technical operational codes or manuals;
- Comment, where required, on the technical aspects of the contracts and licenses governing the performance of HCB;
- Review the ability of the dam reservoir and wall to withstand major flood conditions;
- Review all safety and health issues associated with the operations of HCB including HIV-AIDS programs;

An Additional Information Report was also developed covering:

- Formulation of estimates of capital expenditure requirements and technical performance standards;

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Assignment Name: Turkey - 170 MW Hydroelectric Project	**Approx. value of the contract (in current US$ or Euro):**
Country: Turkey **Location Within Country:** Erzincan Province	**Duration of Assignment (Months):** Ongoing
Name of Client: Eric Energi Uretim ve Tic. A.S.	**Total No of Staff-months of the Assignment:** 5
Address: Eric Energi Uretim ve Tic. A.S. Bulgurulu Caddesi No: 60 Kucuk camlica-34696 Istanbul	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: 2008 **Completion Date:** Ongoing	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any:	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Peter Rae – Project Manager Bob Joyet – Geotechnical Specialist Jim Swaisgood – Geological Specialist Paul Driver – Environmental Specialist Charly Cadou – Hydrological Specialist

Narrative Description of Project:
MHI is acting as owner's engineer for Eric Enerji Uretim to identify project alternatives, followed by conducting a full feasibility study on the chosen alternative. MHI will also assist with financing, construction supervision and operations of the plant.

Description of Actual Services Provided by your Staff Within the Assignment:

- Define overall project plan including the detailed engineering activities, comprehensive schedules and budgets.
- Revise and update previous studies and speculations including the existing mapping/geological study speculations and prepare necessary specifications, RFP/RFQs.
- Review and validate the concepts, calculations, and methodologies provided by all local and international consultants.
- Research and develop viable project alternatives and identify a preferred arrangement in order to optimize the Project based on technical, environmental, financial and risk considerations.
- Perform a feasibility study on the environmental, hydrological, geological, and financial implications of the alternatives and identify and report to the owner any significant gaps, problems or concerns regarding any project related issues.
- Participate in further investigation of shortlisted alternatives and provide a report detailing all possible project alternatives to be analyzed together with the rationale for choosing the chosen project alternative:
    - Further elaboration of shortlisted alternatives and preparation of concept level drawings.
    - Further analysis of the merits of each of the shortlisted options including integration of environmental and social impacts.

- Obtain initial feedback from regulatory authorities regarding the acceptability of the alternatives.
- Comparative technical and economic analysis of all project alternatives.
- Comparative environmental analysis of all project alternatives.
- Criteria for comparing project alternatives.
- Decision matrix and rationale for choosing successful project alternative.

- Site geological/geotechnical investigations
  - Administer geological and geotechnical investigations comprised of geological mapping and seismic analysis, drilling and subsurface inspections.
  - Provide recommendations regarding the scope and methodology for the geological investigations.
  - Review the site investigation program and estimate of costs proposed by the local consultant.
  - Review draft specifications prepared by the local consultant and work with the local consultant to finalize the specifications and a list of qualified bidders.
  - Supervise the evaluation of bids and participate in the negotiation of a contract with the successful bidder.
  - Undertake a project seismological study to develop criteria for the design of project structures.
- Site topographical surveys
  - Provide recommendations for topographic surveys appropriate for the feasibility study of the selected project alternative.
- Develop the Terms of Reference for a local Environmental consultant to provide input to refinement of the selected alternative and to undertake a comprehensive EISA for the selected alternative.
- Review hydrological and reservoir operations studies prepared by the local consultant and provide comments for refinement of the analyses.
- Review, in conjunction with the Owner, the energy market and develop criteria for refinement of the selected alternative.
- Develop detailed work plan and schedule for additional work required to complete the feasibility study, EISA, and project development activities.
- Develop preliminary design criteria for use in the feasibility study design.
- Plan and provide expert advice to define the topographic and geological investigations programs for the feasibility study
- Rate the alternatives on regulatory policies and constraints, IFI policies and constraints, key environmental and social factors, hydrological and sediment reviews, geotechnical reviews, transmission implications, riparian flow requirements, energy and capacity aspects, technical feasibility and constructability, cost estimates, energy generation and alternative specific implications and constraints.
- In accordance with International standards, undertake a financial analysis of the project to identify financing options and prepare a feasibility study and related financial model to be used as a tool for optimizing the project arrangement and to support the possibility of international financing options.
- Support the Owner with potential partners and/or sources of equity and/or debt financing.

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Assignment Name: Technical Assessment – Kano State Hydroelectric Project for Tiga and Challawa Dams	**Approx. value of the contract (in current US$ or Euro):**
Country: Nigeria **Location Within Country:** Kano State	**Duration of Assignment (Months):** 5
Name of Client: Wardrop Nigeria Ltd.	**Total No of Staff-months of the Assignment:** 3
Address: c/o Wardrop Engineering 400-386 Broadway Wpg, MB R3C 4M8, Canada	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: September 2000 **Completion Date:** January 2001	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** David S. Magnusson – Hydroelectric Planning Engineer and Team Leader Efrem Teklemariam – Hydrologist Ramesh Gupta – Geotechnical Engineer

Narrative Description of Project:
Preliminary Technical Assessment to determine technically feasibility and realistic practicality of installing hydroelectric generation at two existing dams in Kano State. The two dams, Tiga and Challawa Gorge, are currently used for irrigation and water supply.

Description of Actual Services Provided by your Staff Within the Assignment:

- Reviewed all available documentation on the construction of the Tiga and Challawa Gorge Dams.
- Reviewed all available hydrological and meteorological data to develop inflow hydrograph for the dams.
- Met with State and Federal agencies responsible for the construction and operation of the dams.
- Site visits were made for visual inspection of the dams and associated facilities.
- Conducted a workshop for the Kano State Committee on Hydro-Electricity to review our findings.
- Prepared a technical assessment which included:
    - The history and current condition of the dams and their reservoirs.
    - Hydrological studies.
    - Determination of available hydro-electric generating capacity at Tiga and Challawa Gorge.
    - Anticipated impact on available hydro-electric generation at the dams.
    - Proposed concepts for hydro-electric generation at the dams.
- Prepared a cost estimate and an economic assessment which included:
    - Estimated project costs based on preliminary design concepts.
    - Potential market for generation from Tiga and Challawa Gorge.
    - Economic returns and pricing for hydro-electric generation from Tiga and Challawa Gorge.
    - Various structures for executing the project including the involvement of the government

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and the private sector. • Recommendations for next steps for implementing the projects.

Assignment Name: Nile Equatorial Lakes Subsidiary Action Program (NELSAP)	**Approx. value of the contract (in current US$ or Euro):**
Country: Equatorial Lakes Region **Location Within Country:** Kigali, Rwanda	**Duration of Assignment (Months):** 6
Name of Client: World Bank (Nile Basin)	**Total No of Staff-months of the Assignment:** 5
Address: 1818 H St. NW Washington DC USA 20433	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: August 2005 **Completion Date:** March 2006	**No. of Professional Staff-months provided by associated Consultants:** 1
Name of Associated Consultants, if any: Power Planning Associates UK	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** D. Priestman MHI – Team Leader-Energy Economics A.M. Snyder MHI – Utility Regional Operations W. D. Young MHI – Utility Finance I. Driscall MHI – Financial Modeling, Private Participation Specialist C. Rufin (Babson College) – Public Goods Assessment Specialist D. Webster PPA – Institutional and Implementation Specialist
Narrative Description of Project: Power Generation and Multipurpose Projects in the Nile Equatorial Lakes Region. The objective of this assignment is to support the World Bank in up-stream economic and financial analysis of a selected number of high priority multi-country and multi-purpose power generation investment projects identified under the SSEA study.	
Description of Actual Services Provided by your Staff Within the Assignment: The analysis provided additional information and proposals to support the conceptual design and possible development of these projects, by providing pro forma financing arrangements for multipurpose hydropower projects including a preliminary assessment of how generated economic benefits may impact financial performance and implementation arrangements, in particular the presence of public goods and the possibility of sourcing grant financing to monetize these benefits and exploring possible institutional, contractual and implementation arrangements.	

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Assignment Name: Russian Electric Utilities Managers Project - Nizhnovenergo	**Approx. value of the contract (in current US$ or Euro):**
Country: Russia **Location Within Country:** Nizhniy Novgorod	**Duration of Assignment (Months):** 2
Name of Client: CIDA	**Total No of Staff-months of the Assignment:** 1
Address: 200 Promenade du Portage Gatineau, Quebec K1A 0G4	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: September 1999 **Completion Date:** October 1999	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: Johnson Management Inc	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Don Deviaene, as a Project Finance Specialist (PFS)

Narrative Description of Project:
Johnson Management Inc. contracted MHI to provide project finance services to meet the commitments of the CIDA funded Electric Utilities Managers II Project Work Plan.

Description of Actual Services Provided by your Staff Within the Assignment:
The PFS was required to perform the following tasks:

- Collect Economic Information
- Review Plant Modernization Investment Cost Estimate
- Review NNE's Capital Expansion Plan
- Confirm Project is Least Cost Alternative
- Compare Estimates with Expansion Plan
- Confirm Need for Capital Expenditure
- Obtain Long-term Rate and Price Forecasts
- Review Existing Legal, Tax and Regulatory Framework
- Establish Industrial Customer Electrical and Steam Load Profiles
- Assess the Avoided Cost for Electricity and Steam
- Determine Credit Worthiness of Industrial Customers
- Develop Revenue Projections
- Perform Production Costing
- Develop Cost Forecasts
- Perform Sensitivity Analysis
- Review the Impact of EnergoSbyt on NNE
- Develop Project After-tax Cash Flow Model
- Develop a Merchant Plant Model (to be determined in Russia)
- Confirm the economic strength of the region to undertake project
- Prepare information for Business Case

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Assignment Name: Due Diligence Review and Transaction Advisory Services	**Approx. value of the contract (in current US$ or Euro):**
Country: Canada **Location Within Country:** Canada	**Duration of Assignment (Months):** 2
Name of Client: Manitoba Hydro	**Total No of Staff-months of the Assignment:** 3
Address: 820 Taylor Avenue Winnipeg, Manitoba Canada R3M 3T1	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: Jan 2007 **Completion Date:** February 2007	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Team Leader- Ian Driscall Generation Engineering - Alex Gerrard Operations Expert - Nigel Wills Financial Analyst - Rick Horocholyn Commercial Operations - Lorne Halpenny
Narrative Description of Project: MHI has been contracted to provide technical assistance to a Canadian energy company for a due diligence review and transaction advisory services for a number of generation assets and a distribution company which were offered for sale internationally. The reviews covered all required due diligence areas such as asset valuation, high level condition assessment, potential returns, and risk assessment.	
Description of Actual Services Provided by your Staff Within the Assignment: The work consists of: • Complete Financial Analysis and recommendations on bid prices. The reviews covered all required due diligence areas such as asset valuation, high level condition assessment, potential returns, and risk assessment.	

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Assignment Name: Technical Assistance - Hydropower Planning and Development Capacity Building	**Approx. value of the contract (In current US$ or Euro):**
Country: Canada **Location Within Country:** Iqaluit, Nunavut	**Duration of Assignment (Months):** Ongoing
Name of Client: Qulliq Energy Corporation	**Total No of Staff-months of the Assignment:** 6
Address: QULLIQ ENERGY Suite 100, Parnaivik Building PO Box 580 Iqaluit, Nunavut, Canada X0A 0H0	**Approx. value of the services provided by your firm under the contract (In current US$ or Euro):**
Start Date: May 2006 **Completion Date:** Ongoing	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (Indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Hydropower Specialist - Alex Gerrard

Narrative Description of Project:
Qulliq Energy Corporation and the government of Nunavut wish to develop the capacity to plan and execute hydropower projects in the former Canadian Northwest Territories. MHI has been contracted to provide technical assistance to assist with the planning and implementation of facilities to compliment or displace diesel generation.

Description of Actual Services Provided by your Staff Within the Assignment:
The work consists of:

- Review various feasibility studies.
- Assisting the client with the preparation of RFP's to procure suppliers and contractors.
- Developing the planning and implementation capacity within the Corporation.

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Assignment Name: South-Eastern Europe Electrical System Technical Support Project	**Approx. value of the contract (in current US$ or Euro):**
Country: Balkan States of Eastern Europe **Location Within Country:** Various – Covers all states within Eastern Europe	**Duration of Assignment (Months):** 60
Name of Client: Canadian International Development Agency (CIDA)	**Total No of Staff-months of the Assignment:** 100
Address: 200 Promenade du Portage Gatineau, Quebec K1A 0G4	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: May 2001 **Completion Date:** 2006	**No. of Professional Staff-months provided by associated Consultants:** 450
Name of Associated Consultants, if any: SNC Lavalin Inc. Power Budd LLP	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** J. Melvin – Quality Assurance for Utility Partner, Rep to Consortium K. Birch – Transmission Utility Operations and Maintenance M. Matiowsky – Telecommunications J. Roik – Distribution Design and Substation Automation Ed Tymofichuk – Transmission System Operator W. Adolphe – Distribution Planning M. Kast – Regulatory Affairs G. Fraser – EMS M. Dudar – Demand Side Management S. Pachal – Restructuring and Process Improvement D. Lohr – Revenue Cycle Management H. Falk – Human Resources and Best Practices Brain Ketcheson – Commercial and Non-technical Losses Manager Don Rochon – Customer Field Specialist Mike Demchenko - Customer Field Specialist

Narrative Description of Project:

The SEETEC project played an important role in attempting to meet the needs in electrical energy of Southeast Europe. CIDA's largest project in the region developed a strong partnership in the field of electrical energy and served as a vanguard for the improvement of trade and the channelling and investment into Southeast Europe. Manitoba Hydro International was the Utility Partner within the consortium.

The initial objectives of the project were to assist the Stability Pact in:

- Restoring and further enhancing regional co-operation in electricity as a means of better meeting their needs in electricity.
- Completing the rehabilitation and updating of generation and restoring and expanding transmission.
- Developing and implementing optimum strategies for further development of their electrical systems.
- Carrying out, completing and/or adjusting reforms of the electrical sector.

- Developing and implementing optimum strategies for integrating climate change commitments and environmental obligations into the above objectives, as well as taking advantage of mechanisms existing in the various worldwide agreements on climate change.

MHI provided services for the SEETEC Project in Serbia, Kosovo, and Albania.

Description of Actual Services Provided by your Staff Within the Assignment:

Serbia - Technical Assistance and Training Services

The services provided were related to training and technical assistance in all aspects of the business and technical operations of an electric utility. More specifically:

- Elektropriveda Srbije (EPS) was provided with support in the preparation of a business case to the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB) to finance the installation of an OPGW fibre optic communications system including related end equipment. Financing was justified on the basis of cost savings that can be achieved through the implementation of an EMS/SCADA system. In addition, three EPS engineers were hosted by the Communications Department for a one-month period in 2002. A comprehensive training program was developed that was customized to meet EPS needs specific to the anticipated communications project including EBRD procurement policies and rules.
- Training was provided to EPS professionals in the specification, installation, testing, operating and upgrading of Energy Management Systems (EMS) required for dispatching electric power systems. The future re-connection of the EPS power system to the Western European grid and the establishment of a Regional Energy Market in Southeastern Europe will require a state-of-the-art EMS to be installed at the National Control Centre in Belgrade. The Swiss Government has decided to assist EPS by donating an EMS (and other related facilities) to be installed at the National Control Centre in Belgrade.
- A training course on Substation Automation was provided regarding Substation Automation which is the use of Intelligent Electronic Devices (IEDs) for data acquisition, protection, metering and control of substations.

Kosovo - Evaluation of Commercial Losses

MHI's assignment involved the following tasks:

- Reviewing the current processes and procedures for collection activities within commercial operations while identifying opportunities for improvement.
- Performing field audits by gathering customer and meter information allowing the SEETEC expert to gather actual information on the line and analyze the accuracy of metering and consumer data files.
- Providing information relating to illegal connections and bypassed meters for a "representative sample" of feeders which would allow for the extrapolation of information in predicting a more accurate level of non-technical losses including thefts throughout KEK.
- Scheduling and performing meter reading, reviewing field work, formatting meter reading information for data entry and following up on exception reports.
- Training and leading field connection and disconnection crews in a very successful pilot programme of customer interaction and enforcement that was sustainable.

Manitoba
HYDRO INTERNATIONAL

Albania - Regulatory & Tariff Study Tour

MHI hosted all of the staff of the Albanian Regulatory Authority (Tirana, Albania) in Winnipeg, Canada. The objectives of the study tour were:

- To provide the participants with an understanding of the concepts related to the regulatory construct used in setting rates, including incentive based rates and price caps;
- To provide advice on Asset Valuation for Tariff setting purposes;
- To provide the participants with an understanding of impacts of deregulation;
- To provide the participants with an appreciation of issues related to customer care measured in terms of reliability, quality of power, price and responsiveness to requests for service, emergencies and restoration of power;
- To provide the participants with exposure to a regulatory hearing and the processes related thereto; and
- To provide the participants with an understanding of the implications of the changing landscape related to electrical supply in South-Eastern Europe.

The member group witnessed rate hearings presented by the Manitoba Hydro Electric Board to the Manitoba Public Utilities Board in response to a general rate application. They also received presentations from electric utility staff of various aspects of the rate application process.

Manitoba
HYDRO INTERNATIONAL

Assignment Name: Energy Infrastructure Services Project Kerala Component	**Approx. value of the contract (in current US$ or Euro):**
Country: India **Location Within Country:** Kerala State	**Duration of Assignment (Months):** 38
Name of Client: Kerala State Electricity Board Canadian International Development Agency	**Total No of Staff-months of the Assignment:** 93
Address: Kerala State Electricity Board Vydyuthi Bhacanam, No.1028, Pattom Thiruvananthapuram, Kerala, India 695 004 Canadian International Development Agency 200 Promenade du Portage Hull, Qc, Canada K1A 0G4	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: March 1997 **Completion Date:** March 2001	**No. of Professional Staff-months provided by associated Consultants:** 70
Name of Associated Consultants, if any: Stikeman, Elliot Sigma VI/ Universalia Nova Scotia Power	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** J. Melvin - Quality Control Officer Shawna Pachal – Process Improvement Specialist Dave Rivest – Customer Service Specialist Jim Hall – Safety Specialist Al Snyder – Executive Reform Damon Rondeau – HR Planner

Narrative Description of Project:
The scope of the work covered during this complex multi-disciplinary project was to assist the Government of Kerala and the Kerala State Electricity Board (KSEB) in addressing the reform and restructuring of the electricity sector as generation is opened up to competition and regulation is introduced. A major component of the project was capacity enhancement and training.

Description of Actual Services Provided by your Staff Within the Assignment:

- Development of a least cost development plan that will be used to guide decisions regarding the selection of projects and assess future needs in terms of generation and transmission; including, load forecast, generation plans and transmission plans, and preparation of pre-feasibility studies for hydro and thermal projects for private sector participation.
- Working with KSEB staff, established a human resources development system through capacity building.
- Assisted with organizations restructuring including, the review of power sector organization and structure.
- Developed strategies and plans for the reorganization of the electric power sector in the State of Kerala.
- Determined the type of regulation to be introduced.
- Created a Working Paper on findings, alternatives and options.
- Planning Guides were issued for load forecast, generation and transmission planning.

Manitoba
HYDRO INTERNATIONAL

Assignment Name: Technical Assistance - Hydropower Development and Operations	**Approx. value of the contract (in current US$ or Euro):**
Country: Canada **Location Within Country:** Northern, Canada	**Duration of Assignment (Months):** 2
Name of Client: Manitoba Hydro	**Total No of Staff-months of the Assignment:** 6
Address: 820 Taylor Avenue Winnipeg, Manitoba Canada R3M 3T1	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: May 2007 **Completion Date:** Ongoing	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Team Leader- Alex Gerrard Operations Manager - Nigel Wills Training Manager - Harold Falk Maintenance Engineer - Don Ans Maintenance Planner - Rob Schumann HR Officer - Sharon Klassen Accountant - Gerald Budnick Generation Performance - Verne M. Percival Transmission Planning Engineer - Les Recksiedler Transmission Maintenance - Ed McColm Telecommunications Engineer - Murray Matiowsky

Narrative Description of Project:
MHI has been contracted to provide technical assistance to a major Canadian energy company for the development of a 1200 MW hydropower facility in Northern Canada. Client and site names are confidential.

Description of Actual Services Provided by your Staff Within the Assignment:
The work consists of:

- Review conceptual plant designs and demographics and geographic features of the plant location
- Recommend Staffing numbers, skills, level of automation.
- Pros/cons of alternative operating strategies.
- Estimate local employment opportunities and training requirements.
- Estimate conceptual annual operating costs and maintenance plan and strategy.

Manitoba
HYDRO INTERNATIONAL

Assignment Name: Valuation of Seventy (70) Hydro Plants in Sweden	**Approx. value of the contract (in current US$ or Euro):**
Country: Sweden **Location Within Country:** Various Locations	**Duration of Assignment (Months):** 2
Name of Client: Mott-MacDonald representing Financiers for Major Hydro Power Owner and Operator	**Total No of Staff-months of the Assignment:** 2
Address: Victory House Trafalgar Place Brighton, UK	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: April 2000 **Completion Date:** June 2000	**No. of Professional Staff-months provided by associated Consultants:** None
Name of Associated Consultants, if any: None	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Bill Burbank – Hydropower Operations Specialist

Narrative Description of Project:
The objectives of this sub-contract to Mott-MacDonald was to assist in the evaluation 70 hydro sites through the study of 20 selected sites in conjunction with owners, lenders and purchaser, to determine the value of the assets. Purchaser and Lender information confidential.

Description of Actual Services Provided by your Staff Within the Assignment:
The work consisted of:

- Site inspections of 20 facilities, involving technical and physical inspection.
- Reviewed operation and maintenance of each selected plant, including operating history, reliability and plant efficiency.
- Reviewed compliance with legislation and consents.
- Evaluated financial aspects.
- Presented findings.

Manitoba
HYDRO INTERNATIONAL

Assignment Name: Tasmania to Victoria HVDC Inter-connector BOT Project	**Approx. value of the contract (in current US$ or Euro):**
Country: Australia **Location Within Country:** Tasmania to Victoria	**Duration of Assignment (Months):** 4
Name of Client: Taslink Consortium	**Total No of Staff-months of the Assignment:** 5
Address: 452 Flinders Street Melbourne VIC 3000 Locked Bag 14060, Melbourne 901	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: July 1999 **Completion Date:** October 1999	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Ian McKay - Project Engineer

Narrative Description of Project:
To provide expert consulting services as "Project Engineer" to TASLINK Consortium and to produce a "Project Technical Design Review Report".

Description of Actual Services Provided by your Staff Within the Assignment:

- Assisted in carrying out an engineering review of the project design.
- Provided advice of the structure, role and responsibilities of long term operations and asset management organization, with an emphasis on higher level issues.
- Worked with TASLINK to assist in defining the project's operation and asset management requirements, in order to design the organizational structure responsible for governance, supervision and management of the overall scheme.
- Provided assistance with designing a suitable Maintenance Sinking Fund and an associated equipment replacement strategy.
- Provided assistance and advice on the replacement strategy for all major equipment and critical sub-components.
- Determined life projections, recommended replacement strategies and estimates of associated costs to achieve a 40 year project life.
- Assisted in establishing reasonable equipment life cycles for the purpose of establishing a maintenance sinking fund.
- Assisted with the preparation of a performance based operations/ asset management/ maintenance specification, including appropriate performance indicators.
- Reviewed the proposed project design, and prepared and presented a report on the review findings.

Manitoba
HYDRO INTERNATIONAL

Assignment Name: Gabral-Kalam Hydropower Project	**Approx. value of the contract (in current US$ or Euro):**
Country: Pakistan **Location Within Country:** Lahore and Swat Valley Northwest Frontier Province	**Duration of Assignment (Months):** 24
Name of Client: Rupali Group Limited	**Total No of Staff-months of the Assignment:** 6
Address: 97- B/D – 1, Gulberg Lahore – 54660 Pakistan	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: April 2005 **Completion Date:** April 2007	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** N. Wills – Project Leader R. Horocholyn – Financial Analyst A. Whitcomb – Construction Specialist A. Gerrard – Feasibility Study Technical Specialist

Narrative Description of Project:
MHI is acting as Technical Advisor (Owner's Engineer), to provide technical assistance services to the Client to strengthen its capacity to carry out the management of the project feasibility study and potential project implementation and to advise the Client during any potential negotiations with the Government of Pakistan.

Description of Actual Services Provided by your Staff Within the Assignment:

- Prepared RFP and Feasibility Study Consultant contract.
- Assisted with negotiation and Award of contract.
- Monitored Consultants progress and approved all sub-contractor and sub-consultant agreements.
- Represented the Client in technical oversight of Feasibility Study Consultants work.
- Represented the Client in its interaction with the Private Power Infrastructure Board (PPIB), WAPDA and the regulator NEPRA.
- Expected to engage in negotiations on tariff and ROI for the project with the Government.
- Prepare representations to PPIB and NEPRA on attracting private investment to the sector.

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HYDRO INTERNATIONAL

Assignment Name: 300 MW Generation and transmission feasibility studies and Implementation	**Approx. value of the contract (in current US$ or Euro):**
Country: Tanzania **Location Within Country:** Dar es Salaam	**Duration of Assignment (Months):** 12
Name of Client: Artumas Gas and Power (AG&P) Ltd.	**Total No of Staff-months of the Assignment:** Initially 6 staff months for Pre-feasibility Study Phase
Address: Artumas Group Inc. 2000, 715-5th Avenue SW Calgary, Alberta T2P 2X7	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: February 2007 **Completion Date:** Ongoing	**No. of Professional Staff-months provided by associated Consultants:** N/A
Name of Associated Consultants, if any: N/A	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Alex Gerrard - Senior Power Engineer Al Whitcomb - Hydropower Construction Engineer Zibby Kieloch - Transmission Civil Design Engineer Jason Doering - Generation Planning Engineer Jim Roik - Transmission Electrical Design Engineer Rick Horocholyn - Financial Analyst Trent Hreno - Environment and Social Specialist Nigel Wills - Project Co-ordination C. Siemens - Finance and Administration Officer Other Support Staff
Narrative Description of Project: Artumas Gas and Power (AG&P) wishes to explore options for monetizing the Mnazi Bay Natural Gas Fields. MHI is managing the procurement and supervision of feasibility studies focused on a generation facility of approximately 300 MW in the Mtwara region of Southern Tanzania and the transmission requirements to move energy to load centres, including the environmental and social impact assessments.	
Description of Actual Services Provided by your Staff Within the Assignment: MHI staff as listed above carried out the procurement of feasibility study consultants on an ICB basis and supervised and directed the consultants on an ongoing basis as well as providing advice and guidance to the developer AG&P.	

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HYDRO INTERNATIONAL

Assignment Name: Electric Power III Reconstruction	**Approx. value of the contract (in current US$ or Euro):**
Country: Bosnia and Herzegovina **Location Within Country:** Entire Country of Bosnia and Herzegovina	**Duration of Assignment (Months):** 8
Name of Client: World Bank (IBRD)	**Total No of Staff-months of the Assignment:** 7
Address: 1818 H Street, NW Washington, DC 20433 United States of America	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: June 1999 **Completion Date:** January 2000	**No. of Professional Staff-months provided by associated Consultants:** 20
Name of Associated Consultants, if any: Teshmont Consultants AGRA Monenco	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** James N. Roik – P. Eng. - T&D Specialist

Narrative Description of Project:
In March of 1999, AGRA Monenco and Teshmont Consultants Inc. contracted with the International Bank for Reconstruction and Development to provide consulting services for feasibility studies and preparation of the 2000 – 2002/2003 electric power rehabilitation program for Bosnia and Herzegovina. This program, known as Power III, was to be used as the technical and economic basis for the proposed Third Electric Power Reconstruction Project for Bosnia and Herzegovina.

The consulting team developed a detailed plan for continuing to rehabilitate and strengthen the bulk transmission system and distribution networks to further improve availability, safety, and environmental impacts and to support power sector reform, coal sector restructuring, and strengthening of the power sector institution. The consulting team provided services in the areas of Transmission, Substations, Generating Stations, Distribution, System Analysis, and Economic Analysis. The need for projects was analyzed and justified both from a systems and economic bases. Detailed estimates and lists of materials were provided to IBRD to be used in their negotiations with donor countries.

Description of Actual Services Provided by your Staff Within the Assignment:
For this project, MHI:

- Verified cost estimates and prepared detailed bills of material.
- Ensured that available funds were being used in the most appropriate manner.
- Held meetings with specialists in each of the three distribution companies.
- Conducted site visits to evaluate progress and the existing condition of the distribution system.
- Prioritized projects requested by the distribution companies.
- Analyzed needs to determine distribution of funds to each distribution company.

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HYDRO INTERNATIONAL

Assignment Name: Rehabilitation/Upgrading of the Liberian Interconnected Power System and Two Community Based Off-grid Electrification Schemes	**Approx. value of the contract (in current US$ or Euro):**
Country: Liberia **Location Within Country:** Liberia	**Duration of Assignment (Months):** 18 months
Name of Client: World Bank	**Total No of Staff-months of the Assignment:** 33 months
Address: 1818 H Street, NW Washington, DC 20433 USA	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: March 2005 **Completion Date:** June 2007	**No. of Professional Staff-months provided by associated Consultants:** 20 months
Name of Associated Consultants, if any: Kaehne Consulting (Diesel) CEMMATS Group (Sierra Leone) Waters Group Liberia Ltd	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** R. Watson – Team Leader J. Kaenhe – Generation Specialist J. Roik – Transmission/Distribution Specialist W. Young – Financial Management Specialist R. Horocholyn – Financial Analyst/Economics J. E. Kilimpt – Environment/Safegaurds Expert E. Onuebuchi – Community Driven Electrification J. Melvin – Contract Specialist

Narrative Description of Project:
MHI was contracted by the World Bank to assist with the implementation of its power sector aid program in post conflict Liberia. The objective of the project was to provide interim support to the Liberia Electricity Corporation to keep the existing generation operable until arrangements can be completed to install replacement generation and distribution in Monrovia, while keeping the existing plant as back-up to the extent possible. In addition, two off-grid community driven electrification schemes were identified and planned for implementation.

Description of Actual Services Provided by your Staff Within the Assignment:
Specific Tasks performed.

- Condition assessment of existing generation, O&M, spare parts and fuel supply.
- Prepared a feasibility study for replacement modular generation and conduct rapid load survey.
- Identification of optimum generation scheme.
- Evaluation of distribution system and identification of distribution requirements.
- Loss reduction strategies.
- Designed and cost an implementation plan.
- Developed design standards and procurement specifications.
- Environmental and Social Impacts assessment.
- Prepared Terms of Reference for Performance Based Management Contract.
- Preparation of least costs fuel procurement plan
- Feasibility Study for Off-Grid electrification schemes.

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HYDRO INTERNATIONAL

Assignment Name: System Improvement Project	**Approx. value of the contract (in current US$ or Euro):**
Country: Saudi Arabia **Location Within Country:** Country Wide	**Duration of Assignment (Months):** 35
Name of Client: Saudi Electric Company (SEC)	**Total No of Staff-months of the Assignment:** 167
Address: Saudi Electricity Company Room No. 2-305W – Headquarters Bldg – Dammam P.O. Box 5190, Dammam 31422 Kingdom of Saudi Arabia	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: January 2010 **Completion Date:** November 2012	**No. of Professional Staff-months provided by associated Consultants:** None
Name of Associated Consultants, if any: None	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** Dan Shiels - MHI Project Technical Coordinator Dharshana Muthumuni - Project Manager Task 3 Garry Clelland - System Operations Specialist Gordon Onsowich - System Operations Specialist Rudy Spack - System Operations Specialist Bob MacKay - System Operations Specialist Doug Rempel - Team Support Bill Strong - Team Support Dennis Ruchotzke - Team Support Gerry Arnason - Team Support Lyndon Miller - Team Support Craig McLean - Team Support HVDC System Studies - Engineering Study Team

Manitoba
HYDRO INTERNATIONAL

Narrative Description of Project:

MHI has been contracted to help the Saudi Electric Company (SEC) improve the performance of its electricity transmission network. The contract awarded to MHI contains six components; each one focused on a specific need of the SEC.

Description of Actual Services Provided by your Staff Within the Assignment:
These components are as follows:

- Review, update, or create the black start restoration plans for the four main operating areas and two minor areas.
- Review, update, create, and unify the Operating Policies, Procedures, & Guidelines for the four main operating areas.
- Conduct nine system engineering studies as pre-defined by SEC. These include interconnection studies, line energizing over voltages studies, harmonic studies, load flow studies, fault level studies, dynamic studies, and electromagnetic transient studies.
- Conduct Basic and Advanced Level training in Saudi for the system operations staff, as well as "Specialized Training" at the System Control Centre in Manitoba. The training includes the following topics:
    - Power Flow
    - System Frequency
    - Generation Control
    - Power System Monitoring & Control
    - Voltage Dynamics & Control
    - Frequency Dynamics & Control
    - Power System Restoration
    - Reliability and Security
    - Voltage Control and Load Shedding
    - Real – time Operations and Reliability Readiness
- Provide system operations specialists to assist with the management of the four main operating centers for a one year period.
- Provide five high voltage apparatus specialists to review and update the maintenance standards and to review and advise on equipment failures.

Manitoba
HYDRO INTERNATIONAL

Assignment Name: Southern China Strategic Energy Planning Project – Phase II	**Approx. value of the contract (in current US$ or Euro):**
Country: China **Location Within Country:** Beijing, Yunnan, Guizhou, Guangxi, Guangdong	**Duration of Assignment (Months):** 36
Name of Client: Canadian International Development Agency	**Total No of Staff-months of the Assignment:** 31
Address: 200 Promenade du Portage Gatineau, Quebec K1A 0G4	**Approx. value of the services provided by your firm under the contract (in current US$ or Euro):**
Start Date: August 1999 **Completion Date:** August 2002	**No. of Professional Staff-months provided by associated Consultants:** 75
Name of Associated Consultants, if any: Ontario Power Generation Teshmont Consultants	**Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):** R. K. Buckland – Project Director Hao Liu – Project Manager and Team Leader – Economic and Load Forecast Strew Jenkinson - Project Advisor Blaine Poff – Strategic Issues and Policy Formation John McNichol – Transmission Tariff Development and Analysis Anibal Carias - Senior Supply Analyst David Stregger – Team Leader – Option Evaluation and Policy Analysis Mark Orton - Team Leader Energy Supply Analysis Gayle Turner – Team Leader Human Resource Development

Narrative Description of Project:
The content of the SEP Extension covered what was described for Phase I and further extended to address issues affected by the events which occurred in the power sector, including government restructuring and the creation of a State Power Corporation in March 1998, the power sector restructuring in 1999, and the government policy on west-east development. These changes, along with the growing awareness of environmental issues and the emphasis on west-east development and poverty alleviation, affected both the mandate of the power sector and the approach to this project.

Description of Actual Services Provided by your Staff Within the Assignment:

- Planned for the four provincial systems to meet the recently established air emission regulations, particularly the acid-rain gases emissions.
- Analyzed the proposed west-east interconnection involving transferring power from the western provinces to Guangdong with the aim of:

  - Estimating the economic benefits with respect to sharing regional resources, load diversification, reserve sharing, and seasonal hydro thermal operation.
  - Assessing air emission reductions throughout the southern provinces and particularly within the eastern provinces.
  - Assessing socio-economic impacts.
  - Conducting financial analysis to assess the impact of proposed power exchange on the financial performance of the provincial power corporation and providing inputs for setting prices for power exchange.
- Analyzed structural and institutional issues related to the recent power sector restructuring.
- Analyzed current operation of regional power exchanges and evaluated potential options for regional electricity markets with further enhanced power exchanges among southern provincial systems.
- Provided training to counterparts on the above aspects.
- Analyzed and quantified the identified regional trading and operating benefits and provided training for various market rules and operating models.
- Held workshops and training sessions in China and formal training in Canada together with Technical Missions for senior company personnel.

Manitoba
HYDRO INTERNATIONAL

2.5. *HVDC Relevant Experience*

PAST PROJECTS (Last 5 years)		
Project Description	**Client/Associated Firms**	**Location**
Lamar/Finney Back-to-Back DC Project		
Assist with the construction, factory testing, supervision, commissioning and operation of DC back-to-back system and long term flicker analysis.	Xcel Energy	USA
Transmission Line Options Study		
Assessment of DC transmission technologies applied to upgrading major transmission of the Alberta interconnected electric system.	ESBI Alberta Ltd.	Alberta, Canada
Interconnection Transmission Line Protection		
Protection study involves the selection and verification of the 500 kV transmission line protection on a series compensated transmission line.	Manitoba Hydro	Winnipeg, Canada
Wind Farm Integration High Voltage Breaker Assessment		
Performed a study on the capabilities of the existing high voltage breaker to operate successfully with the addition of a new 70 MW wind farm.	City of Lethbridge	Alberta, Canada
Generation Resource Loss of load Probability Assessment		
Study reviewed the generator mix together with market options and performed an analysis on the Loss of Load Expectation or reliability of the generation resource to meet future demands.	FortisBC	BC, Canada

Wind Farm Integration Study		
Reviewed the available study documents, and made recommendations on main issues related to this wind farm connection.	Primrose Wind Power Development Ltd./Manitoba Hydro	Manitoba, Canada
AC Collector System and HVDC Links		
AC to DC system interactions with Northern Collector System.	Manitoba Hydro	Manitoba, Canada
Ponton SVC		
Project Management for 3 years for SVC Specification development and FAT.	Manitoba Hydro	Manitoba, Canada
Highgate B2B HVDC System		
Life Assessment Study.	VELCO	USA
Alaska HVDC SWER Project		
HVDC Single Wire Earth Return. HVDC Distribution Low Power Project, Subject Matter Experts and Technical Specification review.	PolarConsult	USA
HVDC Control Life Extension		
Life Extension Study and Report Preparation.	EPRI	USA
HVDC Overcurrent Diverter Removal Study		
OCD Removal Study to assess the impact on valve operation complete with recommendations.	HCB - Cahora Bassa	Mozambique, Africa

CURRENT PROJECTS		
Operating Guidelines, Black Start Studies and Interconnection Limits		
Studies using PSS/E and PSCAD to assist SEC with combining four separate regions of the country into one company.	Saudi Electric Company	Saudi Arabia
HVDC Transmission Monopole / Controls Replacement, and SVC		
Master Services Agreement for two (2) years for the provision of Engineering Services.	ATCO Electric Ltd.	Alberta, Canada
CASA 1000 HVDC Transmission Line		
Provided technical advice on the environmental and social aspects of a 500 kV 1000 MW HVDC Transmission line between Tajikistan and Pakistan.	Integrated Environments	Manitoba, Canada
HVDC Converter Station Life Assessment Study		
Transformer Life Assessment Study.	High Energy Inc.	USA

2.6. MCW Relevant Experience

PAST PROJECTS		
Project Description	**Client/Associated Firms**	**Location**
Lameque Wind Generation Facility		
Detailed design for a 45MW wind generation facility in New Brunswick. Project scope includes provision of electrical design for the Collector sub-	Lameque	New Brunswick

station, Operation and Maintenance Building, Transmission Interconnection, Collector System and SCADA system. Work also included provision of system studies for collector system, equipment specifications, and grounding design.		
Sequioa Energy, Border Wind		
Preliminary designs and cost estimates for a new 160MW wind farm project located in North Dakota. The preliminary work consisted of preparing Collector System Distribution Feeder Layouts, Collector System Single Lines, Interconnection Station and Collector Substation Layouts, Single Line Diagrams, Collector Substation Transformer Specifications, Protection Design Philosophy, and preparing Cost Estimates for the projects. MCW/AGE assisted Sequioa with evaluation of the various studies that where conducted to determine the feasibility and conditions for connecting the wind farm to the grid, and assisted Sequoia with the evaluation of proposed Interconnection Operating Agreements.	Sequioa Energy	North Dakota
20MW Windsam Wind Power Project		
Preliminary engineering to include preparation of the single line, substation plan and profile layouts, distribution collection system layouts, capital cost estimate and application for CIA to the Utility.	Windsam	Ontario
Leader Wind Corporation – 400MW Wind Power Project		
Preliminary engineering to assist in the submission for the Renewable Energy RFP of OPA. Scope included preparation of single line, protection philosophy report, substation plan and profile layouts, distribution collection	Leader Wind Corporation	Ontario

system layouts, capital cost estimate, application for System Impact Assessment Study (SIA) to the Independent Electrical System Operator (IESO) and application for CIA to the Utility.		
Echo Power Corporation – 50MW Wind Power Project		
Preliminary engineering to include preparation of single line, protection philosophy report, substation plan and profile layouts, distribution collection system layouts, capital cost estimate, application for SIA to IESO and application for CIA to the Utility.	Echo Power Corporation	Ontario
Twenty-Two Degrees Corporation – 200MW Wind Power Project		
Preliminary engineering to include preparation of single line, protection philosophy report, substation plan and profile layouts, distribution collection system layouts, capital cost estimate, application for SIA to IESO and application for CIA to the Utility.	Twenty-Two Degrees Corporation	Ontario
Sequioa Energy Wind Farm Projects		
Preliminary designs and cost estimates for three wind farm projects located in Manitoba. The preliminary work consisted of preparing Collector System Distribution Feeder Layouts, Collector System Single Lines, Collector Substation Layouts, Collector Substation Single Line Diagrams, Transmission Line Single Line Diagrams, Collector Substation Transformer Specifications, Protection Design Philosophy, and preparing Cost Estimates for the projects. MCW/AGE assisted Sequioa with evaluation of the various studies that where conducted by Manitoba Hydro to determine the feasibility and conditions for connecting the wind farms, and	Sequioa Energy	Manitoba

assisted Sequoia with the evaluation of proposed Interconnection Operating Agreements for each project.		
Skypower Inc. – 50MW & 100MW Wind Power Projects		
Preliminary engineering to assist in the submission for the Manitoba Hydro RFP. Scope included preparation of the single line drawings, substation plan and profile layouts, project cost estimates, completion of technical schedules and overall project schedule.	Skypower Inc.	Manitoba

3.0 Description of Approach, Methodology and Work Plan for Performing the Assignment

3.1. Technical Approach and Methodology

It is evident that the Newfoundland and Labrador Board of Commissioners of Public Utilities, in its on-going efforts to expand the generation capacity of the Island of Newfoundland's Interconnected Electrical System, intends to decide between two Generation Expansion Alternatives in order to identify the least cost-option for the supply of power to Island Interconnected Customers. It is also understood that the consultant chosen for this project will assess each option by reviewing all relevant studies, reports, cumulative present worth analyses, and any additional sources which pertain to the alternatives. The consultant will also, whilst reviewing the existing information, report on whether the previous work was performed with the degree of skill, care and diligence which is customarily upheld for an appraisal of this nature. Upon completion of the comprehensive review, the consultant will then thoroughly review the Cumulative Present Worth (CPW) Analysis of each alternative in order to identify the least-cost alternative. Finally, it is understood that the consultant will relay its findings in a thorough final report and to provide on-going support to the Board in its preparation of its report to the Government of Newfoundland and Labrador. This support will potentially include: attendance at a technical conference and public consultations in the Province, and perhaps to give presentations and evidence at both events.

To carry out this project, a significant amount of time on the ground in St. John's has been provisioned for, in order to carry out both exploratory and consultation meetings with the Board and Nalcor. During the first visit, two key staff will perform a GAP analysis and plan for technical visits of project experts. Four visits for the Project Manager and CPW Analyst, and eight additional expert visits are planned and provisioned for in the financial estimate. The Project Manager will be the key point of contact and will represent the project team in all activities.

Meetings are planned to be conducted at Nalcor facilities if available. If no suitable office space or meeting facilities are available, meeting and office facilities will be arranged at a suitable site or hotel in St. John's.

Therefore, MHI is proposing to provide consulting services in order to carry out the professional services required to review and report on the two generation expansion alternatives. In the provision of the aforementioned services, MHI will produce the following deliverables:

1) Bi-weekly Progress Reports
2) A Final Report
3) Provision of On-going Support

A visual representation of the projects activities is shown in Figure 3-1:

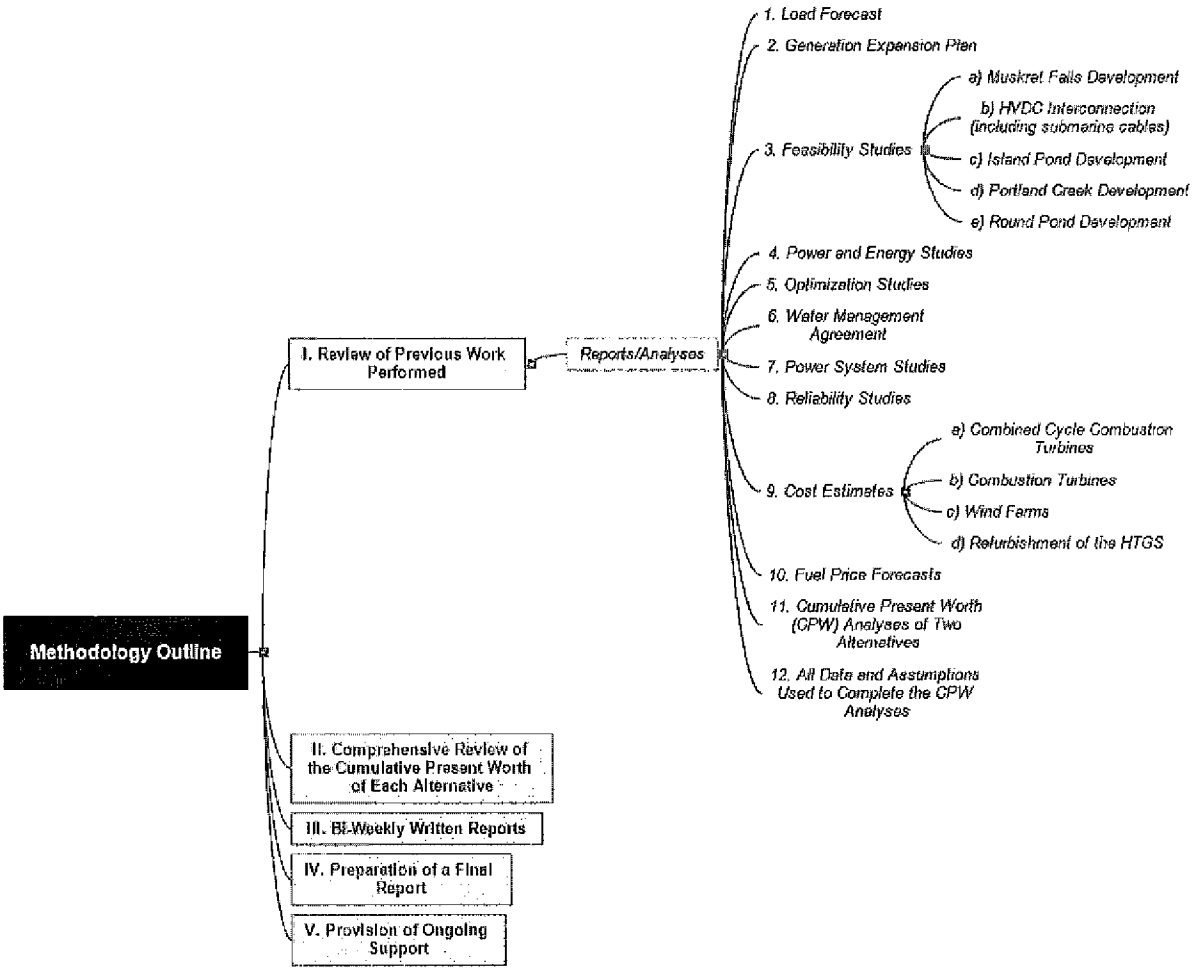

Figure 3-1: Visualization of Project Activities

3.2. Preliminary Evaluation

Once awarded the contract, the first item MHI will address will be to conduct a preliminary evaluation of the volume of literature in which the firm must review. Upon

completion of this review, MHI will submit to the client a budgeted level of effort for the assignment if the volume exceeds that anticipated in this proposal. MHI and the Client may collectively appraise and agree upon the projects level of effort in order to lay the ground work for monitoring and controlling costs.

I. Review of Previous Work Performed

MHI's consulting team will perform a detailed review of all previous work performed by consultants and others related to the Projects and the Isolated Island Option. The review will examine all published reports made available to the project team, and include meetings to interview staff who prepared the documents to expose any undocumented assumptions and factors of consideration. The level of review will be sufficient to report on whether the work was performed with the degree of skill, care and diligence required by customarily accepted professional practices and procedures normally completed in the performance of similar work.

The consulting team will review all available documentation from the studies, reports and related information regarding the two Alternatives that have been prepared over the past years on the various components of each Alternative. The consulting team will be assigned reports based on their particular expertise and will provide comprehensive reviews that identify any gaps that exist in the analysis. Each review will be unique to the type of analysis being performed but will at a minimum will include:

- Ensure that the existing reviews included adequate and reliable source documents;
- Examine and analyse the inputs included in each report for accuracy and relevance;
- Review the methodology used to create each report;
- Analyse the accuracy of any estimates or assumptions made in the existing analyses;
- Review all notes and exceptions made in the existing analyses;
- Outline any gaps or related issues in the existing studies, analyses and reports;
- Provide a professional recommendation on findings; and
- Examination of quality assurance mechanisms.

Copies of the reports and analyses to be reviewed may include:

1. Load Forecast
2. Generation Expansion Plan
3. Feasibility Studies
   a) Muskrat Falls Development
   b) HVDC Interconnection (including submarine cables)
   c) Island Pond Development
   d) Portland Creek Development
   e) Round Pond Development
4. Power and Energy Studies

5. Optimization Studies
6. Water Management Agreement
7. Power System Studies
8. Reliability Studies
9. Cost Estimates
   a) Combined Cycle Combustion Turbines
   b) Combustion Turbines
   c) Wind Farms
   d) Refurbishment of the HTGS
10. Fuel Price Forecasts
11. Cumulative Present Worth (CPW) Analyses of Two Alternatives
12. All Data and Assumptions Used to Complete the CPW Analyses

II. Comprehensive Review of the Cumulative Present Worth of Each Alternative

MHI's financial specialist will perform a comprehensive review and analysis of the existing Cumulative Present Worth (CPW) analysis of the Projects and the Isolated Island Option to enable the Board to identify the least-cost alternative.

Specifically, the finance specialist will:

- Ensure that the existing reviews included adequate and reliable source documents;
- Examine and analyse the financial inputs included in the CPW for accuracy and relevance;
- Comment on the financial risks associated with each of the two alternatives;
- Review the methodology used to calculate the CPW;
- Analyse the accuracy of any estimates or assumptions made in the existing analyses;
- Review all notes and exceptions made in the existing analyses;
- Outline any gaps or related issues in the existing studies, analyses and reports;
- Provide a professional recommendation on findings; and
- Provide advice regarding the preferred Alternative.

III. Bi-Weekly Written Reports

The Project Manager in conjunction with the consulting team will prepare and submit Bi-weekly Written Reports to the Board and relevant concerned parties agreed to by the Board for the duration of the project. These reports will be submitted by e-mail, and will provide:

- A brief update on major progress and outstanding issues;
- The status of the technical and economic aspects of the services;
- A review of the consulting team personnel involved in the performance of the services;
- Any expected changes to the total forecast-final-cost of performance and services; and
- Any other subjects related to the performance of the services.

These reports will be based upon standard reports used by MHI on similar projects and feedback on content, which will be obtained by the Project Manager from the Board.

IV. Preparation of a Final Report

The Project Manager will compile all project analyses and relevant data to prepare a final report which will include, as a minimum the following:

- An executive summary
- Description of the Consultant's review team
- Description of the methodology used to complete the Services
- Summary of the results of the review, including significant data gaps and issues, if any.

MHI is also suggesting that before the submission of the final report that we submit a draft proposal to the Board for discussion and review. In the event that this suggestion is implemented the consulting team will incorporate applicable feedback from the Board into the Final Report.

V. Provision of Ongoing Support

MHI's Project Manager and other senior representative(s) or designate(s) approved by the Board, will provide ongoing support to the Board in preparation of its report to the Government of Newfoundland and Labrador.

Such support may include the following:

- Attendance at a technical conference where third parties and their experts will have the opportunity to ask questions and raise issues related to the Consultant's report.
- Attendance at public consultations in the Province.
- Telephone meetings and enquiries to answer Board immediate questions.

MHI's senior representative(s), or designate(s), approved by the Board, will be available if required, to make presentations and give evidence at public consultations and the technical conference.

In the performance of the Services, MHI will at all times be subject to the direction of the Board and be the agent of the Board in dealing with third parties in relation to the performance of the Services.

3.3. Organization and Staffing

In order to execute a project of this nature, a diverse team of MHI experts with in-depth and expansive knowledge of all facets of generation, HVDC interconnections, load requirements, power and energy studies, optimization studies, power system studies, reliability studies, cost estimates, price forecasts, and cumulative present worth analysis is being proposed.

Also available to the Project Team are Manitoba Hydro support resources, which include relevant Manitoba Hydro departments and MHI Divisions such as:

- Generation Planning
- System Planning Division
- Gas Distribution Division
- Power Projects Development
- The Manitoba HVDC Research Centre

MHI's team and respective roles are described below.

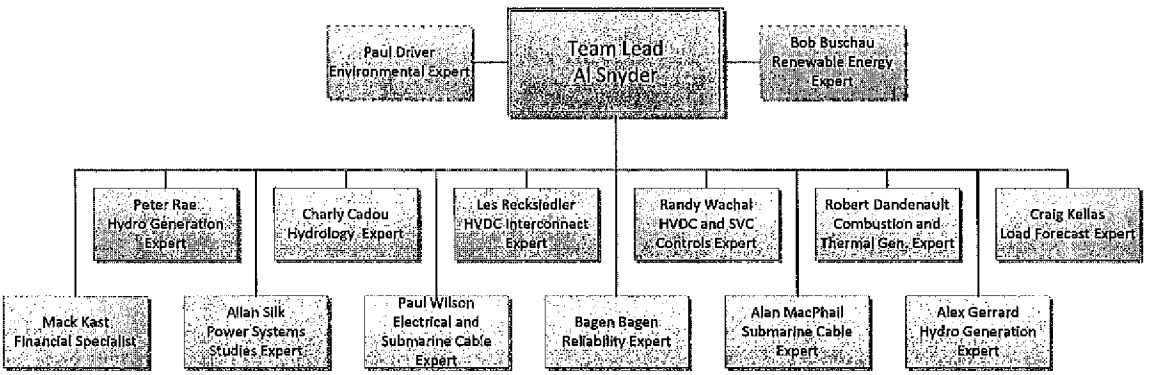

Figure 3-2: Project Team Organizational Chart

Mr. Allen MacPhails participation and compliance as per clause 11 has yet to be confirmed.

Al Snyder (Project Manager / Team lead)

Mr. Snyder is a Utility Management Expert with over 44 years of experience in the electrical utility industry. Mr. Snyder has held the position of Vice President of Distribution and Transmission as well as Vice President of Power Supply at Manitoba Hydro. Over his time at Manitoba Hydro, he lead the re-engineering of the Corporation into three Business Units; Generation, Transmission & Distribution, and Customer Service & Marketing. Internationally, Mr. Snyder provided organizational re-structuring expertise in India, the Bahamas, and more specifically Saudi Arabia where he assisted with setting up the organizational structure and developing the strategic business plan for the Gulf Cooperative Council Inter-Connection Authority. Also, Mr. Snyder acted as the Deputy General Manager of Kenya Power and Light during the MHI Management Contract, and was accountable for coordination and management of the planning, design, construction, operations and maintenance of the transmission network; formulation strategies, policies and standards to improve the overall effectiveness of the delivery of transmission services; and developing strategies and plans to support the defined performance improvements. Mr. Snyder is currently acting as the industry expert for the Utility Consumer Advocate in the Province of Alberta with respect to their 14 billion dollar investment in new transmission.

Peter Rae

Mr. Rae possesses a Master Degree in Civil Engineer with over 30 years of experience in Hydro generation project management. Currently, Mr. Rae is the Expansion Project Manager for Theun Hinboun Power Company in Laos. He has undertaken several projects with Theun Hinboun Power Company focusing on hydropower project development, hydropower expansion, and financial analysis and assessment of a Transmission upgrade project in southern Kyrgystan. On these projects Mr. Rae was involved as the project manager overseeing construction management, contract preparation, and tendering inputs to power purchase agreements, license agreement, financial analysis and assessment, and other commercial matters.

Charly Cadou

Mr. Cadou is a highly experienced civil engineer with 39 years' experience in the field of water resources and hydro technical engineering, in Canada and overseas in Asia, the Americas, Africa and the Middle East. His work experience includes hydrological studies (both regional and project-specific); river basin and water resources planning and management; feasibility studies of water resources & hydropower projects; design and implementation of mitigation and remedial measures to environmentally detrimental river basin development; flood mitigation and flood forecasting studies; planning and operation of hydro-meteorological networks; stream gauging and water quality sampling; river hydraulics; river dredging; management of infrastructure rehabilitation projects, especially in post-conflict environments.

Les Recksiedler

Mr. Recksiedler has over 39 years of electric utility experience and over 34 years in HVDC. Within his HVDV experience he has worked for over 26 years as a Stations Engineer on HVDC Projects and as a Maintenance Engineer for the operations and maintenance of 3 HVDC Converter Stations 3 854 MW, 500 kV DC including HVAC Stations up to 500 kV AC. Based on this experience he was appointed the Subject Matter Expert for the new BP3 which was proposed for Manitoba Hydro's HVDC system. The BP3 is +/- 500 kV DC 2 000 or 2 500 MW and approximately 1500 km long. He provided the proposed O& M costs, staffing levels and estimated the major overhauls and capital replacements for a 35 year life span. Les was also the Subject Matter Expert for the power apparatus for the Reliability Centered Maintenance (RCM) adopted by Manitoba Hydro to reduce maintenance costs and improve equipment reliability. Lastly, as HVDC Engineering Department Manager Les was actively involved with and supported the Root Cause Analysis team which was developed to ensure the performance of the HVDC system remains at a high level. This management expertise will also allow him to effectively manage a project of this mature.

Randy Wachal

Randy Wachal is the Research Projects and Engineering Services Manager at the Manitoba Hydro's HVDC Research Centre and has 26 years of utility experience in power system operations, HVDC / SVC apparatus commissioning, and HVDC design. He is currently responsible for the PSCAD simulation support group and actively involved in many engineering services projects for Manitoba Hydro and other clients. They include the Xcel Lamar B2B HVDC Converter station, the Ponton and the Birchtree SVCs, and all research development projects currently underway at the Centre. He leads a diverse team of engineers, researchers, and laboratory staff and applies his superior technical project management in HVDC and power systems assignments. His thorough knowledge of power systems is evident through various publications on subjects such as electromagnetic transient simulation, PSCAD/EMTDC incorporation, load modelling for simulators, power system simulation, and others.

Robert Dandenault

Mr. Dandenault is in the midst of completing his Masters in Business Administration from Athabasca University. He has garnered 24 years of utility experience through his experience working for Manitoba Hydro in many of which were leadership roles in the Power Supply department working in various generating stations throughout Manitoba. As the Plant Manager for the Grand Rapids Hydroelectric Generating Station, Mr. Dandenault was responsible for the leadership and management of the department to ensure that the Generating Station meets its designated purpose and lead the operation and maintenance of the 480 MW hydroelectric generating station. Currently, Mr. Dandenault is working for Manitoba Hydro International as a project team member in Mozambique, Africa for a technical assistance project. Mr. Dandenault is helping to develop an Environmental Management System (EMS) for

Hidroelectrica de Cahora Bassa (HCB) consistent with the requirements of ISO 14001 standards. He is also assisting with the development of Communications strategies to support the HCB EMS and Community Relations, and develop staff training programs for environmental awareness.

Bob Buschau

Mr. Buschau is a professional engineer with over 25 years of experience in the electricity industry. He is currently the General Manager of MCW/AGE Power Consultants responsible for the coordination, control, and quality assurance of various projects which include distribution system design, upgrade, and rehabilitation. Mr. Buschau has provided oversight of design efforts including development of conceptual designs for all projects, review and approvals of all aspects of design including lines, station protection and control, station arrangement and detailing, grounding, special reports, and scheduling. Mr. Buschau has been involved in numerous Wind projects within North America with his most expansive project exceeding 400 MWs.

Mack Kast

Mr. Kast is a Chartered Accountant with over 35 years of experience in senior management positions in the utility sector and regulatory commissions. Mr. Kast retired from Manitoba Hydro in 2006 to take up the position of Deputy General Manager, Finance and Corporate Services with Kenya Power & Lighting Company. During his role as Division Manager of Gas Supply in Manitoba Hydro, Mr. Kast was responsible for implementing a rate management program to ensure the lowest possible product cost available with minimal sales rate volatility. Mr. Kast also tracked Supply Costs and managed various Deferral Accounts to enhance customer support. He also was heavily involved with hedging and using financial derivatives for the purpose of stabilizing volatile cost inputs. He has worked on-site with the Regulatory Authority in Tirana, Albania drafting an appropriate regulatory protocol, a Code of Conduct, and addressed the process for filing Applications with the Albania Regulatory Commission. More recently, Mr. Kast has served as a financial advisor in Tanzania to develop Rate Base/Rate of Return financial models to provide a basis for capital spending, the determination of a fair rate of return, revenue requirements, financing requirements, and tariff design.

Allan Silk

Mr. Silk is a professional engineer with over 22 years of experience with Manitoba Hydro, who is presently working with Manitoba HVDC Research Centre, a Division of Manitoba Hydro International as a Senior Consulting Engineer. In this role Mr. Silk provides project management services for a variety of projects with emphasis on transmission system operations, cost effective design, management and creation of capital plans, electrical master plans, and specification engineering for procurement. Previous to his current role, Mr. Silk was responsible for managing the Manitoba Hydro

Open Access Interconnection Tariff. This included setting the wholesale rates for use of the bulk transmission system (the rates are approved by the Transmission Rates Committee), processing the applications for both tariffs, ensuring engineer studies to support tariff applications are completed in within schedule, negotiating the service and operating agreements required by applicants to take tariff service. Mr. Silk was also responsible for initiating changes to the tariffs to ensure that they are current with open access practices.

Paul Wilson

Paul Wilson has over 25 years of utility experience in Generation, Transmission, Distribution, and commercial company operations and is currently the Managing Director, Subsidiary Operations of Manitoba Hydro International Ltd. (MHI). MHI assists the power utilities, governments, and private sector clients around the world in the efficient, effective, and sustainable delivery of electricity.

Paul was also the past Managing Director of the Manitoba HVDC Research Centre, which is now a division of MHI. The technical staff of the HVDC Research Centre is involved in the planning, specification, commissioning, operations and maintenance of HVDC plants operating in many countries around the world. A graduate from the University of Manitoba in 1987, in Electrical Engineering, he is an active member of the IEEE (M'00) and CIGRE, and a licensed practicing member of the Association of Professional Engineers and Geoscientists of the Provinces of Manitoba and Saskatchewan. Paul holds an Executive position for the Energy Service Alliance of Manitoba, an association of energy service consultants active in both domestic and international services work.

Paul's particular experience relevant for this proposal stems from his work on the Concepts Review Panel for Potential Future Use of Underground or Under Water Cables for Long Distance Transmission in Manitoba Industry Panel. This panel examined a number of options for submarine and underground cables for AC and HVDC power transmission in Manitoba, including cost estimates, cable installation and maintenance issues, environmental issues, and system issues relevant to this study.

Bagen Bagen

Dr. Bagen is a respected industry expert in resource and power system planning particularly in the area of probabilistic or risk-based planning. He has over 16 years' experience in a variety of areas of power systems including resource planning, generation development, transmission planning, composite generation and transmission planning, interconnection facility/impact evaluation and transmission service request assessment. He was invited and nominated to several strategic industry planning committees including NERC Resource Issue Subcommittee (RIS), NERC Generation and Transmission Planning Model Task Force (GTRPMTS), NERC LOLE

Working Group and MAPP Composite System Reliability Working Group (CSRWT) providing expert advises and leadership on various matters of planning, operating, strategic and technical importance. He also participates in the development of various internal, national and international standards such as Manitoba Hydro's loss of load expectation study criteria and procedures, Manitoba Hydro Transfer Capability Methodology for the Planning Horizon, Manitoba Hydro System Operating Limits Methodology for the Planning Horizon, the MRO resource adequacy assessment standard, NERC Methodology and Metrics for Probabilistic Assessment, NERC Facilities Design, Connections and Maintenance (FAC), NERC Modeling Data and Analysis (MOD) and NERC Transmission Planning (TPL).

Alan McPhail (To be Confirmed)

Mr. McPhail is presently the President and Principal Engineer for Cabletricity Connections Ltd., a firm which provides consulting engineering services for MV, HV and EHV underground and submarine power cable applications. Mr. McPhail also possesses over 30 years of cable application experience filling numerous positions as well as writing various influential technical papers on the topic. Now as a President and Principle Engineer Mr. McPhail is well equipped to both work with and manage teams for various projects. He has also worked on numerous international projects further strengthening his expertise and versatility for providing services abroad. Over his career as either a leader or part of an engineering project team he has engineered many new land and submarine cable systems ranging in voltage level from 35 kVac to 525 kVac and +/- 450 kVdc. Key activities have included technical studies, cost estimations, land and marine surveys, route selection, specification and drawing preparation, bid evaluation, contract negotiations, and contractors' design reviews and approvals among others.

Mr. MacPhails role in this project is to review the submarine cable proposals as part of the HVDC system in Option 1. Please note that his participation has not been confirmed at submission for this proposal as he is on vacation in Europe. If Allen is unavailable to assist on this project, and Paul Wilson is unable to provide the necessary expertise himself, a suitable replacement will be submitted to the Board for consideration and approval, if required.

Alex Gerrard

Alex Gerrard is a Professional Engineer specializing in Hydropower Engineering. Mr. Gerrard has more than 35 years' experience in engineering and management for hydroelectric power, water resources, and infrastructure projects. He has progressed from a mechanical and hydroelectric specialist to Vice-President and General Manager for engineering firms through roles as Project Manager and Manager of Engineering. His experience includes design and management of multi-disciplinary teams on large hydroelectric power and infrastructure projects in Canada as well as the U.S., Middle East, Africa, and Central America. In addition, Mr. Gerrard has been responsible for a

wide variety of water resources, hydroelectric, power, and mining projects in Canada and overseas as Manager of Engineering and Projects. He has experience in project development for energy and transportation projects and in project delivery alternatives ranging from design-bid-build to build-own-operate-transfer schemes.

Craig Kellas

Mr. Kellas is a market and load forecasting specialist that manages the development of customer information, mark research studies, market sector sales forecasts, total system energy, and hourly demand forecasts. This includes analyzing monthly customer billing information, comparison of energy per square foot usage, conducting residential and commercial surveys, conducting conditional demand analysis, developing and calculating hourly load models, calculating weather adjustments, and preparing forecasts for different residential and commercial building types. On a previous MHI project, Mr. Kellas assisted in the development of a report for the governing authority in Costa Rica, and served the purpose of documenting the methodology, results and recommendations of the Load Forecasting and Market Research component of the Demand Side Management project.

Paul Driver (Nippon Koei UK)

Dr. Driver is an environmental scientist with over 25 years of consultancy experience related to the social and environmental components of utility development. In addition to this directly related experience Paul Driver and his firm (Nippon Koei UK), have been provisioned to participate in the capacity of Environmental expert, if required for the analysis. Nippon Koei UK has participated on numerous MHI projects in this capacity, particularly in Africa. Optimization studies typically include consideration to the environment to ensure that fish habitats, watershed flooding, and associated people living along the water resource areas are not negatively impacted.

The provision of environmental services is an integral part of the design, engineering and other technical support services available from the Nippon Koei Group.

NKUK is conscious of the future direction of environmental management and keeps pace with the likely requirements of our clients. Climate change, the increasing cost of hydrocarbons, the growing demand for all natural resources, and the problems of water and waste management are issues that demand our attention.

In the energy field, NKUK's environmental and social track-record in both hydropower and the oil and gas industries puts us in a good position to address the growing need for the development of renewables and for the further exploration, production and transport of hydrocarbons.

Driver possesses both a Philosophiae Doctor and a Master of Environmental Science. His education and experience have permitted him an expertise in environmental impact assessment and auditing, environmental training and institution-building, environmental policy development, poverty/ environmental and social issues, and conservation strategies / action plans, all of which he has employed in over 45 countries. He is also an IEMA Registered Environmental Auditor, a Principal Environmental Assessment Practitioner (IEMA), and an examiner for the latter category. Dr Driver has been the Project Director and/or Manager on numerous environmental and social studies, and has conducted ESIAs on hydropower projects worldwide. Dr Driver has conducted assignments on behalf of the World Bank, ADB, EBRD, DFID, FINNIDA, IFAD, FAO, EU, etc., including project design, evaluation and monitoring missions. He has been the environmental/social member of Panels of Experts supervising various KfW-funded hydropower projects in Nepal, Egypt, Pakistan, India and Rwanda. Dr. Driver's current position is with Nippon Koei where he is the Director of Environment and is responsible for setting up and managing of the Environment Division. Throughout his time with Nippon Koei Dr. Driver has managed numerous projects with scopes similar to the Ruzizi III Regional Hydro Project.

3.4. Conflict of Interest

At the time of drafting this proposal, all staff members selected for this project have no known conflict of interest with the two options being considered by the Board as outlined in the RFP. Any potential conflict of interest uncovered at the project kickoff meeting will be immediately disclosed to Board, and at the Board's option the staff member will be replaced with a suitable alternative.

4.0 Work Breakdown Schedule

Work Breakdown Schedule																		
No.	Activities	Week																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
I.	**Review of Previous Work Performed Reports/Analyses**																		
1.	Load Forecast																		
2.	Generation Expansion Plan																		
3.	Feasibility Studies																		
a)	Muskrat Falls Development																		
b)	HVDC Interconnection (including submarine cables)																		
c)	Island Pond Development																		
d)	Portland Creek Development																		
e)	Round Pond Development																		
4.	Power and Energy Studies																		
5.	Optimization Studies																		
6.	Water Management Agreement																		
7.	Power System Studies																		
8.	Reliability Studies																		
9.	Cost Estimates																		
a)	Combined Cycle Combustion Turbines																		
b)	Combustion Turbines																		
c)	Wind Farms																		
d)	Refurbishment of the HTGS																		
10.	Fuel Price Forecasts																		
11.	Cumulative Present Worth (CPW) Analyses of Two Alternatives																		
12.	All Data and Assumptions Used to Complete the CPW Analyses																		
II.	**Comprehensive Review of the Cumulative Present Worth of Each Alternative**																		
III.	**Bi-Weekly Written Reports**																		
IV.	**Preparation of a Final Report**																		
V.	**Provision of Ongoing Support**																		

Project activities are scheduled to start early July once the appropriate Letter of Award is received and agreements signed, with all activities planned scheduled for completion September 15th as outlined in the RFP 2011-001 clause 3.5 of the Draft Agreement.

5.0 Team Composition and Task Assignments

Professional Staff

Name of Staff	Firm	Area of Expertise	Position Assigned	Task Assigned
Al Snyder	MHI	Civil Engineer	Project Manager	5
Peter Rae	MHI	Civil Engineer	Hydro Power Expert	2, 3a, 3c, 3d, 3e
Charly Cadou	MHI	Civil Engineer	Hydrology Expert	3a, 3c, 3d, 3e, 6, 4
Les Recksiedler	MHI	Electrical Engineer	HVDC Interconnection Expert	3b
Randy Wachal	MHI	Electrical Engineer	HVDC and SVC Controls Expert	3b
Robert Dandenault	MHI	Power Engineering Certificate	Combustion and Thermal Generation Expert	9a, 9b, 9c, 9d
Bob Buschau	MCW	Electrical Engineer	Renewable Energy Expert	9a, 9b, 9c, 9d
Mack Kast	MHI	Certified Accountant	Finance Specialist	10, 11, 12
Allan Silk	MHI	Electrical Engineer	Power Systems Studies Expert	7
Paul Wilson	MHI	Electrical Engineer	Electrical and Submarine Cable Expert	3b
Bagen Bagen	MHI	Electrical Engineer	Reliability Expert	8
Alan MacPhail	Cabletricity Connections Ltd.	Electrical Engineer	Submarine Cable Expert	3b (support)
Alex Gerrard	MHI	Mechanical Engineer	Hydro Generation Expert	2, 3a, 3c, 3d, 3e
Craig Kellas	MHI	Engineer	Load Forecast Expert	1

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6.0 Financial Proposal

6.3. *Breakdown of Remuneration*


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7.0 Noted Exceptions

7.1. On the Terms of Reference

The Terms of Reference states that "The Proponent shall provide its proposed pricing to complete the Services, which shall include the following minimum detail:

- The estimated person-hours and associated hourly all-inclusive rates for the person involved in the performance of the Services"

We have for the submission of this proposal estimated the person-hours to the best of our abilities. However, as the volume of reports which will require review at this time has not been disclosed, MHI is suggesting that we be granted the opportunity to conduct a preliminary evaluation of the volume of literature. Upon completion of this review, MHI will submit to the client a revised budget level of effort for the assignment if the existing budget is exceeded.

The Terms of Reference states that

- "The Consultant shall be authorized to do business in the Province of Newfoundland and Labrador prior to performance of the Services. Where the Consultant is a corporation, it shall be registered to carry on business in compliance with the laws of the Province of Newfoundland and Labrador and shall be registered in good standing with the Registry of Companies of Newfoundland and Labrador." The Terms of Reference then goes on to state that " The Consultant shall be authorized to engage in the practice of engineering in the Province of Newfoundland and Labrador in accordance with the requirements of the *Engineers and Geoscientists Act,* RSNL 1990, Chapter E-12, as amended, prior to performance of the Services. If required by the Board, the Consultant shall provide evidence satisfactory to the Board to this effect."

At this time MHI does not meet these criteria; however, if our proposal is accepted by the Board MHI, will execute all obligatory requirements prior to completion of the work. The registration of individual engineers and the required Permit to Practice, and in what disciplines, will be applied for in consultation with PEGNL to ensure compliance with Provincial Statutes.

7.2. On the Draft Contract

The Draft Contract states that

- "The Consultant shall carry professional errors and omissions liability insurance in an amount not less than five million ($5,000,000) dollars and shall ensure that each consultant who has a professional liability exposure and who is engaged by the Consultant in the performance of the Services is covered against professional errors and

omissions in an amount not less than five million ($5,000,000) dollars. Such insurance shall be in effect for at least twelve (12) months following completion of the Services."

MHI carries both General Liability and Professional Liability insurance. The limit of the Professional Liability Insurance is$1,000,000 dollars with limit of $1,000,000 in the aggregate per year. MHI's deductible is $50,000. If required and on the direction of the Board, MHI will purchase the necessary insurance and pass this through at cost. This requires disclosure of the RFP, Proposal, and anticipated fees in order for the Insurance carrier to determine the cost of the policy extension.

7.3. On the Financial Proposal

- The Financial Proposal is non-inclusive of any legal fees for opinions on the legal validity of the drafted agreements provided by the Board for the study (for example: the Water Management Agreement).

- At this time the Financial Proposal is non-inclusive of the level of effort required for the provision of ongoing support of this Project. In consultation with the Board, MHI will prepare a revised budget item to meet this requirement on development of a comprehensive project plan.

- Estimates of travel, and accommodation/living expenses are estimated based on the assumptions that the project will require the following:

    - Four (4) travel trips for two (2) key experts (Project Manager and CPW Analyst); and
    - Two (2) travel trips for up to four (4) supporting experts.

  The number of planned trips will be provisioned for and a budget item presented to the Board following the first exploratory visit.

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Manitoba
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Appendix I - Curricula Vitae (CV) for Proposed Professional Staff

PROPOSED POSITION: ..... Team Lead
NAME OF FIRM: ..... Manitoba Hydro International Ltd.
NAME OF STAFF:..... Allen M. Snyder
DATE OF BIRTH:..... 25 03 1942
YEARS WITH FIRM/ENTITY: 45 years
NATIONALITY: ..... Canadian

EDUCATION:

1976 University of Manitoba, Canada
Master of Business Administration (Finance) (MBA)

1964 University of Manitoba, Canada
Bachelor of Science in Engineering (Civil) (B. Sc. CE)

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Canadian Electricity Association

Canadian Hydropower Association

International Hydropower Association

Association of Professional Engineers of Manitoba

Rotary International

COUNTRIES OF WORK EXPERIENCE:

The Bahamas, Canada, India, Jamaica, Kenya, Lesotho, Malaysia, Saudi Arabia, Uganda

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Fair	Fair	Fair

EMPLOYMENT RECORD:

2009-Present: President, AM Snyder & Associates, MB, Canada

Consulting for utilities regarding the efficiency of operations and appropriate staffing of organizational structure.
Advisor to the Transmission Line Facilities Cost Monitoring committee of the Province of Alberta.
Vice President Energy Sector, Wood West & Associates Inc – Professional Recruiting Agency.

2000 - 2009: Manitoba Hydro, Vice-President, Transmission & Distribution, MB, Canada

Responsible to provide a reliable and safe transmission and distribution system for the delivery of electricity to domestic and out-of-province customers at the lowest possible cost. As well as responsible for system maintenance, construction, operations, and development. To accomplish this, provide leadership to 2100 staff who plan, design, construct, operate and maintain the transmission & distribution system.

- Deliver a secure, reliable source of power at competitive prices (lowest in North America).
- Implement the plan to address deregulation and competition in the electrical utility industry.
- Represent the Corporation during negotiations with the Canadian and U.S. Governments with respect to strategic initiatives for transmission & distribution including RTOs, market access, aboriginal issues, environmental issues and trade practices.
- Provide a work place that is safe for employees, contractors and customers.
- Implement reliability centered maintenance.
- Design and implement transmission outage costing mechanisms.
- Comply with all transmission & distribution rules and regulations.

1996-2000: Manitoba Hydro, Vice-President, Power Supply, MB, Canada

Responsible for the supply of power to meet both the needs of our customers within the Province of Manitoba and our export commitments. To accomplish this, provide leadership to 1200 staff who plan, design, operate and maintain generating plants capable of producing approximately 5 200 MW of electricity. Also responsible for 900 km of +500 kV HVDC transmission line and converter stations.

- Maintain a secure, reliable source of power at competitive prices (lowest in North America).
- Prepare a plan to address forthcoming deregulation and competition in the electrical utility industry.
- Represent the Corporation during negotiations with the Canadian and U.S. Governments with respect to strategic initiatives for generation including greenhouse gas emissions, fisheries, aboriginal issues, environmental issues and trade practices.
- Prepare and implement action plans to support sustainable development.
- Promote and support the initiatives of our offshore activities, including training, operations and maintenance.
- Provide support for the marketing of electric energy to utilities and re-sellers outside of the local market (30% of corporate sales).

1994-1996: Manitoba Hydro, Vice-President, Corporate Services, MB, Canada

Responsible for all Corporate administrative activities, including Personnel, Fleet, Buildings, Purchasing, Stores, Safety and Business Process Improvement.

- Promoted the practices of fair and equitable treatment of all employees, including hiring practices, compensation and industrial relations.
- Maintained corporate facilities, including buildings, records and image management, library, mail, reproduction, word processing and prepress.
- Maintained the Corporate fleet and equipment.
- Minimized the cost and maximized the value and quality of goods and services purchased outside the Corporation.
- Maintained an adequate supply of materials and equipment and provide haulage service.
- Implemented a Corporate-wide Quality Improvement Initiative to ensure that our safety, rates, reliability and customer service rank among the best in the utility industry in North America.
- Provided a work place that is safe for employees, contractors and customers while maintaining an environmental consciousness.

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1991-1994: Manitoba Hydro, Corporate Planning Officer, MB, Canada

Responsible for planning activities preliminary to the decision to construct physical plant and communicating plans to stakeholders, the public and staff.

- Coordinated the development of a Corporate Strategic Plan and directed its implementation.
- Provided an accurate system load forecast for firm energy and peak system requirements.
- Coordinated the public relations function to ensure that all stakeholders are informed of current and future plans.
- Directed the research and development activities aimed at increasing system efficiencies and security.

1986-1991: Manitoba Hydro, Chief Information Officer, MB, Canada

Responsible for directing all information system activities for the Corporation, including the planning, design, systems development, implementation and operation, including network and computer hardware.

- Developed an integrated systems plan to include applications, data management and networks.
- Coordinated the development of standards and training for a Corporate-wide suite of products and services.

1978-1986: Manitoba Hydro, Systems Development Manager, MB, Canada

Responsible for the development and maintenance of computer applications for business, engineering and process control functions.

- Implemented large scale computer projects, for use during construction of generating stations.
- Developed information system standards, a system development methodology, a quality assurance function and a project control technique.
- Implemented a uniform systems index for use throughout the Corporation.

1964-1978: Manitoba Hydro, Project Engineer/Manager, MB, Canada

Responsible for various aspects of on-site project management, including the Brandon Thermal Generating Station, major hydro-electric projects at Long Spruce Generating Station, Kettle Generating Station, Jenpeg Generating Station and Lake Winnipeg Regulation, Churchill River Diversion works and rehabilitation of the four Winnipeg River Generating Stations.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

- 45 years of experience in the electrical utility industry.
- Re-engineering of the Corporation into three Business Units; Generation, Transmission & Distribution, and Customer Service & Marketing.
- Corporate champion for implementation of performance measurement and business planning.
- Computerization of systems to enhance corporate operations.
- Continuous improvement initiative to optimize use of corporate resources.
- Chairman of many internal and external task forces and represented the Corporation on electrical utility industry committees nationally and internationally.
- Corporate development and governance of business unit activities.
- Coordinated Electrical system planning, load forecasting and economic analysis.

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- Community volunteer and fundraiser for many charitable foundations.

INTERNATIONAL WORK EXPERIENCE:

2006 - 2008: Manitoba Hydro International - KPLC, Deputy General Manager Energy Transmission, Nairobi Kenya

As the Deputy General Manager of Kenya Power and Light, Mr. Snyder coordinated and managed the planning, design, construction, operations and maintenance of the transmission network; formulated strategies, policies and standards to improve the overall effectiveness of the delivery of transmission services; and developed strategies and plans to support the defined performance improvements during the term of the Management Contract.

2006: Manitoba Hydro International, Strategic Planning Expert, Saudi Arabia

Project: Management Consultancy Services For Gulf Cooperative Council Inter Connection Authority (GCCIA) Interconnection - Phase 1

MHI assisted with setting up the organizational structure and developing the strategic business plan for the GCCIA, and developed job descriptions and corresponding salary recommendations for key positions within the newly formed organization. Mr. Snyder's responsibility was to assist in setting up the organizational structure and developing the strategic business plan for GCCIA.

2005 -2006: Manitoba Hydro International - Nile Basin, Utility Regional Operations Specialist, Rwanda

Project: Nile Equatorial Lakes Subsidiary Action Program

The objective of this assignment was to support the World Bank in up-stream economic and financial analysis of a selected number of high priority multi-country and multi-purpose power generation investment projects identified under the SSEA study. Mr. Snyder contributed his expertise in regional utility operations.

2002: Manitoba Hydro International - Madyha Pradesh Electricity Board, Utility Executive Consultant, India

Project: Energy Infrastructure Services Project

Mr. Snyder assisted in the facilitation of process improvement and organizational change within the management structure, and helped prepared recommendations for implementation. The goal of the project was to assist in strengthening MPSEB's capacity to participate and engage in the reform/re-structuring process. Mr. Snyder assisted in providing information on industry perspective, governance, management roles and responsibilities, benchmarking and measurement, strategic business planning and process mapping.

1999 - 2000: Manitoba Hydro International - Kerala state Electricity Board, Planned Power Supply Restructuring Specialist, India

Project: Energy Infrastructure Services Project c/o Kerala State Electricity Board

In support of the Energy Infrastructure Services Project in Kerala, India, Mr. Snyder assisted Electricity Board members in understanding their respective roles under an unbundled organizational structure and assisted the KSEB Executive in understanding their role in guiding and implementing re-organization into profit centres.

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.

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SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM	DATE (24/06/11)
FULL NAME OF AUTHORIZED REPRESENTATIVE:	
Lorne Halpenny, Managing Director	

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PROPOSED POSITION: .....Hydro Generation Expert
NAME OF FIRM: .....Manitoba Hydro International
NAME OF STAFF: .....Peter J. Rae
DATE OF BIRTH:.....1954-11-16
NATIONALITY: .....Canadian

EDUCATION:

1978: Queen's University, Kingston, Ontario
M.Sc. Civil Engineering

1976: Queen's University, Kingston, Ontario
B.Sc. Civil Engineering

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

American Society of Civil Engineers
Canadian Dam Association

COUNTRIES OF WORK EXPERIENCE:

US, Canada, Azerbaijan, Bosnia Herzegovina, Cambodia, Ecuador, Guatemala, India, Indonesia, Iran, Japan, Kyrgyzstan, Laos, Nepal, Pakistan, Panama, Thailand, Uganda, Vietnam

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Fair	Fair	Fair

EMPLOYMENT RECORD:

2007-Present: Theun Hinboun Power Company Limited, Expansion Project Director, Laos

Nam Theun-Hinboun Hydropower Expansion Project

Theun-Hinboun Power Co., Ltd. (2007- present) Project Director responsible for implementation of an IPP hydropower project comprising 70 m high RCC dam with a 60 MW power station and a 220 MW power station with 5500 m tunnel and penstock. Preconstruction development activities included feasibility study, technical assistance with concession agreement and power sales agreement, construction contracting strategy, tendering, and project management.

As Project Director during construction responsibilities included separate design build contracts for main civil works, electrical and mechanical works, transmission line works, as well as a large number of smaller contracts for infrastructure construction. Social and environmental activities were managed as part of the program, involving livelihood activities, environmental monitoring, resettlement and relocations. Construction is in progress with completion scheduled for in 2012.

The Project won the "Renewable Deal of the Year" in *Project Finance International's,* Asia Pacific "Deals of the

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Year" awards for 2008.

2004-2007: PJR Consulting Inc, President, USA

Nam Theun-Hinboun Hydropower Expansion Project
SWECO Associates for contract with Theun-Hinboun Power Co, Ltd. (2006-2007) Part of SWECO project team for feasibility study. Key responsibilities included hydropower project layout and optimization of all project components, such as dam and spillway, plunge pool, power tunnel, penstock, installed capacity, cost estimating, construction scheduling, and development scheduling.

Southern Kyrgyzstan Transmission Upgrade Project
T&D Engineers & Consultants Ltd. (2007) Financial analysis and assessment of financing options for a major transmission network upgrade involving 500 kV, 220 kV, and 110 kV systems in Kyrgyzstan. The assignment included preparation of financial models, sensitivity assessment, and cost estimating.

New Bong Escape Hydropower Project
Laraib Energy Limited (1999-present) Owner's Engineer for an 84 MW IPP project located in Pakistan. Providing consulting services and design during project development. Key activities included preparation of EPC Construction contract, negotiations with the selected EPC contractor, assessment of project benefits, and technical support for project financing, commercial agreements, and shareholder agreements.

The Project won the "Renewable Deal of the Year" in *Project Finance International's,* Middle East "Deals of the Year" awards for 2009.

Baglihar Hydropower Project: *Pakistan Commissioner for Indus Waters* (2003-2006) Technical advisor assisting with preparation of the Pakistan case for submission to the World Bank Appointed Neutral Expert for resolution of a boundary waters dispute. Activities included appraisal of the merits of the Pakistan case under the dispute, preparation of independent technical opinions, and identification of project issues under the Indus Waters Treaty. A detailed design for an alternative intake and spillway was prepared using an innovative sediment evacuation system, which was confirmed using one and two dimensional hydraulic models and a physical model. The project is construction of a 450 MW project in India with run of river reservoir for storage regulation.

Mekong River Hydropower Development Program
Panya Consultants for Department of Energy Development of Thailand (2005) Advisor for project planning methods and project organization for a proposed program to develop large scale hydropower projects along the Mekong River in Laos, Thailand, and Cambodia.

1997-2004: MWH Energy and Infrastructure, Vice President, USA

Nam Mo Hydroelectric Project
Harza International Development Company (1998-2005)
Development Manager for a 110-MW, high head hydroelectric project in Laos including preparation of detailed project feasibility study and social and environmental impact analyses. Responsibilities include project financing, power sales and development agreements, management of studies for project layout and preliminary design, financial assessment, risk analysis, and environmental and social impacts.

Bakun Hydropower Project
Malaysia China Hydro Joint Venture (2004) Team leader for management consulting assignment assessing project and construction management procedures for the 2400 MW Bakun Hydropower Project in Malaysia. The project involves a large CFRD dam, spillway, and associated works. Consulting was undertaken on behalf of the EPC project construction consortium to identify management and construction methods to improve construction performance.

Bujagali Hydropower Project
International Finance Corporation for AES Development
Lender's Technical Engineer responsible for appraisal of the 250-MW project located on the Nile River in

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Uganda. The project comprises an asphalt core rockfill dam, powerhouse transmission line, and associated structures (2000).

Son La Hydropower Project - Vietnam Ministry of Planning and Investment

Project Manager responsible for upgrade of feasibility studies for the 2,400-MW Son La hydropower project in Vietnam comprising large concrete dam, 8-unit powerhouse, surface construction diversion works, and associated structures. Responsibilities included management of the engineering and construction management team assessing technical issues, construction planning, and project construction risks. Provided significant enhancements that reduced project construction risks, shortened the construction schedule, and optimized costs by an improved construction plan, design modifications, and construction methods. (2003).

Other Relevant Project:

- Bakun Hydropower Project, Ahmad Zaki Sdn Bhd, 2004
- Nam Theun 2 Hydropower Project, Theun 2 Electricity Consortium, 2001-2002
- Pumped-Storage Project Evaluation and Ranking, Great Lakes Power Limited, 2000
- Buk Bijela and Srbnje Hydropower Project, AES Horizons Limited, 2000
- Rio Hondo Hydroelectric Development, Engineering and Construction, 1999-2000
- Paidha Hydroelectric Project, Uganda Electricity Board, 1998
- Jatunyacu Hydroelectric Development, Harza International Development Company,1999-2000
- San Rafael – El Reventador Hydroelectric Development, Harza International Development Company,1998
- Pulangi V Project Due Diligence, Enron Engineering and Construction, 1998
- La Fortuna Project Due Diligence, Enron Engineering and Construction, 1999
- Amaila Falls Hydroelectric Project, Harza International Development Company, 1999
- Gullubag Project Due Diligence, CSW International, 1999

1987-1997: Acres International Ltd. Project Manager and Project Engineer

- Methodology for Life Assessment of Hydroelectric Generating Facilities, 1997
- Canadian Electrical Association Nam Tha 1 Hydropower Project, SPB Hydropower Co., Ltd., 1996-1997
- High Falls GS Redevelopment Project, Great Lakes Power Ltd, 1997
- Sir Adam Beck GS 1- Risk Analysis of Uncontrolled Power Flow, Ontario Hydro, 1997
- Power System Enhancement Initiatives, Great Lakes Power Ltd, 1997
- Karun III Development Project, Iran, Iran Water and Power Resources Development Corporation, 1990-1997
- Conestogo River Flood Risk Study, Grand River Conservation Authority, 1996
- Sheet Harbor Dam Safety Study, Nova Scotia, Canada, Nova Scotia Power, 1995-1996
- Chulabhorn Pumped Storage Project, Thailand, Electricity Generating Authority of Thailand, 1995-1996
- Nam Khan II Hydropower Project, Laos, Asia Power Group, 1995
- Larona River Channel Improvement Study, Indonesia, PT Inco, 1995
- Mingechaur HPP Rehabilitation, Azerbaijan, European Bank for Reconstruction and Development, 1995

- Conestogo Dam Safety Study, Ontario, Canada, Grand River Conservation Authority, 1995
- Peru Power Sector Review Study, Peru, Cominco Inc., 1994
- WECS/NEA Institutional Support Project, Nepal, Water and Energy Commission Secretariat, 1994
- Montreal and Michipicoten River Dam Safety Studies, Ontario, Canada, Great Lakes Power Authority, 1994
- Shand Dam Safety Assessment Study, Ontario, Canada, Grand River Conservation Authority, 1994
- Karun I Spillway Remedial Works, Iran, Mahab Ghodss Consulting Engineers, 1994
- Big Eddy Spillway Flood Risk Assessment, Ontario, Canada, Inco Ltd., 1993-1994
- Montreal River Hydraulic Design Review, Ontario, Canada, Ontario Hydro, 1993
- Mississippi River Basin Hydraulic Design Review, Ontario, Canada, Ontario Hydro, 1993
- Winnipeg River Water Management Study, Canada, Lake of the Woods Control Board, 1993
- Matabitchuan River Hydraulic Design Review, Ontario, Canada, Ontario Hydro, 1992
- Larona River Hydro Refurbishment Study, Indonesia, PT Inco, 1991-1992
- Rideau Canal Water Management Study, Ontario, Canada, Rideau Canal Authority, 1991
- Samala River Hydropower Project, Guatemala, Inde, 1991
- Stochastic Streamflow Generation Models for Hydropower Operations, Canada, Canadian Electric Association, 1990
- Bujagali Hydropower Project, Uganda, Uganda Electricity Board, 1990
- Conestogo Dam Small Hydro Study, Ontario, Canada, Grand River Conservation Authority, 1990
- Owen Falls Extension Project, Uganda, Uganda Electricity Board, 1989
- Spillway Gate Installation at Chats Falls GS, Ontario, Canada, Ontario Hydro, 1989
- Belledune TGS Water Supply, New Brunswick, Canada, New Brunswick Power Commission, 1989
- Big Chute Hydroelectric Generating Station, Ontario, Canada, Ontario Hydro, 1988-1989
- Harrisburg Hydroelectric Project, Pennsylvania, U.S.A., City of Harrisburg,1989
- Water Supply Constraints to Energy Development, Canada, Environment Canada, 1988

1980-1987: Monenco Consultants

- Magpie River Hydroelectric Power Development, Ontario, Canada, Great, 1987-1988
- Lakes Power Ltd • Ghost Spillway Rehabilitation, Canada, TransAlta Utilities Limited, 1986-1987 Hydro Reservoir Flood Operating Rules, Alberta, Canada, TransAlta Utilities Limited, 1985
- Oldman River Dam Hydropower Study, Alberta, Canada, TransAlta Utilities Limited, 1985
- Bearspaw Emergency Spillway, Alberta, Canada, TransAlta Utilities Limited, 1985
- Glenmore Spillway Gate Design, Alberta, Canada, City of Calgary, 1985
- Calgary PMF Inundation Study, Alberta, Canada, City of Calgary, 1985
- Glenmore Dam Spillway Rehabilitation, Alberta, Canada, City of Calgary, 1984
- Glenmore Causeway Fuse Plug Design, Alberta, Canada, City of Calgary, 1984
- Flood Action Plan, Alberta, Canada, TransAlta Utilities Limited, 1984
- Dam Break Flood Risk Study, Canada, TransAlta Utilities Inc., 1984
- Paddle River Low Level Outlet Gates, Alberta, Canada, Environment Canada, 1983
- Hydro System Rehabilitation Program, Alberta, Canada, TransAlta Utilities Inc., 1982
- Sheerness Thermal Generating Station, Alberta, Canada, Alberta Power Ltd, 1982

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- Interlakes Spillway, Canada, TransAlta Utilities Limited, 1982
- Keephills Thermal Power Station, Alberta, TransAlta Utilities Limited, 1981
- Pocaterra Spillway, Canada, TransAlta Utilities Limited, 1980-1981
- Elbow River Flood Study, Alberta, Canada, Alberta Environment, 1980
- Alberta Export Power Study, Alberta, Canada, Fordham Coal Limited, 1980

1978-1980: Ontario Hydro

- Whitedog Falls GS, Canada, Ontario Hydro, 1980
- Pickering Nuclear GS, Canada, Ontario Hydro, 1980
- Sir Adam Beck GS 1 and 2, Canada, Ontario Hydro, 1980
- Darlington Nuclear Power Station, Ontario, Canada, Ontario Hydro, 1979
- Bruce Peninsula C and D Generating Station Siting Study, Canada, Ontario Hydro, 1979
- Nanticoke Thermal GS, Canada, Ontario Hydro, 1979

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:
Mr. Rae's has broad project management and engineering background that is combined with strong experience leading teams for multi-purpose projects involving engineering, project financing, social, environmental, and resettlement issues. He has significant experience with project development for private sector projects as well as for traditional utility clients.

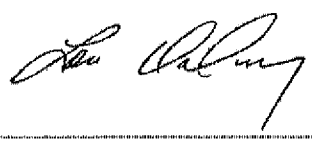
His experience includes all phases of hydroelectric power and water resource project implementation from conceptual and feasibility planning studies through detailed design to construction supervision. He has also worked with development activities for hydropower projects with responsibilities including engineering, commercial agreements, power sales agreements, concession agreements, and environmental and social studies.

He has a post graduate degree in Civil Engineering and over 30 years experience with planning, design, and development of water resources and power generation projects.

His recent assignments as Project Director for the Theun Hinboun Expansion Project in Laos and the New Bong Escape Hydropower Project in Pakistan are directly relevant to the tasks assigned. These projects involved activities spanning from feasibility assessment through construction including commercial, financing, and construction arrangements. Key activities related to the development of effective construction contracting strategies and technical inputs to the commercial and project finance agreements.

Mr. Rae has published several papers dealing with project development .

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:
Lorne Halpenny, Managing Director

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PROPOSED POSITION: .....Hydrology Expert
NAME OF FIRM: .....Manitoba Hydro International
NAME OF STAFF: .....Charly F.X. Cadou
PROFESSION:.....Water Resources and Hydro-Technical Engineering Specialist
DATE OF BIRTH: .....4 Sept 1943
NATIONALITY: .....Canadian

EDUCATION:

1963. University of Montreal, Montreal, Quebec, Canada
Bachelor of Arts

1967. McGill University, Montreal, Quebec, Canada
Bachelor of Engineering, Civil Engineering

COUNTRIES OF WORK EXPERIENCE:

Angola, Bangladesh, Brazil, El Salvador, Honduras, Jordan, Indonesia, Iraq, Laos, Malawi, Mozambique, Niger, Nepal, Nicaragua, Panama, Peru, South Korea, Tanzania, USA, Venezuela, Zambia and Zimbabwe

LANGUAGES:	SPOKEN:	READ:	WRITTEN: (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Excellent	Excellent	Excellent
Spanish	Excellent	Excellent	Excellent
Portuguese	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

2010 – Present: Senior Hydrologist (under contract with SNC-Lavalin Power (Malaysia)

- Review of the hydrology of Chenderoh existing hydropower development on the Perak River and estimation of energy gained by adding a 10-12 MW unit to the site in order to capture spill (2011).
- Assesment of the hydropower potential of the Liwagu catchment, Sabah State (Northern Borneo - 2011).
- Desk study of mini hydro development on three watercourses of the Kelantan catchment (2011).
- Team Leader for Identification of Hydropower resources in Sabah, Malaysia (2010). Hydro ranking study of Sabah State (Island of Borneo).
- Review of hydrological studies of the Ulu Terengganu and Ulu Jelai hydropower projects, Peninsular Malaysia. Update of construction flood study by regional frequency analysis, energy generation estimates of Puah and Tembat HEPs (2010-2011).
- Review and preliminary update of flood and energy studies of Lebir and Nenggiri hydropower projects, Peninsular Malaysia (2010).

2008 – 2010: Team Leader and Hydropower Specialist (under contract with BRLi)

Zambezi Basin Multi-Sector Investment Opportunity Analysis, SADC region (2008-2010). This analysis of water sector projects will provide the analytical foundations to both assist the World Bank in defining a possible long-term support strategy for investments within the basin and riparian countries, and contribute to the processes being undertaken by the riparian states of the Zambezi Basin.

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2008 to present: Manitoba Hydro International Ltd - Cahora Bassa 2075 MW Mozambique

Mr. Cadou currently carrying out an assignment with Manitoba Hydro International Ltd (MHI) for the validation of processes and procedures utilized by Hidroélectrica de Cahora Bassa (HCB) for water resources management of the Cahora Bassa hydroelectric project on the Zambezi River in Mozambique, including reservoir management, coordination with other users upstream and downstream, flood management and hydrological data gathering. Mr. Cadou's mandate also includes recommendation of improvements as required to meet internationally accepted standards.

2008. Manitoba Hydro International Ltd - Qullic Energy - Nunavut Territory Canada

Technical support for review of hydrological data for hydropower developments in Nunavut for Qullic Energy.

2008. Team Leader World Bank financed Multi-Sector Investment Opportunities Analysis of the Zambezi River

Team Leader and Hydropower specialist on a World Bank financed Multi-Sector Investment Opportunities Analysis of the Zambezi River Basin. The objective of the study is to identify worthwhile investments in the water sector (hydropower, irrigation, drinking water, etc.) and to evaluate the impact of each investment on existing projects.

2007. Senior Water Resources Specialist (under contract with SNC♦LAVALIN), El Tablon multipurpose hydroelectric project, Honduras

Update of feasibility study, design and tender documents for the dam and the powerhouse. Specific duties are to assist in the completion and finalization of the downstream multipurpose benefit package studies using or complementing inputs by the hydrologist, hydraulic engineer, agriculture economist, municipal water supply specialist and resources economist.

2005-2006. Program Manager, Jordan and Iraq (under contract with United Nations Office of Project Services - UNOPS)

IDPs Project (2005-06). Manager of a program to facilitate the return and reintegration of internally displaced persons in Northern Iraq that includes the distribution of construction material for 3,000 houses, the management of the construction of 1,000 houses, 3 schools, 2 health centers and 9 rural water projects, vocational training for 380 individuals, income generation projects for 475 individuals, support to local authorities with human resource development through institutional capacity building activities and provision of facilities.

Technical input to AIF WATSAN program for the 33/11 kV, 64 MVA substation of the Sharq Dijla (Bagdhad) water treatment plant (2005-06).

2003. Infrastructure Rehabilitation Engineer, Iraq (under contract with United Nations Office of Project Services - UNOPS)

IDPs Project (2003). Specialist in building the capacity of UNOPS local civil engineers in planning, scheduling, tendering and project control of housing and miscellaneous construction projects for internally displaced persons in Northern Iraq.

WATSAN Project (2003). Preparation of a sectorial report on the current situation of the drinking water in Baghdad and other major cities of Center and South Iraq and recommendations for short-term repairs to water treatment plants and distribution networks and for medium term rehabilitation of the water supply infrastructure.

2000-2002. Manager Study Division of Cojedes Project, Venezuela (under contract with SNC♦LAVALIN) Cojedes Basin Sanitation and Conservation Project, Venezuela (Ministry of Environment):

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Responsible for the development of a comprehensive environmental management plan of the Cojedes River basin, including: assessment of availability and quality of surface water and groundwater; estimation of future water use; GIS mapping of physical and environmental characteristics of the basin; environmental impact assessment of proposed water projects (one waste waster treatment plant and one 65 meter earthfill dam and reservoir); proposal for remedial and/or mitigation measures against detrimental development, including waste water treatment and erosion and flood mitigation.

Water Resources Specialist, Central America (under contract with SNC♦LAVALIN)
1999. Central America Regional Power Project, financed by Canadian International Development Agency (CIDA)

Advisor in regional hydrological techniques for a hydropower investigation and pre-feasibility study of the Santa Maria river basin in Panama.

Central America Regional Power Project, financed by CIDA (1999): Responsible for the feasibility study and technical specifications of a hydro-meteorological telemetry network with real-time transmission by satellite and of a flow forecasting system, in order to optimize the operation in cascade of four hydroelectric power plants for the Comisión Ejecutiva Hidroeléctrica del Río Lempa (CEL). Also responsible for hydrological data analysis related to dam break studies of the four dams of CEL for the development of a Flood Emergency Action Plan.

1998. Senior Technical Editor, Bangladesh (under contract with SNC♦LAVALIN), Northeast Regional Water Management Project, financed by CIDA

Responsible for the preparation of the final feasibility study report on the Kalni-Kushiyara River Management Project in the Northeast region of Bangladesh.

1991-1998. SNC♦LAVALIN, Power Division, Montreal, Quebec, Canada

1995-1997. Project Manager and Senior Water Resources Engineer, Northeast Regional Water Management Project, Bangladesh (financed by CIDA)

Team Leader of the program that included: regional water management plan; design, construction and monitoring of a fish pass; implementation of a river dredging program, including design and construction of confinement chambers to hold dredged spoils and which were converted into flood proof homestead platforms; an early flood warning project; three feasibility studies of river training works to mitigate the impact of pre-monsoon floods on agriculture; environmental impact assessment; community participation and institutional development on all project components.

1995. Lower Larona Hydroelectric Feasibility Study, Sulawesi, Indonesia

Carried out for and financed by PT INCO. Responsibilities included stream gauging, installation of hydrometeorological data acquisition equipment, development of flow series, estimation of construction and probable maximum flood.

1991-1994. Southern African Development Coordination Community (SADC) Hydrological Assistance Project, based in Lusaka, Zambia (financed by CIDA)

Project Manager of Phase 2 of a program to assist water agencies and power utilities of eight countries in the management of the water resources of the Zambezi river basin. The main activities of the project are: establishment and operation of a stream gauging program on a network of 15 hydrometric stations in cooperation with Water Survey of Canada; installation and operation of an environmental telemetry network of 17 data collection platforms with HF radio transmission; establishment of a hydrometeorological database;

development of procedures to forecast inflows into the reservoirs of Itezhitezhi, Kafue Gorge, Kariba and Cahora Bassa and establishment of operation guides for the conjunctive operation of these reservoirs; training of counterpart staff and institutional development.

1982-1991. SNC LAVALIN, Montreal, Quebec, Canada

Senior Water Resources Engineer, Energy and Resources Planning Division

SADC Hydrological Assistance Project (1989-1991, financed by CIDA). Project Manager of Phase 1 of the project based in Zambia and which included: feasibility study of implementing a hydrometric network with automatic data transmission in the Zambezi River Basin; collection, verification, assessment of quality and publication of historical hydrometric data; transfer of technology.

Chaglla Hydropower Project (1988, Study carried out for Electroperu and financed by the Interamerican Development Bank.). Hydrologist and Power generation Planner for the feasibility study of a 400 MW high head hydropower plant in the upper basin of the Huallaga River in Peru.

Gove Hydroelectric Project (1987-1988). Project Manager for the feasibility study of a 40 MW hydroelectric power plant at Gove on the Cunene River in Central Angola. Project carried out for the Southern Africa Development Coordination Conference (SADCC) and the national utility of the Republic of Angola (ENE).

Tannery Island Rehabilitation Project (1987-1988, Tannery Island Power Corp.). Project Manager for the rehabilitation of a mini hydropower plant (1500 kW) on the Black River at Carthage, State of New York, U.S.A., including remedial works to the powerhouse structure, hydraulic improvements to head pond and tailrace.

Dam Stability Evaluation Project (1987, Abitibi-Price Inc.). Hydrologist for flood studies for 27 existing dams in Eastern Canada, including review of design floods and dam break analysis as part of a Dam Stability Evaluation.

Laos Southern Provinces Development Master Plan (1986, Asian Development Bank). Water Resources and Energy Planner responsible for an inventory of the surface and underground water resources of the four southern provinces of Laos, assessment of medium and long term demand of water, reconnaissance of mini and micro hydropower sites, preparation of a water resources and energy development plan and transfer of technology.

Panama Medium Hydropower Project (1986, World Bank). Hydrologist for a hydropower project which included reconnaissance of ten sites, pre-feasibility of three sites, feasibility of two sites and transfer of technology.

Millertown Dam Rehabilitation Project (1985, Abitibi-Price Inc.) Hydrologist and Power Generation Planner for an existing hydropower project located on Red Indian Lake in the province of Newfoundland, Canada.

Lac au Pin Reservoir Feasibility Study (1985, McLaren-Quebec Power Company). Project Manager of a feasibility study of a reservoir on the Lievre River, Quebec, Canada, to regulate the river for hydropower generation and to improve downstream flood control.

Managua Flood Control Project (1984-1985, UNDP). Project Manager and Hydrologist responsible for hydrological studies of the urban and rural zones, conceptual design of hydraulic structures, canals and storm sewers in the urban zone, recommendations on rural land use to minimize erosion and runoff, transfer of technology. Project carried out for the municipality of Managua, Nicaragua.

El Sauce Hydroelectric Project (1984, CIDA). Hydrologist for the feasibility study of an 18 MW hydropower plant in the Huallaga Basin in Peru.

Montreal Archipelago Hydraulic Study (1984, Government of Quebec). Project Manager for a hydraulic study of three lakes located around Montreal Island to evaluate the impact of man-made encroachments in the outlet channels on the levels of the lakes. Study carried out for and in-cooperation with the Secretariat Archipel de Montréal.

CIWEC Project (1983, CIDA). Advisor on Management Information Systems for the Water and Energy Resources Commission of His Majesty's Government of Nepal. Assisted the Commission in defining and

organizing a database for water resources, irrigation and hydropower.

Piah Hydroelectric Feasibility Study (1983, Asian Development Bank). Responsible for hydrologic modeling of the Piah River basin in Malaysia for the National Electricity Board of the State of Malaya.

Water Resources Inventory Study of the Yukon and the Northwest Territories of Canada (1983, Environment Canada). Project Manager of the study, which included regional hydrological analysis, and planning of the hydrometric network of the study area.

Niger Hydropower Project (1982, World Bank). Hydrologist for the feasibility study of several hydro sites on the Niger River and its tributaries for NIGELEC.

Hydropower Efficiency Improvement Study (1982, Electric Power Research Institute). Responsible for the implementation of a database on the characteristics of existing hydroelectric plants of 10 MW or more in the USA, in order to estimate possible improvements in power plant efficiency.

1967-1982. SHAWINIGAN CONSULTANTS INC., Montreal, Quebec, Canada

Water Resources Engineer, Energy and Resources Planning Division

Water Resources Study of the Amazon River Basin (1978-1982, World meteorological Organization/United Nations Development Program). Project Manager and Hydrologist. The study area spans over seven countries. Study included the development of a Geographic Information System (GIS), regional hydrological analysis, recommendations to improve the hydrometeorological network and technology transfer to the Brazilian counterpart

Tocantins Hydrometric Network Planning Study, Brazil (1978, World Meteorological Organization). Consultant to Superintendencia de Desenvolvimento da Amazonia (SUDAM) to carry out a regional hydrological and hydrometric network planning study of the Tocantins River Basin, one of the major tributaries of the Amazon.

Further experience included: power generation planning of several hydropower projects; feasibility and design of a hydrometeorological telemetry network with VHF transmission for flood forecasting; development of mathematical models of complex river hydraulic systems; several energy and reservoir operation analyses; estimation of reservoir storage volume by analysis of LANDSAT satellite images; two studies to estimate regional rainfall, temperature and crop growth characteristics for Canadian Department of Agriculture.

Power Generation Planner, Tidal Power Consultant

Advisor to the Korea Ocean Research and Development Institute for the feasibility study of several tidal power developments on the west coast of Korea, including transfer of technology (1978).

Power Generation Planner for several tidal power developments in the Bay of Fundy, for the Tidal Power Corporation (1976-1977).

Water Resources Engineer, Energy and Resources Planning Division

Experience included regional flood study, generation planning and economic studies of hydropower schemes, design of dykes, river hydraulics (1973-1976).

Systems Analyst, Construction Industry Computer Consultants Inc.

System design and programming of a procurement schedule and cost control software package and a task scheduling program for the construction industry (1973)

Assistant Manager, Computer Centre (1971-1973)

Manitoba
HYDRO INTERNATIONAL

Assistance to the department manager in staff supervision; procurement of the department hardware and software; design and development of several technical and commercial software packages.

Water Resources Engineer, Water Resources and Special Studies Department (1967-1971)

Regional hydro-meteorological analysis, development of GIS, planning of two hydrometric networks and development of a water resources master plan for the province of Newfoundland, Canada.

1965-1967, SNC INC., Montreal, Quebec, Canada

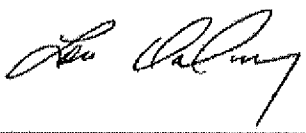
Engineering Trainee, Hydroelectric Department.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Mr. Cadou is an Engineer with 38 years' experience in the field of water resources and hydrotechnical engineering, both in Canada and overseas. His work experience includes: project management, planning, scheduling and cost control; procurement of goods and services; river basin and water resources planning and management; feasibility studies of water resources, hydropower and tidal power projects; environmental impact assessment of water resources projects; design and implementation of mitigation and remedial measures to environmentally detrimental river basin development; hydrological studies both regional and project specific; flood mitigation and flood forecasting studies; rehabilitation of civil and hydraulic components of hydropower plants, water treatments plants and potable water distribution networks; planning and operation of hydrometeorological networks; feasibility, design, installation and operation of environmental telemetry networks; development and operation of hydrometeorological, and environmental databases; stream gauging and water quality sampling; river hydraulics; river dredging; development of geographic information systems (GIS); power generation planning and economics; management of infrastructure rehabilitation projects, especially in post-conflict environments.

International experience includes positions as project manager or specialist in Africa, Asia, the Americas and the Middle East with successful participation in institutional support projects, capacity building and transfer of technology.

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: .....HVDC Interconnect Expert
NAME OF FIRM: .....Manitoba Hydro International Ltd.
NAME OF STAFF: .....Leslie D Recksiedler
DATE OF BIRTH:.....October 12, 1947
YEARS WITH FIRM/ENTITY:.38 years
NATIONALITY: .....Canadian

EDUCATION:

Project Management International Certified courses

Various Post Graduate courses in HVDC Transmission and Business Administration
University of Manitoba

1985 *Certificate in Management and Administration – Gold Award*
University Of Manitoba

1971 Bachelor of Science in Electrical Engineering - Deans Honor Role
University of Manitoba

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Association of Professional Engineers and Geosientists of Manitoba
IEEE Power Transformers

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

2009 - Present: Business Development Manager for the HVDC Research Center at Manitoba Hydro International, Manitoba, Canada

Mr. Recksiedler's extensive knowledge and expertise attained throughout his remarkable career will be maximized in this newly created position.

2001 – 2009: Department Manager, HVDC Engineering Department Manitoba Hydro, Manitoba, Canada

As a Department Manager, Mr. Recksiedler was in charge of all aspects of Engineering in the HVDC Converter Stations including capital projects, design, consultants, maintenance engineering, financial and plant engineering. Most recently, this included the management of all aspects of the Bipole1 and Bipole2 HVDC Converter Transformer replacement program. Mr. Recksiedler was in charge of 72 projects with a total approved budget of approximately $486 million, with 38 projects exceeding the $2 million mark.

1998 – 2001, Manitoba Hydro, HVDC Projects and Maintenance Engineer, HVDC Engineering Department, HVDC Division, Manitoba, Canada

Mr. Recksiedler was in charge of all capital project coordination and contract administration for the Division. Provided technical and administrative support for the operations and maintenance of all HVDC Stations. Work included major equipment condition assessment, replacement, modification, and major overhauls.

Manitoba
HYDRO INTERNATIONAL

1975 – 1998, Manitoba Hydro, HVDC Stations Engineer, HVDC Transmission (Operation) Department, Production Division

Provided technical and administrative support for the operation and maintenance of HVDC converter stations, including major equipment condition assessment, replacement, modifications, and major overhauls. Other responsibilities included performing statistical and post-fault analysis, providing training material, finding alternate sources for repair parts, reverse engineering parts, etc. Led the development of the Corporate Infrared Scanning Program, and the computerization of disturbance data gathering and analysis.

1973 – 1975, Manitoba Hydro, Protection Engineer, Stations Department, Transmission & Stations Division

Involved in the design of protection and metering schemes for major transmission lines (33 - 230 kV). Work included common bus metering and protection design, ranging from simple fuse coordination to solid state impedance relaying. Other duties included computerized fault and load flow studies.

1971 – 1973, Manitoba Hydro, Telecontrol Design Engineer, Telecontrol Department Transmission & Stations Division

Designed and modified:

- Supervisory Control and Data Acquisition (SCADA)
- Automatic Generation Control
- Stored Program Process Controller (Computer)

Included preparation of specifications for new and replacement equipment, designing interfaces and modifications using digital and analog circuitry.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Mr. Recksiedler has over 38 years experience in electric utilites and is a leading expert in Transformers and SVC's . He is presently a Business Development Manager for Manitoba Hydro International (Manitoba HVDC Research Centre).

Mr. Recksiedler recently retired from the HVDC Engineering Department of Manitoba Hydro as manager of 35 engineers, technologists and other technical staff. The department was responsible for the engineering aspects of operations, maintenance, modifications, and capital replacement of two HVDC Bipoles. There were 72 projects with total approved budget of approximately $486 million.

Prior to that Mr. Recksiedler was the HVDC Projects and Maintenance Engineer which developed the initial operating and maintenance procedures, failure analysis, statistical analysis and the purchase of major spare equipment. He was a Subject Matter Expert (SME) in the development of the Reliability Centered Maintenance (RCM) program that replaced the previous time-based system. He was also involved in the review of the HVDC system performance, and assisted in setting goals and targets.

Mr. Recksiedler's extensive expertise in Transformers and SVC's is described below:

Transformers:

- Involved in all aspect of converter transformers (up to 500 kV DC), autotransformers (up to 500 KV AC), station service transformer and auxiliary transformer.
- Factory repair of 3 transformers, including inspections and witnessing of the factory tests.
- Failure analysis of 17 transformer failures.
- Design review for 22 transformers.
- Subject Matter Expert for the development of RCM for Transformers.

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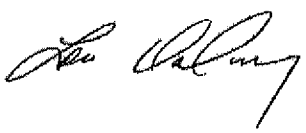
- Authored section for Converter Transformer and AC transformers in Manitoba Hydro Specifications.
- On behalf of EPRI, authored the chapter on Converter highlighting the differences with AC transformers. Elaborated on Converter Transformer intricacies and different and additional maintenance and procedures.
- Replaced a transformer tapchanger including diverter and selector switch.
- Analyzed a tapchanger failure due to excessive maintenance.
- Modified the bushing lead structure for 3 autotransformers 138 to 230 kV.
- Field repaired a bushing Power Factor tap and modified many bushing connections.
- Determined the Root Cause of a 400 kV DC bushing and transformer failure for HCB in Mozambique and assisted them with the repair of the same transformer.
- Developed a specification for HCB in Mozambique for the Purchase of Converter Transformers.
- Assisted in the development of a transformer repair facility data base for the Canadian Electrical Association.
- Was consulted by ABB transformer designers on possible causes of transformer failures in India.
- IEEE Power Transformers - Provided input which was accepted by world wide experts in various Standards.
- Recently revised and approved Converter Transformer Standard.
- Authored section on rail transport for Transport of Power Transformers Guide.
- Chairperson of the DC Bushing Standard Revision, a joint revision with the IEC Standard.
- Vice Chairperson of the new Generator Step Up (GSU) bushing standard, presently under development.
- Currently revising the air core reactor standard.
- Various other standards such as Mitigation of Tank Rupture, etc.

SVC's:

- Fully knowledgeable of scope, components, and maintenance of SVC's and HVDC systems.
- Provided technical expertise with the preparation of a SVC specification.
- Provided technical expertise to AREVA for the design review of SVC transformers on two separate occasions including Geomagnetically Induced Current (GIC) mitigation.
- Manitoba Hydro has several SVC's in service, thus effective existing maintenance practices would be used in the evaluation.

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM — DATE (24/06/11)

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: .....HVDC & SVC Controls Expert
NAME OF FIRM: .....Manitoba Hydro International Ltd.
NAME OF STAFF: .....Randy Wachal
PROFESSION: .....Professional Engineer
DATE OF BIRTH: .....July 30, 1959
YEARS WITH FIRM/ENTITY:. 27
NATIONALITY: ..... Canadian

EDUCATION:

1981 University of Manitoba, Manitoba, Canada
B.Sc. Electrical Engineering

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Association of Professional Engineers of Manitoba; APEGM

Manitoba Hydro Association of Professional Engineers; MHPEA

Senior Member of IEEE

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

1995 – Present: Manitoba HVDC Research Centre Inc; Research Project Manager, Manitoba, Canada

Mr. Wachal's expertise in power systems and commissioning were instrumental in the fulfillment of various duties as described below:

- Development of detailed control models for design studies.
- Senior instructor for HVDC Training Course. Participated in HVDC Life Extension report preparation, specifically focused on HVDC control systems.
- Design and commissioning of HVDC controls systems and auxiliaries, including analog and digital controls.
- Commissioning of HVDC valve equipment, converter transformers, and switchgear.
- Review of DC system performance and design modifications to ensure optimum DC system performance.
- Organization and scheduling of modifications and commissioning tests, often involving energized and operating systems. In many cases the systems would be returned to service temporarily during the modification process in order to minimize disruptions to the critical HVDC operation.
- Involvement with the implementation of PEBB (Power Electronic Building Blocks).
- Project Management of highly skilled and diverse project teams, including utility based projects (SVC and HVDC), development (new technologies RTP, Ice Detection), and research (environmental monitoring).
- Senior instructor for HVDC Training Course. Participate in HVDC Life Extension report preparation, specifically focused on HVDC Control systems.
- Member of the team that prepared the HVDC Life Extension Document for EPRI (Electrical Power Research Institute) EPRI Project 062819-1 2006-7.

2004-2006: Manitoba Hydro, Project Manager, Manitoba, Canada
Mr. Wachal was a project manager for Manitoba Hydro Ponton SVC project (+150 to -20 MVar).

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1994: Manitoba Hydro, Senior Design Engineer, Manitoba, Canada
Mr. Wachal was the senior design engineer for a major controls upgrade of an existing 1960 vintage +160 MVar, -80 MVar synchronous condensers. Replacement of relay logic with programmable controllers was a main project focus.

1991-1993: Manitoba Hydro, Senior HVDC Control Commissioning Engineer, Manitoba, Canada
Mr. Wachal was senior HVDC control commissioning engineer for the replacement of Nelson River Pole 1, ±450 KV, 1800A mercury arc valves with thyristor valves. Extended time was spent at both Radisson and Dorsey HVDC Converter Stations.

1988-1990: Manitoba Hydro, Senior Control Design Engineer, Manitoba, Canada
As the senior control design engineer, Mr. Wachal designed 3 new +300 MVar, -160 MVar synchronous condensers located at Dorsey. Controls included PLC and a PC based monitoring and trending system. During this period, a new PLC joint var control system for 9 synchronous condensers was designed and commissioned. Extended time was spent at Dorsey Converter Station commissioning.

1982-1986: Manitoba Hydro, Assistant Commissioning Engineer, Manitoba, Canada
Mr. Wachal was the assistant commissioning engineer for Nelson River Bipole 2 ±500 KV 2000 MW project. He was involved in all aspects of commissioning controls, thyristor valves, converter transformers, switchgear, cooling systems, 1st grade power systems and associated equipment.

Awards and Special Assignments:
Consultant Rectifier Commissioning Specialist to Dubai Aluminum Company, (DUBAL), United Arab Emirates, March - June 1999. Project: 320 MVA 48 pulse rectifier used to power the POTLINE 6 aluminum smelter with low voltage, high current (200+ kA) DC.

Consultant commissioning specialist to Xcel Energy USA, October – May 2005. Project: 210 MW back to back HVDC tie located in Lamar Colorado.

Consultant commissioning specialist to Tri-State Generation and Transmission USA, Jan-April 2006. Project: +/-25 MVar SVC in New Mexico, USA.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Randy Wachal is the Research Projects and Engineering Services Manager at the Manitoba Hydro's HVDC Research Centre and has 26 years of utility experience in power system operations, HVDC / SVC apparatus commissioning, and HVDC design. He is currently responsible for the PSCAD simulation support group and actively involved in many engineering services projects for Manitoba Hydro and other clients. They include the Xcel Lamar B2B HVDC Converter station, the Ponton and the Birchtree SVCs, and all research development projects currently underway at the Centre. He leads a diverse team of engineers, researchers, and laboratory staff and applies his superior technical project management in HVDC and power systems assignments.

His thorough knowledge of power systems is evident through various publications on subjects such as electromagnetic transient simulation, PSCAD/EMTDC incorporation, load modelling for simulators, power system simulation, and others.

Mr. Wachal has excellent organizational, administrative, and technical skills. Practical application of these skills has been proven with 10+ years of direct field experience commissioning complex controls systems and HVDC power equipment. The ability to organize, schedule, and work as part of a larger team from a variety of departments and other organizations has played an important role in commissioning, consulting, and system studies assignments.

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CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: .....Combustion & Thermal Generation Expert
NAME OF FIRM: .....Manitoba Hydro International
NAME OF STAFF: .....Robert Joseph Dandenault
DATE OF BIRTH:.....03 09 1960
NATIONALITY: .....Canadian

EDUCATION:

2007 - present Athabasca University
Masters in Business Administration - MBA (in progress)

2006 - 2007 Athabasca University
Graduate Diploma in Management

2002 Province of Manitoba
First Class Power Engineer's Certificate with Inter-Provincial standing

2000 University of Manitoba - I.H. Asper Institute
Mid - Management Certificate Program

1982 - 1984 Red River College
Power Engineering Certificate

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Red River College Power Engineering Advisory Committee

Combustion Turbine Operations Task Force (Canada and USA Fleet)

COUNTRIES OF WORK EXPERIENCE:

Canada, Mozambique

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Fair	Good	Fair
Spanish	Poor	Poor	Poor
Portuguese	Poor	Poor	Poor

EMPLOYMENT RECORD:

2010 - Prosent: Manitoba Hydro International Ltd, Resident Technical & Operations Advisor, Hidroeléctrica da Cahora Bassa, Mozambique

- Provision of guidance on capital programs, specifically the Engineering, Construction and Rehabilitation program for the Dam Mid-level Outlets (Reabdesc) and the Rehabilitation and Up-rating of the HVDC Converter station (Reabsub), and including numerous other capital programs up-ratings and replacements.
- Assisting with the establishment of a Reliability Centered Maintenance Engineering Program.

- Day to Day monitoring and provision of technical and operations management guidance on technical and operational issues related to the 2075MW hydropower facility, HVDC Converter Station and Associated HVDC and HVAC Transmission Facilities.

- Provision of guidance on the design and implementation management of operations budgets
- Provision of guidance on Dam Safety, EMS, HR, and staff retention.
- Provision of guidance on Technical and Managerial Training Programs.
- Assist in the establishment and monitoring of technical and operational Key Performance indicators.
- Liaise with and provide assistance to the Hidroelectrica de Cahora Bassa resident Director on day to day operational matters and capital works.
- Arrange for additional technical services to be provided by MHI staff for specific training, engineering consulting services, problem solving and technical assistance.

2006 - 2010: Manitoba Hydro International Ltd, Consultant,Hidroeléctrica da Cahora Bassa Mozambique

- Work with the MHI team to develop an Environmental Management System (EMS) for Hidroelectrica de Cahora Bassa (HCB) consistent with the requirments of ISO 14001 standards.
- Assist with the development of Communications strategies to support the HCB EMS and Community Relations.
- Develop staff training programs for environmental awareness.
- Assist with the enhancement of HCB's lab capacity to expand the service the lab provides to the company and position it favourably to take on work from outside the company.

2006 - Present: Manitoba Hydro, Plant Manager, Grand Rapids Hydroelectric Generating Station

- Responsible for the leadership and management of the department to ensure that the Generating Station meets its designated purpose.
- Responsible for oversight of all associated rehabilitation projects.
- Lead the annual development of a departmental business plan that supports the company's objectives and goals.
- Lead the operation and maintenance of the 480 MW hydroelectric generating station including a company town site, airport, fish hatchery and supporting infrastructure.
- Responsible for managing complex community relations and often act as a corporate liaison to the community groups in an effort to maintain a strong, positive corporate image.
- Ensure that the department complies with all corporate and regulatory requirements including safety and the environment.
- Ensure that a strong focus on employee development is maintained and use performance management as an effective tool for training and development.
- Development and monitoring of the annual station budget.

2003 - 2006: Manitoba Hydro, Plant Manager, Brandon Generating Station

- Lead plant staff of approximately 90 in ensuring the station meets its designated purpose while adhering to corporate and regulatory requirements.
- Lead the operation and maintenance of a 105 MW coal-fired boiler and turbo-generator, 2 x 140 MW Open Cycle Gas Turbines
- Support corporate, business unit and divisional objectives and goals through the development of an annual department business plan.
- Actively pursue training and development opportunities for all staff to ensure that station objectives are met and succession plans are progressing.
- Work together with the Generation South Division Management Team to develop and monitor divisional objectives, goals and strategies
- Development and monitoring of the annual station budget.

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2001 - 2003: Manitoba Hydro, Operating Superintendent, Brandon Generating Station

- Serving as the station's Chief Power Engineer
- Ensure the efficient day to day operation of the station within the confines of all regulatory requirements and safe work practices
- Responsibility for 46 operating and utility staff
- Assume the responsibilities of the Plant Manager in his absence
- Lead operating and utility staff in the operation and maintenance of coal/oil fired boiler and steam turbine/alternator equipment and auxiliaries.
- Intimate experience in design, construction, commissioning, operation and maintenance of two Alstom N2 Gas Combustion Turbines (2 x 140 MW) and auxiliaries.
- Establish and maintain safe operating procedures and ensure staff is fully trained in them.
- Identify and implement staff development plans
- Coordinate outages with the System Control Centre, station maintenance staff, other departments within Manitoba Hydro and contractors.
- Responsibility for the implementation and monitoring of the Safety Management System within the operating and utility groups
- Ensure adherence to the Business Unit Environment Management System and all environmental regulations and licenses
- Participate and facilitate the development of the Brandon Generating Station Strategic Business Plan and lead team in achieving Brandon Generating Stations business objectives.
- Lead and/or participate in the identification and improvement of critical processes within the Brandon Thermal Generating Station
- Assist in station budget preparation and monitor station's cost of operation
- Prepare and submit all station operating and environmental performance reports
- Management member of the Station Workplace Safety and Health Committee
- Member of the station Streamlined Reliability Centered Maintenance (SRCM) analysis team
- Station Co-coordinator Environmental Management System

2000 - 2001: Manitoba Hydro, Production Supervisor, Chemical Laboratory Services, Power Supply

- Responsibility for 12 direct reports, all laboratory technicians
- Managed the work flow for Waverley Oil Lab, Selkirk Lab and the Brandon Lab
- Routinely dealt with customer service issues
- Prepared training and development plans for staff
- Handled lab maintenance issues at the three labs
- Interviewed and selected new staff

1985 - 2000: Manitoba Hydro, Selkirk Thermal Generating Station, Power Supply

- 16 years involvement in the operation and maintenance of the coal fired thermal generating units and gas turbines in Selkirk
- 7 years of supervision over station operators, assistant station operators and auxiliary plant operators
- Responsibilities have included maintenance planning and work order assignments for all crews within the station

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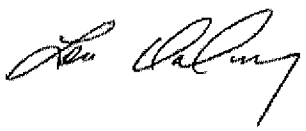
- Responsibility for all operator shift scheduling
- Responsible for developing and maintaining station operating manuals
- Project leader (coordinator) for the development and implementation of the station's Environmental Management System (ISO 14001 registered)
- Responsible for producing the stations environmental and performance reports
- Member of the stations Streamlined Reliability Centered Maintenance (RCM) working group
- Member of the station Process Improvement Committee
- Member of the station Economic Viability process improvement team
- Responsibilities at Selkirk Generating Station have included, water treatment operator, turbine operator, boiler operator, control room operator, utility crew supervisor, maintenance planner, shift engineer

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: .....Windfarm and Renewable Energy Expert
NAME OF FIRM:.....Manitoba Hydro International
NAME OF STAFF: .....Robert (Bob) Neil Buschau
DATE OF BIRTH:.....19 01 1963
NATIONALITY:.....Canadian

EDUCATION:

1995 - University of Manitoba
B.Sc. Electrical Engineering

1988 - Red River Community College
Electrical Apprenticeship

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Association of Professional Engineers & Geoscientists of the Province of Manitoba (APEGM)

Association of Professional Engineers & Geologists and Geophysicists of Alberta (APEGGA)

Association of Professional Engineers & Geoscientists of the Province of BC (APEGBC)

Manitoba Energy Management Task Force (MEMTF)

Institute of Electrical and Electronics Engineers (IEEE)

COUNTRIES OF WORK EXPERIENCE:

Canada, Bulgaria, Tanzania

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Poor	Fair	Poor

EMPLOYMENT RECORD:

1999-Present: MCW/AGE Power Consultants, Manager, Canada

Mr. Buschau is responsible for the on-going coordination, control, and quality assurance of various projects undertaken by MCW/AGE Power Consultants. These projects have included the supervision of numerous station rehabilitation programs undertaken by Utility and Industrial clients, including apparatus, protection and control, and grounding. His responsibilities also include the conceptual design and design coordination for Greenfield and Brownfield substations.

1995-1999: AGE Engineering Consultants, Engineer, Canada

As an Electrical Engineer and designer, developed a new division of the company which addressed power quality issues at the consumer level, including measurement, simulation and treatment of system Harmonics, protective relay studies, grounding, lightning protection, and VAR compensation. The design work comprised of commercial, institutional and industrial electrical design of electrical and life safety systems, and a large number of critical power installations, one of which included a 40MW (installed) uninterruptible power supply (UPS).

Manitoba
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1984-1994: Manitoba Hydro, Journeyman Electrician, Canada

Preformed and supervised the Electrical installation of numerous commercial, institutional, industrial and utility projects, including customer owned sub-stations to 25kV, and a 500kV HCDC converter station valve replacement.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Name of assignment or project: Lindi, Masasi, & Mtwara Central Generation and Electrification Project.
Year: 2009 – 2010.
Location: Tanzania
Client: UMOJA Light Company
Main project features: Design of 33 and 132 kV interconnection stations for new generating facility, preparation of new 33 kV distribution standards, and design of 95 km of 33 kV feeders.
Positions held: Engineering Lead.
Activities performed: Oversight of design efforts for station design including general arrangement, protection report and balance of plant for interconnection station. Oversight of development of new 33 kV distribution standards and preparation of construction package for station egress and new feeder.

Name of assignment or project: System Development Plan Implementation.
Year: 2005 - 2010
Location: BC Canada
Client: Fortis BC
Main project features: Design Development and Detailed design for approximately $200,000,000 of system improvements including distribution and transmission line rehabilitation, turnkey design for new distribution and transmission stations to 230 kV, and existing station upgrade projects to 230 kV including protection and control upgrades, bank additions, breaker replacement, grounding upgrades, etc.
Positions held: Engineer of record/Team Lead.
Activities performed: Oversight of design efforts including development of conceptual designs for all projects, review and approvals of all aspects of design including lines, station protection and control, station arrangement and detailing, grounding, special reports and scheduling.

Name of assignment or project: Consultant to Manitoba Hydro
Year: 2003 - 2010
Location: Manitoba Canada
Client: Manitoba Hydro
Main project features: Station Engineering support for on-going capital improvements including protection and control upgrades, and on-going programs for grounding and DC systems.
Positions held: Engineer of record.
Activities performed: Oversight of design efforts including development of conceptual designs, review and approvals of designs and special reports.

Name of assignment or project: Consultant to Hydro One
Year: 2007 - 2010
Location: Ontario Canada
Client: Hydro One
Main project features: Station Engineering support for on-going capital improvements including protection and control upgrade programs, and embedded generation interconnections at the distribution level.
Positions held: Engineer of record.
Activities performed: Oversight of design efforts including development of conceptual designs, review and approvals of designs and special reports.

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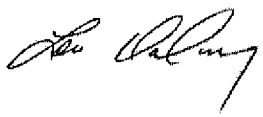
CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: .....Financial Specialist
NAME OF FIRM: .....Manitoba Hydro International
NAME OF STAFF:.....H. M. (Mack) Kast
DATE OF BIRTH:.....06 20 1945
NATIONALITY:.....Canadian

EDUCATION:

1971: University of Toronto, Canada
Bachelor of Commerce

1973: Canadian Institute of Chartered Accountants, Manitoba Institute of Chartered Accountants
Chartered Accountant Designation

1975 – 2004: Various Management Courses
Team Based Management, Strategic and Operational Planning, Utility Management Development Program, Performance Based Management, Application of Derivatives, Treasury Management, Regulatory Management

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Canadian Institute of Chartered Accountants

Manitoba Institute of Chartered Accountants

Financial Executives International

Winnipeg Chamber of Commerce

COUNTRIES OF WORK EXPERIENCE:

Albania, Bulgaria, Romania, Kenya, Nigeria

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

2010: Manitoba Hydro International, Artumas Regulatory Reform, Financial Consultant, Tanzania

Responsible for various financial matters pertaining to the commencement of delivery of electrical power to customers, and expansion of the rural customer base in the Mtwara-Lindi Region of Tanzania.

Particular focus has been applied to the following:

- Various financial models were developed to bridge the gap between offering tariffs that are acceptable to the customers to expand the customer base, the factoring in of all related costs of doing so, the financing alternatives and the key stakeholders.
- Meeting with the Energy Water Utilities Regulatory Authority (EWURA) to dialogue on various regulatory matters.
- Meeting with Government officials to discuss various financial and regulatory matters.

2006–2008: Manitoba Hydro International/Kenya Power & Lighting Company (KPLC), Deputy General Manager Finance & Corporate Services (Finance/IT/Procurement), Kenya

- Member of a three person team on a two year contract assignment with KPLC working on Energy Sector Recovery Project.
- Primary objective was to upgrade/refurbish and expand the under-invested, poorly maintained and overly aged transmission and distribution system of the national electric utility. KPLC has 37,000 km of transmission and distribution lines, 6,300 substations and 24,000 transformers. MHI oversaw two major Rural Electrification projects with 250,000 new customer connections.
- Delivered on performance objectives of reducing power losses, improving the rate of customer connectivity, reducing the number of customer outages, reducing the repair times to restore power, and to reduce the voltage fluctuations in the delivery of power.
- Chaired negotiations to sign Power Purchase Agreements with main power supplier.
- Chaired Tender Committee subject to revised Procurement Act and Regulations.
- MHI successfully managed KPLC through the stressful period of having to deal with the post-election country wide violence, which followed the national election held December 27, 2007.
- It has taken KPLC 85 years for it to connect it first one million customers. With the changes implemented by MHI, KPLC is now positioned to add its second million customers over the next five to seven years.

2001– 2004: Manitoba Hydro, Various International Assignments, MB, Canada

On-site efforts in January, 2003 with the Albania Regulatory Authority for the purposes of drafting an appropriate regulatory protocol and a code of conduct. Addressed processes for filing of applications with the regulatory commission.

Coordinated and hosted Albania Regulatory Authority Study Tour in Canada, June 6-18, 2004. Tour topics included addressing Rate Base/Rate of Return Regulatory Construct; Price Caps; Licensing Process; Unbundling Transmission and Rate Setting; Visit to Hydro Generating Stations and application of DC Transmission; observation of Rate Hearing in progress; and visit to Independent Market Operators complex in Toronto.

On-site visits to the Romanian Regulatory Authority in September, 2003 and January, 2004. Recommended an appropriate regulatory construct for rate setting purposes. Construct included determination of rate base, gross plant, accumulated depreciation, working capital and other adjustments. Model was forward looking and addressed capital prioritization. Rate setting included various components of revenue requirements, including operating and maintenance expenses, depreciation expense, amortization expenses, property and other taxes, rate of return on rate base and related income taxes. The regulatory model included incentive mechanisms in the form of price caps for fixed periods. Also addressed difference between investment by potential investors and company book equity.

On-site project manager in Nigeria, Africa in 2001 and 2002 in various cities including Kano, Abuja, Aba and Port Harcourt. Primary objective was to address significant technical and non-technical energy losses. Established contacts and set up contract working closely with local personnel.

1999 – 2004: Manitoba Hydro, Division Manager, Gas Supply, MB, Canada

Co-ordinated multi-test year rate application for filing with the Manitoba Public Utilities Board. Addressed numerous interrogatories and testified in support of filed material. Identified capital expenditures and priority for budget setting. Led customer survey initiative to determine customer perceptions and degree of tolerance for sales rate volatility.

Responsible for determination of optimum asset mix related to gas supply, transportation and storage assets. Implemented rate management policy, the purpose being to have market responsive sales rates, but at the same time tempered for price volatility. Extensive involvement with hedging and use of financial derivatives used for purposes of stabilizing volatile cost inputs.

Lead the implementation of a new web-based management system to capture all deal entries and reporting. Ensured appropriate division and segregation of duties and the application of internal controls. Ensured

comprehensive management reporting was in place, including the use of exception based reporting.

Prepared strategic and operational business plans on an annual basis. Ensured the inclusion of extensive performance measures and targets. Reported against them on a monthly basis and identified corrective actions when necessary.

Tracked all costs and managed various deferral accounts to support customers' sales rate riders for recovery of pass-through costs. Implemented a rate management program to ensure the lowest possible product cost available with minimal sales rate volatility. Extensive involvement with hedging and use of financial derivatives for purposes of stabilizing volatile cost inputs.

Documented policies and operating principles and procedures relating to both the physical and financial transactions.

Continual commitment to staff to ensure team-based environment is operating at an optimum level. Ensured full use of performance appraisals, personal development plans and succession plans were in place.

1986 – 1999: Manitoba Hydro, Vice-President, Finance, MB, Canada

Responsible for financial and regulatory matters, as well as customer billing, credit and collection, information technology, procurement and stores, facilities and environmental matters. Broader responsibilities included strategic and operational planning, moving to a customer-driven organization and the introduction of a team-based management style.

Financial responsibilities included setting long-term financial forecasts, annual budgeting, asset prioritization, capital asset cost/benefit analysis, variance reporting, maintaining appropriate financial debt/equity ratio, and maintaining an appropriate credit rating. Made many presentations and recommendations to the company's Board of Directors and external parties.

Responsibility for Information Technology; from a hardward perspective, ensured appropriate platform was in place, with all upgrades and changes prioritized and updated as necessary. Ensured thorough business cases supported all system software program changes, that all stakeholders were involved, that appropriate controls were in place and that projects were tightly managed.

Responsible for various process improvement initiatives including the revenue collection cycle. Responsible for the implementation of a new customer billing system.

Involved in extensive work with both the internal and external auditors to ensure the highest level of integrity was maintained in the procurement process, including the drafting of requests for proposals, tendering and bid analysis. Reorganized supply chain contracts to extend contracts beyond the typical one-year budget cycle.

Regulatory responsibilities included making a determination of the need to file for rate changes. Extensive involvement with appropriate regulatory construct, including shift from using an historical asset rate base approach to setting rates on a future test-year basis. Applied various regulatory incentive based techniques. Quality controlled many applications filed with the regulatory board; filed written testimony and testified before public tribunals on many occasions. Reviewed many regulatory decisions and ensured on-going compliance.

1980 – 1986: Manitoba Hydro, Director of Regulatory Affairs, MB, Canada

Extensively involved in regulatory applications of eleven companies being filed across seven different regulatory jurisdictions. Dealt with various approaches to regulation and the many issues associated with each. Determined rate base calculations mainly reflecting the inclusion of fixed assets and working capital; calculated revenue requirements which included operating expenses, depreciation, property taxes, and a return component. The return component covered interest charges relating to each of long and short term debt and a rate of return on equity component. A key determinant in the return component was agreement on the appropriate debt to equity ratio, be it deemed or actual. After having determined the revenue requirement, the expected revenue was estimated after which either a revenue deficiency or sufficiency was calculated. Was

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responsible for the budget linkage to the regulatory applications.

1978 – 1980: Ontario Hydro, Manager, Rates Department, ON, Canada

As Manager of Rates Department, had extensive involvement with a study covering long run marginal costing and time-of-use rate setting theories.

1977 – 1978: Ontario Energy Board, Manager, Rates, ON, Canada

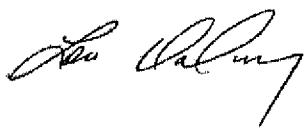
As Manager of Rates, was responsible for the review of various regulatory applications filed with the Ontario Energy Board. Worked with advisors and consultants so as to ensure a thorough review was completed during the course of a public hearing. Ensured all applications contained only expenditures that were prudent and justified; a thorough review was completed of the complex material filed with the Board. Advised board members on various matters pertaining to issues raised during the course of public hearings.

1973 – 1977: Alberta Public Utilities Board, Director of Regulatory Technical Affairs, AB, Canada

As Director of Regulatory Technical Affairs, managed staff and reviewed various regulatory applications filed with the Board.

1971-1973: Public Practice, Audit Firm

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
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PROPOSED POSITION: .....Power Systems Studies Expert
NAME OF FIRM: .....Manitoba Hydro International Ltd.
NAME OF STAFF: .....Allan D. Silk, P.Eng
DATE OF BIRTH:.....4/4/56
YEARS WITH FIRM/ENTITY:.22
NATIONALITY:.....Canadian

EDUCATION:

1989 – 92. University of Manitoba,
Several Graduate Level Courses in Electrical Engineering

1985. University of Manitoba
Bachelor of Science in Computer Engineering

1982. Red River Community College
Diploma in Computer Technology

1978. Red River Community College
Certificate in Telecommunications

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Midwest Independent System Operator (MISO)
Mid-Continent Area Power Pool (MAPP)
Engineers Canada (Canadian Society of Professional Engineers)
Association of Professional Engineers and Geoscientists of Manitoba(APEGM)
Manitoba Hydro Professional Engineers Association
Institute of Electrical and Electronics Engineers

LANGUAGES:	SPOKEN:	READ:	WRITTEN: (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

May 2007 – Present: Manitoba HVDC Research Centre, Manitoba Hydro International, Senior Consulting Engineer, Manitoba, Canada

Responsibilities include:

Providing project management services to a wide variety of clients and projects including simulation study and analysis, engineering design, inspection, troubleshooting while utilizing industry recognized best practices, standards, and procedures to meet the goals of the project. This includes preparing project proposals, project schedules and estimates, participating in projects and serve as Project Manager with due emphasis on utility or transmission system operations, cost effective design, management and creation of capital plans, electrical master plans, and specification engineering for procurement to match our clients purchasing practices.

May 2007 – December 2010: Manitoba Hydro, Tariff Administration and Rates Engineer Chief Compliance Officer for the Manitoba Hydro Standards of Conduct Program, Manitoba, Canada

Responsible for managing the Manitoba Hydro Open Access Interconnection Tariff, the Manitoba Hydro Open Access Transmission Tariff. This includes setting the wholesale rates for use of the bulk transmission system (the rates are approved by the Transmission Rates Committee), processing the applications for both tariffs,

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ensuring engineering studies to support tariff applications are completed in within schedule, negotiating the service and operating agreements required by applicants to take tariff service. I was also responsible for initiating changes to the tariffs to ensure that they are current with open access practices.

As the CCO for the Standards of Conduct Program, Allan monitored and ensured corporate compliance to the Manitoba Hydro Standards of Conduct Program. The Standards of Conduct Program was mandated by the US Federal Energy Regulatory Commission for "vertically integrated" entities that wish to participate in open access for the sale and purchase of wholesale power within the USA.

October 2001 – May 2007: Manitoba Hydro, Integrated Network Performance Engineer, Manitoba, Canada

Responsible for leading the study teams that studied and provided the operating guidelines for the System Control Centre and Midwest ISO. In this position, Allan built a team that successfully kept pace with the evolving needs of the corporation within an ever-changing industry. Paramount in this effort was aligning the efforts of staff members with the goals and targets set forth in the departmental and divisional business plans. This has been accomplished by developing processes which define our actions with stakeholders internal and external to the corporation.

October 91 -October 2001 Manitoba Hydro, AC Network Studies and Principal Network Studies Engineer, Manitoba, Canada.

Responsible for studying all aspects of the AC Network including disturbance analysis, developing power transfer limits, and developing procedures for operating the system. While in this position, I led the Interconnected Studies Task Force, which is an international multi-utility taskforce that determines the transfer capability between Manitoba and the USA. I also actively participated in the Northern MAPP Operating Review Working Group. In 1997, MAPP's Regional Reliability Committee elected me to a four-year term on the Design Review Subcommittee. The Design Review Sub-committee reviewed and approved all the system additions including new transmission and generating additions at the design stage of the project. I was re-elected in November of 2000.

1989 – 1991: Manitoba Hydro, Electrical Systems Engineer, Engineering Systems Department

Develop and support new and existing computer applications used to study the Manitoba Hydro power system.

1988 - 1989: Manitoba Hydro, Process Control System Software Specialist, Engineering Systems Department

Develop and support new and existing computer applications used to control the Manitoba Hydro power system. All applications were developed for Manitoba Hydro's AGC/SCADA computer.

1986 – 1988: Manitoba Microelectronics Centre, Design Engineer, Manitoba Microelectronics Centre

Design of Telecommunications and Power System control systems. Redesigned a Telecommunications test systems that allowed technicians to analyze communication circuits from a central location. Developed a prototype of a Power Line monitor to production readiness.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

A focused professional with over 16 years experience in Power System Studies with specific knowledge in:

- Inter-utility coordination
- Facility additions
- Flowgate analysis
- NERC Planning Standards and Operating Policies
- RTO Operations
- Computer based modelling tools

Specific experience in analyzing power systems using the following techniques:

- Powerflow

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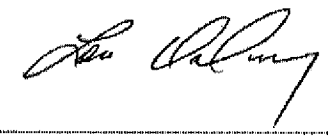
- Dynamic Stability
- Voltage Stability
- Eigenvalue analysis

Experience in operational planning in both a regulated and de-regulated environment.

Effective oral and written communicator.

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
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PROPOSED POSITION: ...Consulting Engineer (Submarine Cables)
NAME OF FIRM: .....Manitoba Hydro International Ltd.
NAME OF STAFF: .....Paul Wilson
DATE OF BIRTH: 12/04/1961
NATIONALITY: .....Canadian

EDUCATION:

1987 University of Manitoba
Department of Electrical and Computer Engineering
Graduate 1987 B. Sc. EE

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Association of Professional Engineers & Geoscientists of Manitoba (APEGM)
Association of Professional Engineers & Geoscientists of Saskatchewan (APEGS)
International Council on Large Electric Systems (CIGRE)
Institute of Electrical and Electronics Engineers (IEEE)
President of the Energy Service Alliance of Manitoba (ESAM)

COUNTRIES OF WORK EXPERIENCE:

Canada

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

2010 – Present, Manitoba Hydro International – Managing Director, Subsidiary Operations
Mr. Wilson is responsible for all aspects of operations of Manitoba Hydro International Ltd. (MHI). MHI's mission is to assist power utilities, governments, and private sector clients around the world in the efficient, effective, and sustainable delivery of electricity. As a services company, Paul manages the overall operations, ensuring effective use of resources and coordination through the Divisions, minimizes risk to the Parent Company through contract management, industry best practices, exercising leadership in Industry through collaboration of likeminded services providers, and ensure solid fiscal performance and returns to the shareholder. As a result, the company has been growing at a rate of approximately 30% per year with similar growth in net revenues.

1999 – 2010 Manitoba HVDC Research Centre – Managing Director, Manitoba, Canada
Mr. Wilson is responsible for all aspects of operations of the Manitoba HVDC Research Centre. This organization through its activities is a fundamental cornerstone to the Centre of Excellence that exists in Manitoba with the electrical power industry. The Centre develops professional and commercial level of power system software used in 72 countries around the world. Through the guidance and leadership of Paul Wilson, the development team, the support and training network, customer service, and the network of knowledgeable representatives has grown to provide a very high level of service to our clients. Recently adopted quality control

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and assurance processes, together with the necessary corporate cultural shift, has greatly improved the stability and robustness of our products, and our capabilities to tackle larger challenges. The Centre provides research and engineering services to clients both internal and outside of the shareholder as part of our normal business mix.

1998 – 2000 Manitoba Hydro – Year 2000 Project Manager, Manitoba, Canada
Mr. Wilson, in the capacity of Project Manager and Chair of the Manitoba Hydro Year 2000 Task force – Power Systems and Operation, led the successful transition all Manitoba Hydro embedded computer systems to meet the Year 2000 challenge. All systems were ready for the deadline with the project under budget and on-time. All risks were assessed and contingency plans prepared.

As part of role, Paul was a member of the Mid Area Power Pool Year 2000 Task force and the Canadian Electrical Association, regularly meeting together with the power pool coordinators, and other member utilities to formulate and consolidate plans, devise best practices where none existed, develop useful public communication strategies, and lobby government.

1993 – 1998 Manitoba Hydro – Protection Maintenance Engineer, Section head, Manitoba, Canada
In this position with the Systems Support Department, Manitoba Hydro, Paul supervised a small team primarily responsible for all protection relay settings applications and maintenance standards. Working together with field staff, Paul provided engineering support for all protection relay, metering, digital fault recorder, RTU, maintenance, commissioning and outage investigations.

Regular communication with various operations and maintenance groups including design, HVDC, generation, distribution, and transmission apparatus maintenance presented its own challenges to bring the diverse work groups to a common goal and understanding.

1988 – 1993 Manitoba Hydro – Protection Engineer, Manitoba, Canada
In this position in Distribution Engineering – Central Region, Manitoba Hydro, Paul was primarily responsible for all distribution protection design and settings, voltage regulation and power quality. Working together with operations, design and maintenance groups, the challenges of serving both rural and urban distribution were solved.

1987 – 1998 Manitoba Hydro – Project Engineer, Manitoba, Canada
In this position, Distribution Engineering – Central Region, Paul Wilson was part of a team to develop a feeder optimization computer program.

WORK UNDERTAKEN THAT BEST ILLISTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Mr. Wilson has excellent organizational, administrative and technical skills. In his current capacity as Managing Director, Subsidiary Operations of Manitoba Hydro International, Paul demonstrates all core competencies in visionary leadership, achieving results, financial responsibility, and effective decision making to a high level of skill. Together with his technical skills, Paul excels at creation of teams to solve difficult and challenging problems. Practical application of these skills has been proven with 24 years of utility and International Utility Services experience. Key qualifications are derived from demonstrated experience in engineering services management, commercial software development and intellectual property management, provision and management of research services, quality assurance and process management, and in the management and leadership of a dynamic and diverse organization. Paul has past distribution protection design, protection design, protection maintenance and generator unit and HVDC protection commissioning, training and project management experience giving him a core understanding of utility business.

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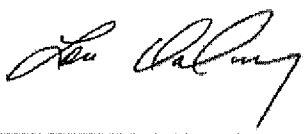
In his role of Managing Director, a great deal of time is spent in actively participating with leading industry associations (CIGRE and IEEE), collaborating with Universities and Research centers around the world, and managing a the Divisions of Manitoba Hydro International in order to achieve the strategic goals of the Manitoba Hydro International. Paul Wilson and his staff regularly participate on numerous working groups and committees to promote their services, technologies, publish their knowledge and findings, develop standards and working documents, and guide young researchers and students in fruitful endeavors.

Relevant to this proposal, Paul is currently a Task Force leader in the CIGRE Working Group C4.502 on "Power system technical performance issues related to the application of long HVAC cables". Paul also participated on and completed the report for "Potential Future Use of Underground or Under Water Cables for Long Distance Transmission in Manitoba" which was an expert Industry Panel sponsored by Manitoba Hydro. A report was completed and submitted to the Government of Manitoba and all stakeholders as a public document.

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
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PROPOSED POSITION:...Reliability Expert
NAME OF FIRM:.....Manitoba Hydro International
NAME OF STAFF: .....Bagen Bagen
DATE OF BIRTH:.....January 15, 1968
NATIONALITY: .....Canada

EDUCATION:

2002-2005:University of Saskatchewan, Saskatoon, Canada
Ph.D., Electrical Engineering

2000-2002:University of Saskatchewan, Saskatoon, Canada
M.Sc., Electrical Engineering

1991-1994:Sichun Normal University, Chendu, China
M.Sc., Physics

1985-1989:Inner Mongolia University for Nationalities, Tongliao, Inner Mongolia
B.Sc., Physics

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Professional Engineer Registered with the Association of Professional Engineers and Geoscientists of the Province of Manitoba

IEEE Senior Member

COUNTRIES OF WORK EXPERIENCE:

Mongolia, China and Canada

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
Mongolian	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent
Chinese	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

2005-Present: Manitoba Hydro, Interconnection and Probabilistic Planning Engineer

Activities include:

1. Provided specialist service and expert guidance to probabilistic planning studies on the Manitoba Hydro system and its planning reserve sharing group resource adequacy.
2. Directed, conducted and lead quantitative risk assessment on Manitoba Hydro transmission systems and bulk generation/transmission systems in order to provide inputs to major project justifications or high level decision making process.
3. Developed and prepared planning standards, criteria, methodologies and specifications.
4. Conducted and lead generator interconnection studies as per the Manitoba Hydro Open Access

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Interconnection Tariffs.

5. Conducted and lead long term transmission service studies in accordance with the requirements of Manitoba Hydro Open Access Transmission Tariffs.
6. Developed capital budget documentation, including the preparation of Capital Project Justifications, Capital Expenditure Revisions and budget single line diagrams to make recommendations for capital expenditures.
7. Represented Canadian utilities and Manitoba Hydro several strategic planning committees and task forces.
8. Initiated and participated in research and development projects.
9. Contributed to various academic committees associated with IEEE, CIGRE and PMAPS.
10. Trained and supervised engineers and technical staff.

Project Examples:

1. Probabilistic Planning, Assessment and Methodology

- MAPP Loss-of-Load Expectation (LOLE) Study for the 10-Year Planning Horizon 2010-2019
- Manitoba Hydro Planned Resource Adequacy Assessment for the 10-year Planning Horizon from January 1, 2011 through December 31, 2020
- Probabilistic Reliability Assessment of Transmission Alternatives for Keeyask and Conawapa generation development
- Expected Energy Not Supplied (EENS) Study for Manitoba Hydro Transmission Enhancements Associated with Bipole III HVDC Transmission
- Reliability Assessment of Letellier Station Development Options Using a Probabilistic Approach

2. Generator Interconnection Studies

- Gull Generating Station (620 MW) Interconnection Evaluation Study
- St. Joseph Wind Farm Project: System Impact Study on Manitoba-Ontario Interconnection
- St. Joseph Wind Farm Project: System Impact Study on Manitoba-Saskatchewan Interconnection

3. Transmission Service Request Studies

- MHEB System Impact Study: IESO to MHEB Firm Point to Point Transmission Service Request- Ontario to Manitoba Transfer Capacity of 100 MW
- MHEB System Impact Study: MHEB to IESO Firm Point to Point Transmission Service Request- Manitoba to Ontario Transfer Capacity of 300 MW
- MHEB Facility Study: MHEB-IESO Firm Point to Point Transmission Service Requests- Manitoba to Ontario Transfer Capacity of 300 MW/Ontario to Manitoba Transfer Capacity of 100 MW/Ontario to Manitoba Transfer Capacity of 200 MW
- MHEB Facility Study: MHEB-SPC Firm Point to Point Transmission Service Requests- Manitoba to Saskatchewan Transfer Capacity of 45 MW/ Saskatchewan to Manitoba Transfer Capacity of 25 MW
- MHEB Facility Study: MHEB-SPC Firm Point to Point Transmission Service Requests- Manitoba to Saskatchewan Transfer Capacity Increase of 50 MW and 100 MW

4. Other Planning Studies

- Riel Station Reliability Project- System Impact Study on Manitoba-Ontario Interconnection
- Riel Station Reliability Project- System Impact Study on Manitoba-Saskatchewan Interconnection
- Riel Station Reliability Project- Report to the MAPP Design Review Subcommittee
- HVDC Reduction Functional Specification for the Riel Station Sectionalization Project
- Evaluation of Transmission Alternatives to Bipole III HVDC Transmission
- Study on Manitoba Hydro System Reactive Power Reserve Associated with the 500 kV Tie Line
- Evaluation of Reactive Power Reserve Margin on Dorsey Synchronous Condensers
- Justification for the advancement of the La Verendrye- St. Vital New 230 kV Line and the 230 kV Breaker Replacement
- Breaker Failure Scenario Analysis on Manitoba Hydro 115 Stations

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1994-2000: Inner Mongolia Electric Power Group, Planning Engineer

Activities include:

1. Provided consultant services to power utility companies on power system planning and reliability analysis.
2. Performed technical studies on power systems including power flow study, fault analysis, contingency analysis, reliability and transient stability analysis of power networks.
3. Conducted research on power system reliability and wind energy for power generation.
4. Coordinated implementation of power plant rehabilitation project sponsored by the Asian Development Bank in the capital city of Mongolia.
5. Performed wind energy impact study sponsored by the Department for International Development, United Kingdom.
6. Provided lectures to undergraduate students and electric power engineers on power system reliability, electrical and magnetic circuit and electricity, magnetism and field theory.

1989-1991: Daerhan-Maominan High School, Bathaalage, Inner Mongolia, Teacher

Taught high school physics

WORK UNDERTAKEN THAT BEST ILLISTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Dr. Bagen is a respected industry expert in resource and power system planning particularly in the area of probabilistic or risk-based planning. He has over 16 years experience in a variety of areas of power systems including resource planning, generation development, transmission planning, composite generation and transmission planning, interconnection facility/impact evaluation and transmission service request assessment. He was invited and nominated to several strategic industry planning committees including NERC Resource Issue Subcommittee (RIS), NERC Generation and Transmission Planning Model Task Force (GTRPMTS), NERC LOLE Working Group and MAPP Composite System Reliability Working Group (CSRWT) providing expert advises and leadership on various matters of planning, operating, strategic and technical importance. He also participates in the development of various internal, national and international standards such as Manitoba Hydro's loss of load expectation study criteria and procedures, Manitoba Hydro Transfer Capability Methodology for the Planning Horizon, Manitoba Hydro System Operating Limits Methodology for the Planning Horizon, the MRO resource adequacy assessment standard, NERC Methodology and Metrics for Probabilistic Assessment, NERC Facilities Design, Connections and Maintenance (FAC), NERC Modeling Data and Analysis (MOD) and NERC Transmission Planning (TPL).

Dr. Bagen actively involves in various academic activities in his career. He is a member of the International Technical Advisory Committee of Probabilistic Method Applied to Power Systems. He is also serving in various academic committees and working groups associated with CIGRE and IEEE as well. He has published the results of his studies and research in academic journals and conference proceedings. Some of his recent publications are provided as bellow:

Journal:

1. **B. Bagen**, W.Y. Li and Y. Gao, "Comparison of Alternative Probabilistic Techniques for Adequacy Assessment of Small Isolated Wind/Diesel Systems" the International Journal of System Assurance Engineering and Management, Vol. 1, No.2, pp.129-134, 2010.
2. A. Dissanayaka, U.D. Annakkage, B. Jayasekara and **B. Bagen**, "Risk Based Dynamic Security Assessment" a paper accepted by the IEEE Transactions on Power Systems in September 2010.
3. R. Billinton and **B. Bagen**, "Generating Capacity Adequacy Evaluation of Small Stand-Alone Power Systems Containing Solar Energy", Reliability Engineering and System Safety Vol. 91 pp. 438–443, 2006.
4. **B. Bagen** and R. Billinton, "Evaluation of Different Operating Strategies in Small Stand-alone Power Systems", IEEE Transactions on Energy Conversion Vol. 20, No. 3, pp. 654-660, 2005.
5. **B. Bagen** and R. Billinton, "Incorporating Well-Being Considerations in Generating Systems Using Energy Storage", IEEE Transactions on Energy Conversion Vol. 20, No. 1, pp. 225-230, 2005.
6. R. Billinton and **B. Bagen**, "Incorporating Reliability Index Distributions in Small Isolated Generating

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System Reliability Performance Assessment", IEE Proceedings-Generation, Transmission and Distribution, Vol. 151, No. 4, pp.469-476, 2004.

7. R. Billinton and **B. Bagen**, "Reliability Evaluation of Small Stand-Alone Wind Energy Conversion Systems Using A Time Series Simulation Method", IEE Proceedings-Generation, Transmission and Distribution, Vol. 150, No.1, pp.96-100, 2003.

Conferences:

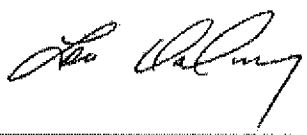
1. **B. Bagen**, "A Probabilistic Procedure for the Reliability Assessment of Substation Development Options" a paper submitted to be presented at the 2011 IEEE Canada Electrical Power and Energy Conference will be held in Winnipeg in October 2011.
2. D. Jacobson, R. Ostash, **B. Bagen**, P. Wang and S. Shelemy, "Large Scale Wind Interconnection Studies at Manitoba Hydro" a paper presented at the 9th International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Québec, Canada, 18-19 October, 2010.
3. **B. Bagen**, P. Koegel, M. Couillard, K. Stradley, B. Giggee, A. Jensen, J. Iverson and G.E. Haringa, "Probabilistic Resource Adequacy Assessment of Large Interconnected Systems", a paper presented at the 11th International Conference on Probabilistic Methods Applied to Power Systems, Singapore, June 14-17, 2010.
4. **B. Bagen** and W.Y. Li, "Reliability Evaluation of Integrated Wind/Diesel/Storage Systems for Remote Locations", a paper presented at the 11th International Conference on Probabilistic Methods Applied to Power Systems, Singapore, June 14-17, 2010.
5. **B. Bagen** and R. Billinton, "Reliability Cost/Worth Associated With Wind Energy and Energy Storage Utilization in Electric Power Systems", a paper presented at the 10th International Conference on Probabilistic Methods Applied to Power Systems, Rincon, Puerto Rico, May 25-29, 2008.
6. **B. Bagen**, D. Jacobson, G. Lane and H. Turanli, "Evaluation of the Performance of Back-Back HVdc Converter and Variable Frequency Transformer for Power Flow Control in A Weak Interconnection", an Invited paper presented at the IEEE General meeting, 24-28 June 2007, Tampa, Florida, USA.
7. R. Billinton and **B. Bagen**, "Reliability Considerations In the Utilization of Wind Energy, Solar Energy and Energy Storage in Electric Power Systems", a paper presented at the 9th International Conference on Probabilistic Methods Applied to Power Systems, Stockholm, Sweden, June 11-15, 2006.

Industry Reports/Books/Chapters

1. NERC Generation and Transmission Reliability Planning Model Task Force Final Report on Methodology and Metrics, December 2010.
2. NERC Integration of Variable Generation Task Force 1-2, Methods to Model and Calculate Capacity Contributions of Variable Generation for Resource Adequacy Planning, November 2010.
3. Chapter 3 Lead Editor of CIGRE Book prepared by Working Group C4.601, "Review of the Current Status of Tools and Techniques for Risk-Based and Probabilistic Planning in Power Systems" October 2010.

CERTIFICATION:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: ...Submarine Cable Expert
NAME OF FIRM: .....Manitoba Hydro International
NAME OF STAFF: .....G. Allen MacPhail
NATIONALITY: .....Canadian

EDUCATION:

1972: University of British Columbia
B.Sc. Electrical Engineering

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Member, Association of Professional Engineers and Geoscientists of BC and Association of Professional Engineers, Geologists and Geophysicists of Alberta

Member, Institute of Electrical and Electronics Engineers: Power Engineering Society and Dielectrics & Electrical Insulation Society

Voting Member and past Chair of Cable Construction and Design Subcommittee, Insulated Conductor Committee of IEEE

Member, CIGRE Canada and CIGRE Working Group B1.32 – „Recommendations for testing HVDC extruded cable systems for power transmission at a rated voltage up to 500 kV"

OTHER TRAINING:

COUNTRIES OF WORK EXPERIENCE:

Canada

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

June 2006 – Present: Cabletricity Connections Ltd; President and Principal Engineer

Providing consulting engineering services for MV, HV and EHV underground and submarine power cable applications.

1978 – June 2006: BC Hydro; Senior Engineer, Specialist Engineer (1996-2004) and Principal Engineer (2004-2006), Transmission Cables Team/Transmission Design Department

As leader or part of an engineering project team, engineered many new land and submarine cable systems ranging in voltage level from 35 kVac to 525 kVac and +/-300 kVdc to +/-450 kVdc. Activities included technical studies, cost estimating, land and marine surveys and reviews, route selection, specifications and drawing

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preparation, bid evaluation, contract negotiations, contractors' design reviews and approvals, factory tests and report reviews, construction inspection and final acceptance testing. Activities were for internal and external clients through BC Hydro International (BCHIL).

Performed studies and investigations to determine optimum underground and submarine cable systems for a large variety of applications. Participated in route selection activities related to cable installation cost, environmental impact and reliability. Performed calculations to determine cable ampacities using analytical and numerical modeling techniques. Investigated corrosion mitigation methods, life expectancy and up-rating feasibility for aged 230 kVac and 300 kVdc submarine cable systems. Implemented real time cable dynamic rating and distributed fibre-optic temperature sensing systems; developed computer programs for analysis of various cable sheath bonding and transient over-voltage protection methods.

As part of a major 230 kVac/300 kVdc submarine cable project, participated in preparation of environmental applications for two government levels in US and Canada, including CPCN application and support during utilities commission hearings as an expert witness. Prepared technical specifications for $135M submarine cable system supply/install contract.

1974 – 1978: BC Hydro; Distribution Design Engineer

Designed underground and overhead 12 kV and 25 kV distribution systems for residential, commercial and high load density urban areas; compared radial, primary selective, open loop, integrated network and spot network systems; responsible for design of civil and electrical work for many additions and extensions to existing distribution systems.

1972 – 1974: BC Hydro; Engineer-In-Training

Participated in design, installation and maintenance of overhead and underground distribution systems; performed many technical studies such as voltage drop, power factor correction, fault protection coordination, optimum conductor size selection and transformer cost of losses analysis.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Submarine and Underground Transmission Cable projects:

1979 – 1980

- Design Task manager for replacement of 138 kVac submarine cable shore ends, Tsawwassen

1980 – 1984

- Design assistance for two new 1200 MW, 38 km long, 400 m deep, 525 kVac cable circuits to Vancouver Island
- Design assistance for new 2L170 Pike Lake – Esquimalt 230 kV 5.5 km 600 MW underground transmission line, Victoria
- Design assistance for new 2L31/32, Murrin – Cathedral Square 230 kV 2.4 km 400 MW underground transmission lines, Vancouver
- Design Task Manager for relocation of 60L52 cales for BC Place stadium construction, Vancouver

1984 – 1987

- Design Task manager for relocation and re-termination of 2L145 and 2L170; installation of new 230 kV cables to T1/T2 at Horsey Substation, Victoria
- Design assistance for underwater ROV inspection of 525 kVac cables, Georgia Strait

1987 – 1990

- Design Task manager for new 69 kV cables to T9 at Ingledow Substation, Surrey
- Design Task manager for relocation of 2L49 at Horne Payne & new 230 kV cables to T2, Burnaby

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1990 – 1991

- Design assistance with recovery and investigation of 138 kVac cable faulted due to long underwater free spans, corrosion and abrasion, Galiano Island

1991 – 1992

- Design assistance with repair of 300 kVdc cable faulted by large concrete block, Galiano Island

1992 – 1994

- Assisted with preparation of specifications and bid documents for new 5.5 km, 230 kVac cable across Hood Canal in Washington State, client - Puget Sound Energy

1993 – 1994

- Assisted with cost estimates and marine survey review for proposed +/-300/400 kVdc interconnector across Irish Sea between Ireland and Wales, client – Electricity Supply Board of Ireland

1994 – 1995

- Prepared cost estimates for +/-450 kVdc interconnector across Sunda Strait between Sumatra and Java, client - PT. ATA Brasinu.

1996 – 1997

- Assisted with a corrosion study for existing 400 kVdc KONTEK Denmark-Germany cables, client - Elkraft/SEAS

1996-1997

- Prepared preliminary designs, cost estimates and reports for a variety of 525 kVac and 300/450 kVdc alternatives for Vancouver Island future electricity supply
- Assisted with a condition assessment and reliability enhancement study for existing 138 kV submarine cables across Taku Inlet, Juneau, Alaska, client – Alaska Industrial Development & Export Authority
- Design Task Manager for three new 69 kV underground transmission lines exiting Newell Substation, Burnaby

1997-2000

- Project Engineer for 20 km long, 35 kVac submarine cable in Belize, Central America, client - Belize Electricity
- Design Task Manager for three new 69 kVac underground transmission lines exiting Como Lake Substation, Coquitlam
- Design Task Manager for major condition assessment of existing +/-300 kVdc cables to Vancouver Island
- Design Task Manager for undergrounding of 60L73 through Morgan Creek development, Surrey
- Owner"s project Cable Engineer for completion phase of 13 km long, 850 m deep, 420 kVac/dc cables between Egypt and Jordan. These were the deepest HV power submarine cables in the world at the time. Clients – Egyptian Electricity Authority, Jordanian Electricity Authority
- Owner"s project Cable Engineer for new 138 kV submarine cables across 5.5 km wide, 200 m deep Taku Inlet, Juneau, Alaska, clients – Alaska Electric Light & Power, Alaska Industrial Development & Export Authority
- Review of proponent"s proposal for 290 km, 400 kVdc Victoria-Tasmania Bass Strait submarine cable interconnector, MHI/Taslink
- Design Task manager for condition assessment & uprating studies of 2L39/40/46/56 cables
- Prepared technical specifications for several underwater inspections of DC1, DC2 and 5L29/31 submarine cables
- Participated as a technical advisor on EPRI"s Underground Transmission Task Force

2000-2002

- Provided assistance with preparation of specifications and design reviews for San Juan Islands 69 kVac submarine cable No. 5 improvement project, San Juan County, client - Bonneville Power

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Administration
- Prepared preliminary designs and cost estimates for two 230 kVac, 30 km long, 600 MW submarine cable interconnections to Vancouver Island
- Coordinated engineering activities for underwater inspection and condition assessment of 300 kVdc & 525 kVac submarine cables in water depths to 400 m, Georgia Strait
- Provided technical oversight for new MUR-DGR 60L50 60kVac cable circuit, Vancouver
- Design Task Manager for replacement of 2.4 km of 230 kVac cables from 49th&Cambie to Kidd1 Substation, Vancouver
- Project Manager for Strategic R&D project with EPRI to demonstrate Distributed Temperature Sensing Systems at BC Hydro.
- Vice-Chaired IEEE PES Insulated Conductors Committee, Accessories Sub-committee

2002-2004
- Design Task Manager and Engineer of Record for replacement of 5 km long 300 kVdc submarine cable across Trincomali Channel and 5 km long submarine cable from Galiano Ridge to Galiano Terminal, Georgia Strait
- Design Task Manager and Engineer of Record for new 9 km, 230 kV, 500 MW HPN-CSQ circuit 2L33, Vancouver
- Coordinated route condition assessment surveys and studies for possible new 2 x 230 kVac, 600 MW submarine cable circuits to Vancouver Island
- Chaired IEEE PES Insulated Conductors Committee, Cable Construction & Design Sub-committee
- Chaired AEIC CEC Task Group 10-2 for development of a new standard CS9 „Specifications for Extruded Insulation Cable Systems, 46 to 345 kV"

2005-2006
- As Task Manager for cable systems, assisted the project team with preliminary designs, cost estimates, permit applications, technical specifications and tender reviews for $135M, 30 km, 600 MW 230 kVac/300 kVdc submarine cable circuit to Vancouver Island (VITR project), for October 2008 in-service

June 2006-2011
- Consultant to BC Hydro on VITR submarine cable project and various other project reviews and standards
- Consultant to BC Transmission Corporation on cable Asset Management
- Technical advisor to the Electric Power Research Institute (EPRI) for their Underground Transmission program
- Technical audit for 138 kV Long Island Sound Replacement Cable project (20 km x 3 x 150 MW)
- Preliminary submarine cable engineering for 40 km, 800m deep, 69 kVac submarine cable project near Juneau, Alaska
- Submarine cable engineering lead for functional specs as part of Owner"s Engineer services for a 675 km 500 kVdc link in Southeast Asia
- Feasibility study for a 300 kVac submarine cable for a proposed wind farm near Prince Rupert, BC
- Factory QA assistance with a 500 kVac XLPE cable project for a 600 MW hydroelectric plant in Colombia
- Investigation of technical and safety issues with installing 138 kV cables on Confederation Bridge between New Brunswick and PEI, Canada
- Feasibility investigation of 500 kV submarine

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Manitoba
HYDRO INTERNATIONAL

SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM	DATE (24/06/11)
FULL NAME OF AUTHORIZED REPRESENTATIVE:	
Lorne Halpenny, Managing Director	

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: ..Hydro Generation Expert
NAME OF FIRM:..... Manitoba Hydro International Ltd.
NAME OF STAFF:..... Alex Gerrard
DATE OF BIRTH 1948
NATIONALITY:..... Canadian

EDUCATION:

1975: University of Manitoba, Winnipeg, Manitoba, Canada
M.Sc. Mechanical Engineering

1971: University of Manitoba, Winnipeg, Manitoba, Canada
B.Sc. Mechanical Engineering

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Professional Engineers of Ontario - Licensee, 1986 – 2007

Association of Professional Engineers & Geoscientists of Saskatchewan – Licensee, 1982 – 2006

Association of Professional Engineers & Geoscientists of Manitoba – Member, 1976 – 2007

Former member of the Board of Examiners for the Association of Professional Engineers & Geoscientists of Manitoba, 12 years

COUNTRIES OF WORK EXPERIENCE:

Iran, Uganda, Mexico, Panama, Pakistan, Canada, Tanzania

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:**
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

June 2007 to Present: Manitoba Hydro International, 300MW Generation Plant and Transmission Options for Gas Generation in Mtwara Tanzania for Artumas Group

Project leader for management of feasibility study consultants for 300MW Gas generation facility and transmission options for transmission from Mtwara to Dar Es Salaam.

May 2007 to Present: Manitoba Hydro International, 1200 MW Hydropower Development, Northern Canada

Project leader for assessment of operation and maintenance staffing, training and cost estimates for potential 1200 MW generation project. Confidential client.

Jan to Feb 2007: Manitoba Hydro International, Due Diligence Review of Generation and Distribution Asset Transaction

Participated in due diligence reviews and transaction advisory services to potential buyer of four generation plants and distribution system in East and West Africa - confidential client.

May 2006 to Present: Manitoba Hydro International, Advisory Services to Qulliq Energy Corporation, Hydropower Development

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Advisor to Qulliq Energy Corporation, Nunavut, Canada, for capacity building and development of hydroelectric generation alternatives to replace existing diesel generation.

May 2006 to Present: Manitoba Hydro International, Owner's Representative Swat Hydropower, Pakistan

Team leader for providing technical assistance and owner's engineer services to the developer of the Gabral Kalam 135 MW hydroelectric project in the Swat Valley - Northwest Frontier Province, Pakistan

May 2006 to Present: Consultant - Hydroelectric Power and Infrastructure.

- Advisor for start-up of new diversified energy company in Canada.
- Expert witness for Canadian provincial power utility for hydro-electric large claim – confidential.
- Specialist Consultant on Winnipeg Floodway Expansion project, Winnipeg, Canada
- Specialist consultant on 200 MW Hydroelectric Development, Saskatchewan, Canada

2002 - March 2006: SNC-LAVALIN ENGINEERS & CONSTRUCTORS INC., Vice-President & General Manager – Winnipeg Operations, Winnipeg, Manitoba, Canada

- Responsible for overall management and operations of the Winnipeg operations of SLE&C and for turnaround, growth and development of the operations in the Mid - Western region. Achieved both geographic and business sector diversification and rapid growth and profitability in a competitive market.
- Project Manager for study and detailed design assignments for elements of the $700,000,000 Winnipeg Floodway Expansion Project.
- Project manager for preliminary studies for the 200 MW James Smith Hydroelectric project, Saskatchewan in partnership with three First Nations bands.
- Project manager/consultant for several assignments for dam safety, turbine-generator overhaul and related assignments for several hydroelectric projects, for Manitoba Hydro and SaskPower.

2000-2002: KGS GROUP, Vice-President & General Manager – KGS International, Winnipeg, Manitoba, Canada

- Responsible for the start-up, development of international business and management of KGS International and director in KGS Group.
- Due diligence for purchase of four hydroelectric projects in Northern Ontario.- confidential client.
- Project Manager for the 51 MW Bajo de Mina and the 12 MW Paso Ancho hydroelectric projects in Panama. The scope included project development investigations, financial evaluation, pre-feasibility studies and assistance in establishing a development team.
- Project Manager for project development, application for concession and pre-feasibility studies for the 62 MW El Alto hydroelectric project in Panama.
- Project Manager for International Falls, Minnesota, hydroelectric station unit replacement study.
- Project Manager for CIDA-funded small hydro development seminars project in Russia.
- Expert witness for contractor for review of design and development of a re-work program for Abiqiu Dam, Army Corps of Engineers, New Mexico, U.S.
- Project Manager for Stage II studies for 30 to 120 MW expansion alternatives at Kelsey Generating Station, Manitoba Hydro.

- Adviser on Winnipeg Floodway expansion studies and on floodway inlet structure rehabilitation.
- Risk analysis for intake gates for two hydroelectric stations, Ontario Hydro.

1997-1999: ACRES INCORPORATED, Manager of Projects and Engineering – Acres International, Winnipeg, Manitoba, Canada

- Responsible for the overall performance of projects, staffing and quality control for Acres Winnipeg with a multi-disciplined staff of more than 90 and for start-up of a satellite office in Thompson, Manitoba. The offices undertook a wide variety of large and complex projects in the power, water resources, industrial, mining, transportation, and environmental sectors.
- Project Manager for advisory services to State of Bajo California, Mexico on Build-Own-Operate-Transfer negotiations for the Tecate Hydroelectric Project in Mexico.
- Project Manager for penstock re-rating and synchronous condenser retrofit for the 8-unit, E.B. Campbell Generating Station, SaskPower.
- Project Manager for a risk analysis based assessment of alternatives for replacement of 18 intake gates at Great Falls Hydroelectric Generating Station for Manitoba Hydro.
- Project Manager on feasibility studies for redevelopment and up-rating of Calm Lake and Sturgeon Falls Hydroelectric Stations, Abitibi Consolidated, Ontario.
- Project Manager for major overhaul of SaskPower's 3*84 MW Kaplan turbines, Nipawin, Saskatchewan.
- Project Manager for the project development and bidding phase of the Tijuana Light Rail Train project in Baja California, Mexico. The project consisted of a new $300,000,000, 14-km long LRT project, which was to be developed under a Build-Own-Operate-Transfer scheme.
- Project Manager for the failure analysis of a 120 MW Kaplan turbine replacement runner and for refurbishment at Grand Rapids Hydroelectric Generating Station, Manitoba Hydro.
- Project Manager for the study on unit up-rating for six, 30 MW units at the E.B. Campbell hydroelectric station in Saskatchewan.
- Advisor on design-build proposal for the 170 MW Keenleyside Hydroelectric Project, British Columbia.
- Project Manager for several hydroelectric rehabilitation projects for Abitibi-Consolidated, Fort Frances, Ontario.

1996-1997: ACRES INCORPORATED Overseas Posting

Acres representative in Tehran, Iran and design manager for the 2000 MW Karun III hydroelectric project. The project is comprised of an 8-unit underground powerhouse, two 13-m diameter diversion tunnels and a 200-m high arch dam.

1987-1993: ACRES INCORPORATED, Manager of Engineering

- Responsible for staffing and technical activities of a multi-disciplined staff of 40 to 50 in the Winnipeg office. The office undertook a wide range of water resources, hydroelectric, industrial and general engineering projects, including studies for major hydroelectric projects in Canada, feasibility studies and detailed design of international hydroelectric projects and a large number of dam safety investigations
- Project Manager for Slave Falls hydroelectric turbine re-work for Winnipeg Hydro, Manitoba.

- Technical advisor for design of unique, 9.8-m diameter penstock couplings to accommodate large movements due to AAR at the Mactaquac Hydroelectric Project, New Brunswick.
- Project Manager for the 60 MW Tecate hydroelectric project in Mexico. This project was the first hydroelectric project to be developed under a build-own-operate and transfer (BOOT) scheme, with private financing in Mexico. Provided advice to Comisión Estatal de Servicios Públicos de Tijuana (CESPT), on development of the project, as well as contracting strategy, power purchase arrangements, financial analysis and development of documents for international competitive bidding, pre-qualification of bidders, and bid evaluation.
- Manager for the final design and implementation of the 200 MW Owen Falls Extension, Hydroelectric Project in Uganda. The project was funded by the World Bank and the African Development Bank, as well as with IFI's from Europe. Negotiated several of the major contracts.
- Project Manager for several hydroelectric rehabilitation projects, for Abitibi Consolidated, Ontario.
- Project Manager for a series of assignments for Manitoba Hydro's 440 MW Grand Rapids hydroelectric generating station, including upgrade of auxiliaries, and technical review and analysis for rehabilitation of two, 110 MW Kaplan turbines.

1987-1993: ACRES INCORPORATED, Senior Staff Engineer

- Design Manager for a feasibility study, preliminary design, preparation of specifications and preparation of construction drawings for the 200 MW Owen Falls Extension Hydroelectric Project, Uganda.
- Responsible for investigation of head cover failure and subsequent engineering for rehabilitation of a 110 MW Kaplan turbine at Grand Rapids Generating Station, Manitoba Hydro.
- Reviewed turnkey tenders for international design-build-finance bids for 2000 MW, Karun III hydroelectric project in Iran.
- Technical advisor to Iranian partner for the 2000 MW Karun III hydroelectric project and high arch dam in Iran. Carried out several in-country advisory terms in Iran.
- Project Manager for assessment and repairs to two dams at Kettle Falls, and for assessment of the Raft Lake dam and for up-rating of Generating Station #1 for Boise Cascade Canada, Ontario.
- Responsible for preliminary design, for a contractor, of a steel penstock liner for the 900-m Kemano project, British Columbia.
- Technical advisor for the mechanical design of a proposed 1400 MW, 10 unit, Conawapa generating station in Manitoba.
- Project Manager for condition assessment and design of remedial measures for unique control gates at the Lockport dam in Lockport, Manitoba, PWGSC, Canada.
- Project Manager for an extensive program of rehabilitation and upgrading for four turbines and generators, and for repairs to major structures at Sturgeon Falls and Calm Lake hydroelectric generating stations, Ontario.
- Technical advisor on mechanical equipment including precedent setting 13 m span high head diversion/ spillway gates for the 1300 MW Limestone hydroelectric generating station, Manitoba Hydro.
- Technical advisor for spillway gate equipment at the Oldman River dam project in Alberta.
- Responsible for CEA/Manitoba Hydro studies on post-tensioned concrete designs for hydroelectric

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structures.

1980-1987: ACRES INCORPORATED, Staff Engineer

- Responsible for upgrading studies and rehabilitation work for hydroelectric plants for Boise Cascade Canada.
- Responsible for mechanical engineering input to studies for 300 MW Wuskwatim, 200 MW First Rapids, and 150 MW Manasan hydroelectric projects on the Burntwood River, Manitoba.
- Mechanical design of spillway/diversion gates for the 1300 MW Limestone Generating Station, Manitoba.
- Mechanical co-ordinator for the 252 MW Nipawin hydroelectric project, Saskatchewan during the layout, specification, procurement, detail design and construction phases.

1978-1980: ACRES INCORPORATED Lead Mechanical Engineer

Responsible for preliminary design of mechanical equipment for the Nipawin hydroelectric project.
Co-ordination of design for:

- spillway and intake gate equipment for the 84 MW Upper Salmon development, Newfoundland and Labrador Hydro
- gate equipment for St. Mary redevelopment, Ontario
- spillway gates for St. Mary dam, Alberta.

Prepared feasibility study of power generation at Bassano Dam, Alberta.

1975-1978: ACRES INCORPORATED Mechanical Engineer

- Responsible for mechanical engineering for mechanical equipment and preliminary engineering for gates at Manitoba Hydro's Limestone generating station.
- Contract administration and design review of mechanical equipment, including hydraulic gates, cranes, and turbine equipment, detail design of miscellaneous mechanical equipment, and preparation of instruction manuals for Long Spruce generating station, Manitoba Hydro.

1972-1973: ATOMIC ENERGY OF CANADA, Pinawa, Manitoba, (seconded from WESTINGHOUSE CANADA LIMITED)

Responsible for several in-reactor nuclear fuel experiments and investigation of failure in driver fuel for research reactor. Work included planning and supervision of experiments, examination of fuel failures, and reports.

1971-1972: WESTINGHOUSE CANADA LIMITED, Nuclear Power Division, Hamilton, Ontario

Responsible for analysis of nuclear fuel, including heat transfer and stress analysis calculations, extensive use of computer codes, and report writing.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Alex Gerrard has more than 35 years experience in engineering and management for hydroelectric power, water resources and infrastructure projects. He has progressed from a mechanical specialist, hydroelectric, through roles as Project Manager and Manager of Engineering to Vice-President and General Manager for consulting engineering operations. His experience includes design and management of multi-disciplinary teams on large hydroelectric power and infrastructure projects, in Canada as well as the U.S., Middle East,

Manitoba HYDRO INTERNATIONAL

Africa and Central America.

In addition, Alex has been responsible, as Manager of Engineering and Projects, for a wide variety of water resources, hydroelectric, power, and mining projects in Canada and overseas. He has experience in project development for energy and transportation projects and in a range of project delivery alternatives ranging from design-bid-build to build-own-operate-transfer schemes.

PUBLICATIONS:

Nipawin Hydroelectric Station – Modifications to Extend the Life of 84 MW Kaplan Turbines, Hydro Vision 2000 Conference, 2000. (Co-author)

The Use of Post-tensioning in Hydraulic Structures, CEA Hydraulic Structures Subsection Meeting, March 1990. (Co-author)

Post-tensioning of Concrete Semi-spiral Case and Intake Piers for Hydraulic Structures, CEA Report 722 G 626.

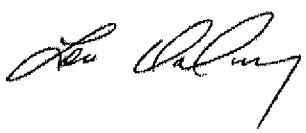
Control of River Ice During Construction of Limestone Generating Station, CEA/EPRI/Hydro Quebec Ice Problems Workshop, August 1987. (Co-author)

Measurements and Prediction of Full Developed Turbulent P-low in an Equilateral Triangular Duct, J. Fluid Mech., Vol. 95, 1979. (Co-author)

Turbulent Flow in A Equilateral Triangular Duct, M.Sc. Thesis, University of Manitoba, Winnipeg, Manitoba, 1975.

CERTIFICATION:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: ...Load Forecast Expert
NAME OF FIRM: .....Manitoba Hydro International Ltd.
NAME OF STAFF: .....C.A. (Craig) Kellas
DATE OF BIRTH:.....01/04/53
NATIONALITY: .....Canadian

EDUCATION:

1975, University of Manitoba
Bachelor of Commerce Degree (Major: Operations Research),
Selected courses in Statistics, Economics, and Econometrics

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

(M.A.P.P.)Canadian Representative for the Mid-Continent Area Power Pool on Load Forecasting activities.

(C.E.A.)Canadian Electrical Association (CEA)
Chair, Energy Forecasting Section (1992,1993)
Vice-Chair, Energy Forecasting Section (1990, 1991)

LANGUAGES:	SPOKEN:	READ:	WRITTEN: (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent

EMPLOYMENT RECORD:

2000 – 2010. Manitoba Hydro, Manager, Market and Load Forecasting (Gas & Electric)

Manage the development of the customer information, market research studies, market sector sales forecasts for an integrated gas & electric utility.

2001. Manitoba Hydro International, Consultan, Instituto Costarricense De Electricidad (ICE) in Costa Rica.

The Regional Electrical Energy Project for the countries of Central America was funded by the Canadian International Development Agency (CIDA). A report was developed for the Instituto Costarricense De Electricidad (ICE) and served the purpose of documenting the methodology, results and recommendations of the Load Forecasting and Market Research component of the Demand Side Management project. Objective was to analyze all existing sources of customer information and prepare a Market Sector Forecast of ICE's energy and peak demand by end use.

1999. Manitoba Hydro International, consultant for ENMAX Power Corp.

1992 – 2000. Manager, Market and Load Forecasting (Electric)

Manage the development of the customer information, market research studies, market sector sales forecasts, total system energy and hourly demand forecasts. This would include the following duties:

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Customer Classification – Assign building codes to all residential customers. Assign building and business codes to all commercial and industrial customers.

Customer Information – Develop a PC-based system that retains monthly billing information. This database currently stores thirteen years of monthly information for over 400,000 customers.

Tax Data – Match government tax data on size and age of building to billing account data. This information can be used to benchmark customers and explain variations in usage.

Benchmarking – Compare the energy per square foot, demand per square foot and revenue per square foot for similar customer types. This information can be used to target markets, size transformers and develop customer rate policies.

Survey Analysis – Conduct residential and commercial surveys, analyse results and produce reports.

End Use Analysis – Conduct conditional demand analysis on survey results to estimate residential end use consumption coefficients.

Energy Efficiency – Calculate the conservation effect of new, more efficient appliances.

Load Research – Design sample frame to produce statistically valid estimates by rate code and by building type. Analyse the results.

Hourly Load Monitoring – Calculate models that estimate hourly loads for 8760 hours in a year. These models require one year of hourly load research data. They can be used to model loads at the customer, market sector, station or system level.

Weather Adjustment – Calculate the effects of weather on monthly energy sales or hourly system loads.

Market Forecasting – Prepare forecasts for six residential types, 14 commercial building types and eight industrial business types.

1987 – 1992. Manitoba Hydro, Senior Load Forecasting Officer, Corporate Planning

Coordinate all activities such as customer coding, billing, surveys, statistical analysis, modelling, and reporting involved with the preparation of the System Load Forecast and General Consumers Revenue Forecast. Supervise the development and enhancement of end use and econometric forecasting models.

1983 – 1987. Manitoba Hydro, Energy Forecast Officer, Corporate Planning

Perform regression, statistical and econometric analysis in the preparation of energy use forecasts.

1980 – 1983. Manitoba Hydro, Energy Forecast Analyst

Maintain energy database. Administer market surveys. Perform load forecast calculations.

1976 – 1979. Manitoba Hydro, Hydraulic Analyst

Perform regression analysis on river flow data to complete flow record histories.

1975 – 1976. Manitoba Hydro, Commerce Trainee

Perform various analyses on a rotational basis. Experience gained in a number of departments such as personnel, billing, and computer services.

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WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Load Forecasting
Sales & Revenue Forecasting
Residential & Commercial Surveys
Load Research
End-Use, Econometric & Hourly Load Modelling
Regression & Conditional Demand Analysis
Customer Classification & Coding
Customer Information Data Base Systems

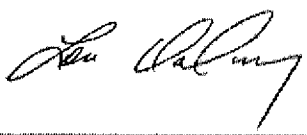
PRESENTATIONS:

Canadian Electrical Association (CEA) – 1991 – Conditional Demand Analysis

Canadian Electrical Association (CEA) – 1993 – Commercial Survey Analysis

Instituto Costarricense De Electricidad (ICE) – 2001 – Forecasting & Market Research

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

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PROPOSED POSITION: ...Environmental Specialist
NAME OF FIRM: .....Manitoba Hydro International Ltd.
NAME OF STAFF: .....Dr. Paul Adrian Driver
PROFESSION: .....Environmental Scientist
DATE OF BIRTH: 14/06/1948
NATIONALITY: .....British

EDUCATION:

1969: University of Portsmouth, UK
BSc (Hons) Biology

1970: Bangor University, UK
MSc Marine Biology

1974: University of Portsmouth, UK
PhD Fisheries

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Registered Environmental Auditor (IEMA)

Principal EIA Practitioner (IEMA)

Member of Estuarine & Coastal Science Association (ECSA)

COUNTRIES OF WORK EXPERIENCE:

United Kingdom, Rwanda, India, Sierra Leone, Pakistan, Kazakhstan, Mozambique, Iran, Azerbaijan, China, Turkmenistan, Afghanistan, Bangladesh, Kenya, Uganda, Russia, Egypt, Dominican Republic, St. Lucia, Nepal, Ukraine, Vietnam, Botswana, Gambia, Ghana, Nigeria, Italy, Tringen, Trinidad and Tobago, Oman, Namibia, South Africa, Tanzania, Zimbabwe, Finland, Indonesia, Venezuela, Cote d'Ivoire, Turkey, Zanzibar, Brazil, Jersey, Ethiopia, UAE, Cyprus, Algeria, Bahrain, Saudi Arabia

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Fair	Fair	Poor

EMPLOYMENT RECORD:

2001 - Present : Nippon Koei UK, Director Environment
Director responsible for setting up and running the Environment Division within the newly established company of Nippon Koei UK, a wholly owned subsidiary of Nippon Koei Co Ltd of Japan.

Moragahakanda Agricultural Development Project, Sri Lanka, 2010
JICA 'SAPROF' study for the development of a dam, reservoir and hydropower station on the Amban Ganga, part of the Mahaweli system supplying water to irrigated agricultural settlements downstream. Responsible for review of the ESIA and all associated studies

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conducted over many years. Also responsible for the supervision of local consultants appointed to collect additional data and prepare improved EMP and EMoP.

Olkaria-Lessos-Kisumu Transmission Line Project, Kenya (JICA) 2009
JICA 'SAPROF' study for the development of a new powerline. Responsible for environmental scoping of two alternative routes, including one through the Mau Forest Complex. Assistance to Kenya Power & Light Co. in developing ToR for the ESIA, monitoring consultants' work and reviewing the ESIA report. Also advised on route amendments to minimise adverse environmental impacts. In addition, commissioned and monitored local consultants in the conduct of specialist studies on flora & fauna, landscape and socioeconomics of the route.

Environmental and Social Due Diligence: Proposed Bioethanol Facility and Sugarcane Estate, Sierra Leone, 2009
Performance review of all ESIA and RAP-related documents against all IFC Performance Standards and EHS Guidelines and EC Renewable Energy Directive requirements. Responsible for integration of environmental and social issues in report preparation. Resettlement, land use, water availability, and food security were key issues.

Hidroeléctrica de Cahora Bassa, Mozambique, 2008-2009
Environmental Specialist responsible for preparing the Environmental Management System (EMS) for the Cahora Bassa dam and hydropower plant in Mozambique, one of the largest HEP schemes in Africa. Also responsible for monitoring of environmental performance on an on-going basis.

Mainstreaming Environment into the Liberia Poverty Reduction Strategy, 2007-2008
Working within the UNEP / UNDP Poverty – Environment Initiative (PEI). Worked with the Liberia EPA and Environment Working Group to mainstream environmental issues into the Poverty Reduction Strategy (PRS). Subsequently developed poverty - environment indicators and drew up a draft PEI programme for Liberia.

Bumbuna Hydroelectric Power Project EIA, Sierra Leone (World Bank)
Project Director / Manager of study to upgrade the original EIA conducted in 1995, i.e. prior to the civil war. The upgrade includes additional work on primate distribution in the reservoir basin (with a focus on chimpanzees), further forest inventory work, catchment management, hydrology, estuarine ecology, archaeology, additional consultation with local communities, and further environmental work on the 200 km powerline route to Freetown.

Subsequently commissioned to conduct additional field studies over a period of one year concerning primates, small mammals, birds, fish, reptiles, amphibians, butterflies, plants and archaeology.

Bumbuna Hydro-Electric Project: Environmental Management Support, Sierra Leone (World Bank), 2007-2009
NKUK was contracted to provide environmental management support to the Bumbuna PIU for a three-year period, which includes the initial filling of the Bumbuna reservoir and subsequent commissioning of the hydropower station.

Environmental Planning for Hydropower in Pakistan (KfW) 2007
Member of the Panel of Experts (PoE) responsible for monitoring and supervision of environmental and social issues in the development of the new hydropower schemes at Keyal Khwar and Chor Nala / Spat Gah in the Indus Basin in the North West Frontier Province (NWFP) of Pakistan.

Pare Hydroelectric Power Project, Arunachal Pradesh, India (KfW), 2007
Conducted environmental and social review of proposed hydropower project.

Nyabarongo Hydroelectric Power Project, Rwanda (KfW), 2007
Conduct of environmental and social review of proposed hydropower project.

Capacity Development for Pollution Prevention and Control in the Petroleum Industry, Kazakhstan (JICA)
Environmental law and institutional specialist within multi-disciplinary team.
Nippon Koei was appointed to undertake an 18-month study, aimed at developing local capacity to address oil pollution in the Caspian Sea and its coastal areas in the Atyrau and Mangistau oblasts. Specific activities of the study are as follows:

- Review of environmental laws, legislation and environmental management institutions. To include review of systems for permitting, fees, fines, contingency plans, etc.
- Review of environmental situation in the Caspian, and the related performance of the oil industry.
- Review of environmental monitoring facilities and capabilities in relation to pollution from the oil industry.
- Preparation of a development plan for capacity building in environmental monitoring and management.

Technical Due Diligence on Hidroeléctrica de Cahora Bassa, Mozambique
Environmental Specialist responsible for looking at current environmental and social impacts, obligations, liabilities, issues, and HCB compliance as part of the Technical Due Diligence.
The Government of Portugal (GoP) and the Government of Mozambique (GoM) have embarked on the restructuring process of Hidroeléctrica de Cahora Bassa (HCB) to effect the transfer of ownership and control of HCB from GoP to GoM. HCB owns and operates the Cahora Bassa dam, located in Songo, Tete province, Mozambique, and is jointly owned by the GoP and GoM. To achieve this objective, a comprehensive due diligence was required. The two Governments therefore appointed NKUK to conduct the required due diligence of HCB.

Bumbuna Hydroelectric Power Project EIA, Sierra Leone (World Bank)
Project Director / Manager of study to upgrade the original EIA conducted in 1995, i.e. prior to the civil war. The upgrade includes additional work on primate distribution in the reservoir basin (with a focus on chimpanzees), further forest inventory work, catchment management, hydrology, estuarine ecology, archaeology, additional consultation with local communities, and further environmental work on the 200 km powerline route to Freetown. Subsequently commissioned to conduct additional field studies over a period of one year concerning primates, small mammals, birds, fish, reptiles, amphibians, butterflies, plants and archaeology.

Anzali Wetland Management Plan, Iran (JICA)
Responsible for institutional and ecological matters within the development of an integrated management plan for this Ramsar site on the southern shore of the Caspian Sea. The study included issues of environmental planning and management within the whole catchment of Anzali Wetland.

Long Term Strategy and Feasibility Study for Samur-Apsheron Canal (SAC) System, Azerbaijan (World Bank)
Conduct of the EIA for the Samur-Apsheron water supply and irrigation scheme, including construction of the 140m gravity Tahtakopu Dam and associated 9km^2 reservoir.

SEA Advisor (DFID)
Member of OECD DAC Task Team on development of Guidelines for the application of Strategic Environmental Assessment within development assistance.

ESIA for Trans-Sahara Gas Pipeline (Penspen)
Project Director / Manager of team conducting environmental and social impact assessment of proposed 4,300 km pipeline to take gas from the Niger Delta to the Mediterranean coast of Algeria, via Niger.

Yichang - Wanzhou Railway (Ensuring Safeguard Practices), China (ADB)
Currently member of the Panel of Experts for the Yichang - Wanzuou Railway (YWR), ADB's biggest ever loan project. Appointed by ADB to be the independent expert responsible for oversight of environmental and social issues on the YWR Project in Hubei Province of China, in particular to ensure that the project complies with ADB safeguard policies.

Strategic Environmental Assessment Structured Learning Programme (SEA-SLP), (World Bank)
Contributor to a World Bank initiative involving the development of an SEA Toolkit for Urban Development and

redevelopment.

Turkmenistan–Afghanistan–Pakistan (TAP) Gas Pipeline Feasibility Study (ADB)
Conduct of environmental and social impact assessment for proposed 1700 km pipeline. Route selection study, followed by ESIA of selected route. (In association with Penspen.)

IABIN: Inter-American Biodiversity Information Network (World Bank / JCTF)
Technical support for the Bank in project preparation for IABIN. In association with the UNEP-World Conservation Monitoring Centre, Cambridge, UK.

Poverty / Environment Planning, Bangladesh (DFID)
Facilitation of the integration of environmental issues into the Bangladesh Poverty Reduction Strategy (PRS) process. Included high-level presentation in Dhaka on international experience of mainstreaming environment in PRSPs.

Revision of Environmental Appraisal Procedures & Environmental Guide (DFID)
Review and revision of the DFID Environmental Guide and appraisal procedures to reflect the new interest in environmental mainstreaming, poverty-environment issues and the environmental implications of DFID Direct Budget Support and other programmes of development assistance.

Biodiversity in Oil and Gas Site Selection (Conservation International / Shell)
Research followed by preparation of frameworks for the consideration of biodiversity and protected areas within decision-making for hydrocarbon exploration and development. Part of the international Energy & Biodiversity Initiative (EBI) and funded by Shell International.

Annual Stakeholder Consultations in the Niger Delta (Shell)
Facilitation of annual stakeholder workshops on the environmental and community development programmes of the Shell Petroleum Development Company of Nigeria Ltd (SPDC), held in Port Harcourt and Warri. Preparation of workshop materials, communiqué and reports.

Environmental Management of Lake Nakuru Basin, Kenya (JBIC)
Responsible for catchment management, agriculture and institutional environmental management issues within the Special Assistance for Project Sustainability (SAPS) team addressing the protection of Lake Nakuru from industrial, urban and agricultural pollution. SAPS 1 assignment in 2001, followed by SAPS 2 in 2002.

Poverty / Environment Planning, Uganda (DFID)
Technical support for the National Environment Management Authority (NEMA) for "mainstreaming" environment and sustainability issues into the country's Poverty Eradication Action Plan (PEAP) and Plan for Modernisation of Agriculture (PMA).

Cleaner Production Project Design, Russia (DFID)
Conduct of project design missions to Russia on behalf of the UK's Department for International Development. Project to develop incentives and processes for cleaner production in the major industries of the Urals region.

Environmental Planning for Naga Hammadi Barrage, Egypt (KfW)
Member of the Panel of Experts (PoE) responsible for monitoring and supervision of environmental and social issues in the development of a new hydropower / irrigation barrage at Naga Hammadi on the River Nile during the 9-years of its design and construction.

Also commissioned to undertake a retrospective environmental and social review of the Naga Hammadi project with respect to the recommendations and guidelines of the World Commission on Dams (WCD).

Environmental Planning for Assiut Barrage, Egypt (KfW)
Member of the Panel of Experts (PoE) responsible for environmental and social issues in the development of a new or refurbished barrage at Assiut on the River Nile for the purposes of hydropower and irrigation downstream to Giza.

Poverty / Environment Planning, Rwanda (DFID)
Provision of technical support to MINITERE and the National Poverty Reduction Programme in the preparation of Rwanda's Interim Poverty Reduction Strategy Plan (PRSP), particularly with reference to environmental and social issues.

1992 - 2000: Mouchel Consulting Ltd., Director, Environmental Consultancy

Department for International Development, UK
Project Director of the Enabling Agreement for the provision of all environment and sustainable development consultancy advice to the DFID Environment Policy Department for a two-year period.

Private Client, Puerto Caucedo, Dominican Republic
Conduct of an environmental impact assessment scoping study for a new container port (and associated quarry) within a coral reef located at Boca Chica.

Waste Management Project, St. Lucia
Project Director for the project management of design and construction of a new landfill site at Deglos, to provide refuse disposal facilities for the northern half of the island.

Poverty Eradication Action Plan (PEAP), Uganda
Commissioned by DFID to provide technical support to the National Environment Management Authority (NEMA) for "mainstreaming" environment and sustainability into the PEAP and the Plan for Modernisation of Agriculture (PMA).

Kasese Cobalt Company Ltd., Uganda
Conduct of post-construction environmental and social audits of the Kasese cobalt processing plant in western Uganda and the associated Mubuku III hydropower scheme.

Environmental Expert, Egypt and Nepal
Appointed by KfW to join international Panels of Experts for the design and construction of the Naga Hammadi Barrage on the River Nile in Egypt, and the Middle Marsayangdi Hydro-electric power project in Nepal. Responsible for addressing all environmental and social issues over nine-year development period.

Project Monitoring, Russia
Responsible for monitoring of all DFID-funded environmental projects in Russia during the period 2000-2001.

Project Identification, Russia
Conduct of project identification missions on behalf of the UK's Environmental Know How Fund. Discussions with stakeholders in St Petersburg, Bryansk, Samara, Ekaterinburg and Moscow, followed by preparation of Project Concept Notes for DFID.

Donetsk Environment Project, Ukraine
DFID delegate on World Bank project appraisal mission. Discussions with stakeholders in Donetsk followed by preparation of two projects to be implemented as the Know How Fund part of the Donetsk Environment Project.

Environmental Monitoring, Vietnam
Monitoring of the DFID-funded Ha Tinh Province Poverty Alleviation Project. Preparation of environmental guidelines for the construction of coastal protection bunds, small-scale dams/reservoirs and farm-to-market roads.

K2/R4 EIA Review, Ukraine
Commissioned by EBRD to review and update the EIA documents prepared for completion of the K2 and R4 nuclear power stations.

EIA Scoping Study, Botswana
Team leader for an EIA scoping exercise related to the erection of veterinary fences between Ngamiland in

Botswana and the Caprivi Strip in Namibia. Mission conducted on behalf of DFID.

EIA Capacity-Building, Africa Region
Responsible for the CEASSA project (Capacity-building for Environmental Assessment in Sub-Saharan Africa), funded by World Bank via IUCN. Consultations throughout Africa, followed by preparation of a comprehensive action programme for EIA capacity building.

Kasese Cobalt Company Ltd, Uganda
Preparation of EIS for the proposed processing facility for cobalt sulphide concentrate derived from the former Kilembe copper mine, the stockpiles of which were polluting the adjacent Queen Elizabeth National Park and the Lake George Ramsar site.
Preparation of EIS and Resettlement Action Plan for the Mubuku III hydro-power scheme that will provide power for the cobalt plant.
On-going community consultation and monitoring in relation to the cobalt plant and hydro-power scheme development.

National Environment Agency, the Gambia
Development of environmental quality standards, national monitoring programme, enforcement procedures and waste management strategy, as part of the implementation of the Gambia's NEAP. Funded by the World Bank.

Environmental Institutional Support, Ghana
Development of EIA procedures, preparation of EIA guidelines and provision of EIA training courses for government departments, local consultants and financial institutions on behalf of the Ghana EPA. Part of a long-term NEAP implementation project funded by DFID.

Stakeholder Consultations, Pakistan
Commissioned by Premier Shell Pakistan to undertake stakeholder consultations in relation to exploration of the Dumbar gas concession, much of which coincides with Kirthar National Park in Sindh Province.

Stakeholder Consultations, Nigeria
Commissioned to assist Shell Petroleum Development Company (SPDC) with its programme to improve environmental performance in the Niger Delta. This has consisted of the preparation of discussion documents and the conduct of formal stakeholder consultation sessions in Port Harcourt. The final output will be both a framework for future consultation and an SPDC environmental programme which will satisfy stakeholders.

Environmental, Social and Economic Principles
Worked with BP and WWF to prepare environmental, social and economic principles for oil industry operation. Principles have been developed relating to: biodiversity, pollution reduction, Environmental Management Systems, resource utilisation/conservation, product stewardship, human rights, support for civil society, change in society, culture and traditions, localisation of benefits, economic impact assessment, diversification and environmental economics. A code of practice has been developed for the implementation of each principle. For British Petroleum.

FAO Investment Centre, Rome
Provision of training in environmental assessment and planning to division chiefs and programme officers involved in joint FAO / World Bank funded agricultural developments.

Tringen, Trinidad and Tobago
Investigation of marine fouling of industrial cooling water intake. Followed by design of new chlorination and screening system and new water intake.

EIA Training, Uganda
Provision of Uganda's first (1995), second (1996) and third (1997) national training programmes on EIA. Organised in association with the National Environmental Management Authority (NEMA), with funding from the British Council.

Coral Reef Management Plan, Oman

Condition surveys of all coral reefs in the Sultanate of Oman, followed by preparation of a national coral reef management plan.

Environmental Issues in the Power Sector, India
Acted as the representative of DFID on a World Bank mission to India to appraise and refine a proposed project to build the environmental cost of coal-mining and power generation into power system planning.

Environmental Monitoring and Management, Namibia
Member of a DFID project design mission to Namibia to prepare a project that will expand the environmental monitoring capability of the Etosha Environmental Institute to be applied to environmental management in the former Ovamboland.

Tianjin Coal Terminal, China
Provision of the environmental and social elements of a feasibility study for a proposed mechanised coal terminal (designed to alleviate severe environmental and health problems associated with existing coal-handling facilities). ODA funded.

Independent Development Trust, South Africa
Development of environmental management system and environmental appraisal manual. Provision of environmental training for all levels of staff, and EIAs of case study projects in housing, water supply and bush clearance. Funded by ODA.

Environmental Review, Tanzania
Environmental review of outgrower tea and fuelwood project proposed to be developed in the East Usambara Mountains of N Tanzania (an area of high biodiversity). Conducted on behalf of Commonwealth Development Corporation (CDC).

Environmental Review, Pakistan
Field environmental review of the rural development programme of the Aga Khan Rural Support Programme in the Karakoram Mountains. Preparation of environmental appraisal system for future projects. Provision of training in environmental planning for senior AKRSP officers. Funded by IUCN.

Environmental Training, Ukraine
Provision of training course on environmental planning and management for regional officers of Ministry of Environmental Protection. Funded by UK Know How Fund.

Maputo Corridor Study, Mozambique
Pre-divestment environmental audit of the CFM-Sul railway network, Maputo port and Matola oil terminal. Commissioned by ODA on behalf of the World Bank.

Forestry Training, SE Asia
Provision of environmental training for forestry and forest industries in Malaysia, Thailand and Philippines; for Finnish Forestry Training Programme.

Odessa Oil Terminal EIA, Ukraine
Environmental assessment, environmental audit and certification for new crude oil SBM terminal. Commissioned by Ukraine State Oil and Gas Committee.

Phosphate Mine and Fertiliser Plant EIA, Uganda
EIA for phosphate mining in the Sukulu Hills and TSP fertiliser production at Tororo in E Uganda, for African Development Bank.

EIA Training, Tanzania
Provision of EIA training course for senior staff of TANESCO, the national power generation utility. Conducted at the construction site for the new Pangani Falls hydropower scheme. Funded by FINNIDA.

EIA Training, Zimbabwe

Provision of EIA training for senior staff from various Zimbabwe line ministries. Funded by CIDA.

EIA Training, Finland
Provision of EIA training for field officers and administrators of FINNIDA.

Shanghai Environment Project, China
EIA and environmental planning for major environmental improvement scheme to safeguard Shanghai's water supply from the Huang Pu River; for ODA.

EIA Training, Indonesia
Training in EIA and environmental planning for Plan International, a rural development agency operating in Thailand, Indonesia and the Philippines.

EIA Legislation, Botswana
Leader of workshop on development of EIA legislation for Botswana as part of the National Conservation Strategy.

FINNIDA (Finnish International Development Agency)
Review of FINNIDA's existing guidelines on environmental impact assessment and advice on revision of guidelines.

Batoka Gorge EIA Scoping, Zimbabwe
Leader of scoping conference for environmental assessment of a proposed hydropower scheme; for the Governments of Zambia and Zimbabwe.

World Parks Congress, Venezuela
Chairman of workshop on the impacts of pollution in National Parks; for IUCN - The World Conservation Union.

Forestry Training, Abidjan, Cote d'Ivoire
Responsible for the environmental elements of a forestry training programme for the Finnish Forestry Training Programme.

Arctic Oil Exploration Environmental Guidelines
Editor/compiler of guidelines prepared on behalf of IUCN and the oil industry's Exploration and Production Forum.

Ash Disposal Project, Turkey
Environmental appraisal of marine disposal of fly ash from Catalagzi 'B' Power Station, Turkey; for KfW.

Sarhad Rural Support Corporation, Pakistan
Review of environmental impacts and design of mechanism for environmental impact assessment.

Environmental Assessment Training, Zanzibar
Presented training course on environmental impact assessment, on behalf of the Finnish International Development Agency.

Forestry Training, Belem, Brazil

Responsible for the environmental elements of a forestry training programme; for the Finnish Forestry Training Programme.

Port Qasim Environmental Review, Pakistan
Undertook an environmental review of Port Qasim, Karachi; on behalf of IUCN - The World Conservation Union.

1988 - 1991: The World Conservation Union, Director, Conservation Services IUCN
Responsible for provision of services in Environmental Impact Assessment, environmental law, conservation strategies and environmental training / education.

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Responsible for development and management of Environmental Impact Assessment support service developing countries. Consultant selection and organisation for a variety of EIA missions. Personal assignment on EIAs and EIA training, e.g.:

EIA, Preliminary EIA and EIA Review

Pakistan	- EIA guidelines for the energy sector
Uganda	- Cobalt processing plant, Katwe
Uganda	- Saltworks, Katwe
Zimbabwe	- Feruka-Harare oil pipeline
Congo	- Kayes 'A' Oil exploration (Chevron)
Laos	- Nam Thuen II Dam/hydropower scheme
Costa Rica	- Gold mining in Guanacaste
Costa Rica	- Banana cultivation
Guatemala	- Road construction at Chacon Machacos
Guatemala	- Airstrip construction in the Peten
Ecuador	- Oil exploration in Amazonia
Barbados	- EIA service development
Oman	- Initiation of National Conservation Strategy

EIA Training

Barbados	(UNDP)	Rome	(IFAD)
Antigua	(UNDP)	Helsinki	(FINNIDA)
Rome	(FAO)	Panama	(FTP)
UK	(ODA)	Ghana	(FTP)
Botswana	(IUCN)	Nepal	(IUCN)
Pakistan	(IUCN)	Ethiopia	(IUCN)

1980 - 1988: W S Atkins Group, Head of Environmental Assessment and Ecological Studies Department

European Development Fund, Botswana
Environmental aspects of feasibility study for Pandamatenga agricultural development project. Included study of wildlife impact on Chobe and Hwange National Parks.

Islands Development Committee, Jersey
Environmental impact assessment for proposed coal-fired power station.

NTPC, India
Preparation of water-quality monitoring programme for power station fly-ash mound.

Midland Metro, UK
Environmental aspects of development study for proposed new metro network in the East Midlands.

Cardiff Bay Development Corporation, Wales
Project Manager of site-selection study for proposed new district hospital, requiring air quality and noise studies.

Teeside Development Corporation, UK
Environmental impact assessment of proposed Tees estuary barrage.

Private Client, UK
Aquatic ecology and lake design associated with large-scale integrated urban development along the E. Stour River at Ashford, Kent.

Thames Water Authority, UK
Preparation of technology strategy papers for future development and utilisation of the authority's scientific services.

Hindustan Zinc Ltd, INDIA

Project manager of environmental impact assessment and environmental management plan for lead/zinc mine (funded by Overseas Development Administration).

South West Water, UK
Exe estuary physico-chemical and biological surveys.

IUCN, Pakistan
Rapid assessment of sources of industrial pollution affecting the communities and mangroves of Korangi Creek, Karachi. Also design of programme of workshops on Environmental Impact Assessment for Pakistan.

P Garnett and Sons, UK
Study of impact of proposed Burley-in-Wharfdale bypass on quality of river water used by paper mill.

W.R.D.A., Ethiopia
Study of environmental and health implications of proposed reservoir and irrigation scheme on Gelana River.

IUCN, Botswana
Initial environmental review of proposed Kolobeng and Metsomotlhaba dam/reservoirs. Preparation of Terms of Reference for subsequent Environmental Impact Assessment.

Private Client, UAE
Environmental impact assessment of proposed training facility in Dubai.

Hydraulics Research Ltd, UK
Review of metals transport by phytoplankton in Liverpool Bay.

IUCN, Gambia
Project evaluation for environmental support unit for government.

Overseas Development Administration
Consultant to the ODA for undertaking an environmental audit of the completed Victoria Dam hydro-power and irrigation project, Sri Lanka.

Conoco, UK
Water quality studies at onshore oil exploration and production sites in South England.

Atomic Energy Authority, UK
Contributions to the EIA for the European Demonstration Reprocessing Plant (EDRP) proposed for Dounreay, Scotland. Also expert witness at the subsequent public inquiry.

UNDP/IUCN, Cyprus
Ecological assessment of proposed site for sewage treatment works adjacent to Limassol salt lake, a site of international importance for migratory and resident birds.

Agence National pour l'Amènagement du Territoire, Algeria
Environmental and fisheries / aquaculture elements of regional development plan for the Wilaya of Jijel.

Ministry of Housing, Bahrain
Project Manager for environmental impact assessment of major land reclamation proposal on coral reefs off the east coast of Bahrain.

ODA/Kennedy and Donkin, UK
Comparative environmental impact assessment of five alternative schemes for hydro electric power development on the River Nile in Uganda, including two sites within Murchison Falls National Park.

Swire-Duro, Hong Kong
Environmental impact assessment for proposed bitumen and vermiculite exfoliation plants on Tsing Yi Island,

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Hong Kong.

Prudential Assurance Company, UK
Investigation of blue asbestos within large department store. Advice on safety, removal and decontamination. Air sampling and analysis.

Hydraulics Research Station, UK
Feasibility study on the mathematical modelling of heavy metals movement through the ecosystems of greater Liverpool Bay.

United Nations Environment Programme, Goa India
Course tutor for the training programme on Marine Resources Management and Conservation in the Indian Ocean Basin and Adjacent Seas.

European Economic Commission (EEC)
Study of coastal zone management throughout the EEC countries, as sub-consultant to INERAL (France).

Ministère de l'Industrie Lourde, Algeria
Comparative assessment of environmental impact at four alternative sites for the development of a new steel works in the Wilaya of Jijel.

Royal Commission for Jubail and Yanbu, Saudi Arabia
Determination of environmental constraints and objectives for Phase II of the development of Yanbu Industrial City. Study included measures for the preservation of air and water quality, the protection of human health and safety, and the conservation of mangroves and coral reefs of the Red Sea Coast.

British Nuclear Fuels Ltd, UK
Environmental impact assessment of construction of proposed marina terminal on the north-west coast of England.

International Maritime Organisation
Member of joint UNEP/IMO mission to the United Arab Emirates to make a preliminary assessment of the environmental impact of two large coastal industrial complexes based on hydrocarbon feedstocks.

Tien Chu Ve-Tsin Chemical Industries, Hong Kong
Environmental impact assessment for proposed chlor-alkali plant on Tsing Yi Island, Hong Kong.

1975 - 1980: Chief Executive Officer, The Lancashire and Western Sea Fisheries Joint Committee

1970 - 1974: The Portsmouth Polytechnic Marine Laboratory, Research assistant and demonstrator, Hayling Island

PUBLICATIONS:

Predictions of fluctuations in the landings of Brown Shrimp (Crangon crangon) in the Lancashire and Western Sea Fisheries District. **Estuarine and Coastal Marine Science** (1976), 4, 567-573.

The prediction of shrimp landings from sunspots activity. **Marine Biology** (1978) 47, 359-361.

'Marine Fisheries' – Chapter in **The Maritime Dimension** (1980), Eds: R. P. Barston & Patricia Birnie, Allen & Unwin, London.

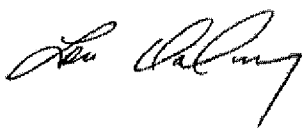
'Assessment of the environmental impact of onshore pipelines' – Chapter in **Pipelines and the Environment** (1984), Ed: J. N. H. Tiratsoo, Pipes & Pipelines International, Beaconsfield, UK.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Manitoba
HYDRO INTERNATIONAL

- Environmental Impact Assessment and Auditing
- Environmental training and institution-building
- Environmental policy development
- Poverty / environment and social issues
- Conservation Strategies / Action Plans

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes the individual, their qualifications, and their experience. I understand that any willful misstatement described herein may lead to disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/10)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

Manitoba
HYDRO INTERNATIONAL

PROPOSED POSITION: .....Windfarm and Renewable Engineer
NAME OF FIRM:.....Manitoba Hydro International
NAME OF STAFF: .....Robert (Bob) Neil Buschau
DATE OF BIRTH:.....19 01 1963
NATIONALITY: .....Canadian

EDUCATION:

1995 - University of Manitoba
B.Sc. Electrical Engineering

1988 - Red River Community College
Electrical Apprenticeship

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Association of Professional Engineers & Geoscientists of the Province of Manitoba (APEGM)

Association of Professional Engineers & Geologists and Geophysicists of Alberta (APEGGA)

Association of Professional Engineers & Geoscientists of the Province of BC (APEGBC)

Manitoba Energy Management Task Force (MEMTF)

Institute of Electrical and Electronics Engineers (IEEE)

COUNTRIES OF WORK EXPERIENCE:

Canada, Bulgaria, Tanzania

LANGUAGES:	**SPOKEN:**	**READ:**	**WRITTEN:** (PROFICIENCY RATED EXCELLENT, GOOD, FAIR, OR POOR)
English	Excellent	Excellent	Excellent
French	Poor	Fair	Poor

EMPLOYMENT RECORD:

1999-Present: MCW/AGE Power Consultants, Manager, Canada

Mr. Buschau is responsible for the on-going coordination, control, and quality assurance of various projects undertaken by MCW/AGE Power Consultants. These projects have included the supervision of numerous station rehabilitation programs undertaken by Utility and industrial clients, including apparatus, protection and control, and grounding. His responsibilities also include the conceptual design and design coordination for Greenfield and Brownfield substations.

1995-1999: AGE Engineering Consultants, Engineer, Canada

As an Electrical Engineer and designer, developed a new division of the company which addressed power quality issues at the consumer level, including measurement, simulation and treatment of system Harmonics, protective relay studies, grounding, lightning protection, and VAR compensation. The design work comprised of commercial, institutional and industrial electrical design of electrical and life safety systems, and a large number of critical power installations, one of which included a 40MW (installed) uninterruptible power supply (UPS).

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1984-1994: Manitoba Hydro, Journeyman Electrician, Canada

Preformed and supervised the Electrical installation of numerous commercial, institutional, industrial and utility projects, including customer owned sub-stations to 25kV, and a 500kV HCDC converter station valve replacement.

WORK UNDERTAKEN THAT BEST ILLUSTRATES CAPABILITY TO HANDLE TASKS ASSIGNED:

Name of assignment or project: Lindi, Masasi, & Mtwara Central Generation and Electrification Project.
Year: 2009 – 2010.
Location: Tanzania
Client: UMOJA Light Company
Main project features: Design of 33 and 132 kV interconnection stations for new generating facility, preparation of new 33 kV distribution standards, and design of 95 km of 33 kV feeders.
Positions held: Engineering Lead.
Activities performed: Oversight of design efforts for station design including general arrangement, protection report and balance of plant for interconnection station. Oversight of development of new 33 kV distribution standards and preparation of construction package for station egress and new feeder.

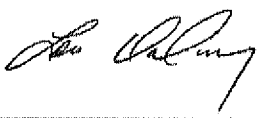
Name of assignment or project: System Development Plan Implementation.
Year: 2005 - 2010
Location: BC Canada
Client: Fortis BC
Main project features: Design Development and Detailed design for approximately $200,000,000 of system improvements including distribution and transmission line rehabilitation, turnkey design for new distribution and transmission stations to 230 kV, and existing station upgrade projects to 230 kV including protection and control upgrades, bank additions, breaker replacement, grounding upgrades, etc.
Positions held: Engineer of record/Team Lead.
Activities performed: Oversight of design efforts including development of conceptual designs for all projects, review and approvals of all aspects of design including lines, station protection and control, station arrangement and detailing, grounding, special reports and scheduling.

Name of assignment or project: Consultant to Manitoba Hydro
Year: 2003 - 2010
Location: Manitoba Canada
Client: Manitoba Hydro
Main project features: Station Engineering support for on-going capital improvements including protection and control upgrades, and on-going programs for grounding and DC systems.
Positions held: Engineer of record.
Activities performed: Oversight of design efforts including development of conceptual designs, review and approvals of designs and special reports.

Name of assignment or project: Consultant to Hydro One
Year: 2007 - 2010
Location: Ontario Canada
Client: Hydro One
Main project features: Station Engineering support for on-going capital improvements including protection and control upgrade programs, and embedded generation interconnections at the distribution level.
Positions held: Engineer of record.
Activities performed: Oversight of design efforts including development of conceptual designs, review and approvals of designs and special reports.

Manitoba
HYDRO INTERNATIONAL

CERTIFICATION:
I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



SIGNATURE OF STAFF MEMBER OR AUTHORIZED MEMBER OF THE FIRM **DATE (24/06/11)**

FULL NAME OF AUTHORIZED REPRESENTATIVE:

Lorne Halpenny, Managing Director

This is the last page of the Proposal for RFP 2011-001