Q. Provide resumes of the Hydro staff who undertook the Conditions Survey of Holyrood Units 1 and 2 and the Hardwoods and Stephenville Gas Turbines, and the Avalon Upgrade of Transmission Lines. In addition, provide the Condition Surveys (Roberts Prefiled Testimony, page 12, lines 6 to 31, and page 13, lines 1 to 2).

A. Please refer to the attached resumes for the following who completed the referenced studies:

<u>Holyrood Generation Station</u>

R. Jerrett, P. Eng, Senior Civil Engineer, Generation Engineering
R. Kaushik, P. Eng., Senior Electrical Engineer, Generation Engineering
R. Leggo, P. Eng., Senior P&C Engineer, Generation Engineering
J. Mallam, P. Eng., Senior Mechanical Engineer, Generation Engineering

<u>Gas Turbine Stations</u>

D. Hicks, P. Eng., Electrical Engineer, Transmission & Rural Operations
G. Lundrigan, P. Eng., Senior Civil Engineer, Transmission & Rural Operations
J. Mallam, P. Eng., Senior Mechanical Engineer, Generation Engineering
C. Warren, P. Eng., P&C Engineer, Transmission & Rural Operations

Avalon Upgrade of Transmission Lines

Dr. Asim Halder, P. Eng., Specialist Engineer, Transmission and Distribution, Transmission & Rural Operations.

Please refer to the response to NP-59 for the reports on the Condition Surveys.

Resume of Robert Jerrett, P.Eng.

Education:
1973 - Bachelor of Engineering Degree (civil) from Technical University of Nova Scotia

1973 to present – numerous technical and management courses

Professional Membership:
APEGN

Experience:

2000 to Present: Senior Projects Engineer and Supervising Civil Engineer, Generation Engineering

Managed the Civil Section, together with a variety of projects including studies, capital cost estimates and budget proposals, design, contract preparation, tendering, contract management and project management for the Holyrood Generating Station, as well as, the other major hydroelectric generating stations.

1980 to 2000 Senior Projects Engineer and Project Engineer

Cat Arm and Upper Salmon Hydroelectric Developments – assigned full time to the Owners' Team to monitor the civil activities of the design, construction, schedule, costs and project completion.

Project managed numerous capital and operating projects such as:
- New diesel plants at Mary's' Harbour, Port Hope Simpson and Hopedale;
- New Head Office Building at St. John's
- New Waste Water Treatment Plant at Holyrood
- Civil works for the new Gas Turbine at Happy Valley

1973 to 1980 Project Engineer (on several major projects in Nfld, N.S. and Alberta)

Provided supervision and construction management for several major projects such as:
- New mining site development at Lingan, N.S.
- New Facilities at CFB Greenwood, N.S.
- 3 power development sites in Alberta – Spray Lake, Horseshoe Dam, Sundance
- Numerous marine projects in Nfld and N.S.
- Mall Expansion at Sackville, N.S.

Publications

"Cat Arm Development – General Description and Special Features" - co-authored with engineers from Cat Arm Consultants for the CEA conference in Montreal, 1984.

Resume

Name: Raj Kaushik

Address: 27 Wedgeport Road
St. John's, NF A1A 5A5

Telephone: 709-726-1275 (H) 709-737-1216 (W)

Education:
Bachelor of Engineering (Electrical)
R.E.C.K. India (1973)
Masters of Engineering (Electrical)
TUNS, Nova Scotia (1981)
First Year MBA Courses
Memorial University (1982-88)
A number of short courses in Electrical Engineering
And Project Management

Professional Membership: APEGN

Experience:

(i) May 2000 – Present — Granite Canal Hydroelectric Project Team
Project Electrical Engineer

Responsible for reviewing electrical engineering details prepared by Consultants and Contractors.

(ii) April 1995 – May 2000 — Generation Engineering
Supervising Electrical Engineer

Duties involved the supervision of other engineers in providing electrical engineering and technical support for the operation and maintenance of hydroelectric and thermal plants.

(iii) Sept. 1985 – April 1995 — Churchill Falls (Labrador) Corporation
Senior Electrical Engineer

Duties involved the supervision of other engineers in providing electrical engineering and technical support for the operation and maintenance of Churchill Falls hydroelectric generation facilities and associated transmission and distribution system.

(iv) April 1981 – Sept. 1989 Systems Planning
Generation Planning Engineer

Duties included collection and analysis of data and performing various computer simulation studies of existing and future electrical systems of the Island.

(v) July 1979 – April 1981 WBA Consulting Engineers
Electrical Engineer

Duties included electrical design and layout of buildings electrical system, lighting, motor control centers, low and medium voltage switchgear etc.

RESUME

Name: Richard W. Leggo

Address: Newfoundland & Labrador Hydro
P. O. Box 12400
St. John's, Newfoundland
A1B 4K7

Education: Bachelor of Engineering (Electrical)
Memorial University of Newfoundland (1977)

A number of short courses primarily involving protection & control

Memberships: APEGN

Work Experience:

(i) April 1995 – Present — Generation Engineering
Supervising Engineer. Protection & Control

Duties involve the supervision of other engineers in providing design and technical support for the generating plants. Projects involve protective relaying, instrumentation, control systems and other electrical equipment.

Involved in major projects including the exciter replacements at Bay D'Espoir and Holyrood, the governor replacement on Unit 1 at Holyrood and the controls aspects of the Water Treatment and Wastewater Treatment Plants at Holyrood.

(ii) March 1992 – March 1995 — Senior Protection & Control Engineer
Engineering & Construction

Duties involved the supervision of other engineers in providing design and technical support for the generating plants, terminal stations, and diesel plants. Project involved protective relaying instrumentation, control systems and other electrical equipment.

Involved in the replacement of the boiler and burner management controls on Unit 3 at Holyrood, the protection and control design for several diesel plants, protection design for transmission lines and the writing of a specification for the replacement of the gas turbine control systems at Hardwoods and Stephenville.

(iii) March 1982 – March 1992 System Performance & Protection Engineer

Duties involved providing design and technical support on protection & control issues for the transmission system including terminal stations.

Involved in the Protection and Control aspects of the SCADA system installed for the Energy Management System. Researched and wrote the trouble reports for problems that occurred on the system involving transmission lines, gas turbines, hydro plants and thermal plants

(iv) June 1979 – March 1982 Protection & Control Engineer Engineering & Construction

Duties involved the design of protection & control systems for capital projects in the terminal stations. This involved protection and control design for a number of new stations.

(v) August 1977 – May 1979 Graduate Training Program

Assignments during the Graduate Training Program were with System Planning, Telecontrol and System Operations. These were of short duration to learn about different departments within Hydro.

Resume of John Mallam P.Eng.

Education:
1975 - Bachelor of Engineering Degree (Mechanical) from Memorial University of Newfoundland

1976 to present – numerous technical and management courses

Professional Membership:
APEGN, Canadian Electrical Association

Experience:
80-03-19 to Present: Senior Mechanical Engineer and Senior Supervising Engineer, Generation Engineering

Managed the Mechanical Section implementing a variety of projects encompassing feasibility studies at all levels, capital cost estimates and budget proposals, design, contract preparation, tendering, contract management, construction management of Hydro forces and contractors, project management, claim negotiation, management of consultants and all other aspects of large multi faceted projects.

77-10-03 to 80-03-19 Mechanical Engineer, Projects

Bay D'Espoir Unit 7 - Participated in the final stages of construction supervision. Performed the final inspection, testing and commissioning of all mechanical equipment and participated in the testing and commissioning of the turbine and generator.

Holyrood Unit 3 - seconded to the consultant as a site contract manager for the early mechanical, condenser, high pressure piping and fire protection systems contracts. Assisted with the management of the turbine, generator, boiler and other mechanical contracts. Prepared the performance test procedures for turbine and generator and prepared the draft performance test procedure for the boiler. Supervised the performance test, analyzed the results and wrote the test report for the turbine and generator.

75-05-05 to 77-10-03 Mechanical Design Engineer, Operations

Provided technical support to Hydro's interconnected generating plants. Provided site inspection, contract supervision, commissioning and testing of mechanical equipment at the newly constructed Hardwoods and Stephenville Gat Turbines and prepared the performance test procedures, participated in performance acceptance tests and analyzed results.

Selected project list:

Cat Arm project design
Upper Salmon project design
Condensate polishers for three units at Holyrood
Ebbegunbaeg Control Structure modification and upgrading
Holyrood Unit 4 project design, construction, commissioning
Holyrood Unit 3 synchronous condenser starting drive
Rebuild of Holyrood gas turbine
Paradise River project design
West Salmon Spillway upgrading
Holyrood uprate project
Holyrood wastewater treatment plant design
Happy Valley Gas Turbine
Holyrood warm air makeup system
Holyrood combustion air heating system
Numerous capital and operating studies and cost estimates for System Planning for gas turbine, steam turbine, hydro turbine, wind and diesel plants
Numerous technical studies and reviews

Canadian Electrical Association Involvement
Member of the Hydraulic and Alternate Energy Workgroup of the Generation Research and Development Committee from 1983 to 1987; Chairman from 1985 to 1987. Rejoined the committee in 1994.
CEA Liaison to EPRI hydraulic research and development group
Member of the Publisher's Advisory Board of "Hydro Review" magazine
Technical Advisor to contractors performing several research projects
Reviewed, assisted in selection and administered numerous research projects.
Currently Chairman of the Thermal Generation Interest Group

Publications

"Engineering and Environmental Challenges of Siting a Coal Fired Power Plant in Newfoundland" - co-authored with engineers from Bechtel for the ASME POWERGEN conference in New Orleans, 1989

"Uprating of Holyrood Units 1 and 2" - co-authored with General Electric and Combustion Engineering for presentation at the Fall 1990 CEA conference

"The Uprating of the Holyrood Generating Station", Canadian Power Engineer Magazine, 1994 Fall Issue

"Bay D'Espoir Runner Replacement", Power Generation Technology, Spring 1995 Issue

Resume of David Hicks, P. Eng.

Education:

1991 - Bachelor of Engineering Degree (Electrical) from Memorial University of Newfoundland.

1992 - Present - Numerous technical and professional development courses.

Professional Membership

Association of Professional Engineers & Geoscientists of Newfoundland.

Experience:

January 1992 Present: Electrical Design Engineer - Engineering Design Dept.

Electrical design engineering associated with all aspects of project design related to terminal stations, diesel plants, gas turbines, and other utility facilities. Work involves the preparation of specifications, contracts, and technical design for construction tenders and for equipment supply contracts. Inspections and factory acceptance of utility equipment. Preparation of budget proposals and cost estimates. Investigations of operations equipment failures and system operating problems, and preparation of reports and development of solutions. Condition assessments of operating equipment and reports and recommendations on upgrades and life extension strategies. Research and technology watch of EMF phenomena of HV transmission systems and participation on CEA committee on same. Engineering standards development and committee work on various engineering standards committees. Supervision and management of Engineering Coop students.

Selected Project List:

Hardwoods and Oxen Pond capacitor bank installations.
Station service upgrades - Mary's Hr diesel plant.
Terminal station upgrade project at L'Anse au Loup diesel plant.
Hopedale, Harbour Deep & McCallum diesel plant rebuild projects.
Condition Assessment of the Grand Falls & Corner Brook Frequency Converter installations.

Investigations and condition assessment of 230kV Breaker failures at Bay D'Espoir.
Condition assessments of Hardwoods and Stephenville Gas Turbines.
Development of database and analysis techniques for dissolved gas in transformer oils.
Come By Chance 230kV breaker replacement project.
Compressor replacement projects at Grand Falls and Corner Brook frequency converters.
Refurbishment of 45MVA, 230kV power transformers for Wabush terminal station.

Canadian Electrical Association Involvement

Member of CEA - EMF Working Group

Publications:

Not Applicable

RESUME

Name: George W. Lundrigan

Address: Newfoundland & Labrador Hydro
P.O. Box 12400
St. John's, NF
A1B 4K7

Education: Bachelor of Engineering (Civil)

A number of short courses primarily involving Civil Engineering and Construction and Project Management

Professional Membership: APEGN

Experience:

1) October 1999 to Present — Supervising Engineer – Civil
TRO Engineering

Duties involve the supervision of other engineers and technicians in providing design and technical support for the operation and maintenance of terminal stations, regional offices, diesel plants and fuel storage facilities.

Duties also include the provision of design and inspection and project management services for the construction of new facilities and for the expansion of existing facilities.

2) December 1996 to October 1999 — Senior Engineer – Civil
TRO Engineering

Duties were the same as for the Supervising Engineer – Civil.
Job title was revised.

3) July 1991 – December 1996 — Senior Construction Engineer – Civil
Construction and Project Services
Engineering and Corporate Services

Duties involved the supervision of other engineers and technicians in the provision of inspection and project management services for the construction of new facilities and for the expansion to existing facilities. Terminal Stations, transmission lines, distribution lines, regional depots, diesel plants, fuel storage facilities and generating plants were the facilities involved.

4) December 1981 – July 1991 Superintendent of Construction
Construction and Project Services
Engineering and Corporate

Duties were the same as those for Senior Construction Engineer – Civil. Job title was revised.

5) October 1977 – December 1981 Project Engineer
Construction and Project Services
Engineering and Corporate Services

Duties involved the supervision of field staff in the provision of inspection and contract management services for the construction of access roads, transmission lines and distribution lines for the Hinds Lake and Upper Salmon Development Projects. Also Shift Engineer for construction of sections of the Hinds Lake side hill canal, main dam and control and spillway structures.

6) May 1974 – October 1977 Civil Engineer
Civil Department
Engineering and Construction

Duties involved the design of, and the supervision of others in the design of, and construction of terminal stations and diesel plants. Duties also included contract management and some direct construction inspection.

<u>Selected Projects</u>

1996 to Present

Project Manager responsibilities for the following projects:

- New diesel plants at Nain and McCallum (both scheduled to be in service by end of 2001)
- New fuel storage facilities at La Poile, McCallum, Recontre East

- Upgrading of fuel storage facilities at Stephenville and Hardwoods Gas Turbine Generating Stations and Davis Inlet, Postville, Rigolet, Charlottetown, St. Brendan's, Harbour Deep and Petites diesel generating plants.
- Cleanup of PCB contaminated soils at Hardwoods and Oxen Pond Terminal Stations
- Co-ordination of the provision of technical advice to Project Manager, Davis Engineering and Associates Ltd. for the design and construction of a new diesel plant and distribution system at Natuashish
- Upgrading of various terminal stations, regional depot buildings and properties, fuel storage facilities and diesel generating plants.

In addition to the above, supervised the civil design and construction components of projects managed by others. Also provide input into numerous budget estimates.

December 1981 – July 1996

Provided construction management for the following:

- 230 Transmission Line Construction
    - Holyrood to Hardwoods (27 km)
    - Bay D'Espoir to Upper Salmon (51.31 km)

- 138 kV – Transmission Line Construction
    - Howley to Hinds Lake (14.8 km)
    - Sunnyside to Salt Pond (155 km)
    - Seal Cove to Bottom Waters (36 km)
    - Bottom Brook to Grandy Brook (123 km)
    - Grandy Brook to Hope Brook (33 km)
    - Berry Hill to Daniel's Harbour (86 km)
    - Daniel's Harbour to Plum Point (110 km)
    - Plum Point to Bear Cove (26 km)
    - Bear Cove to St. Anthony Airport (51 km)

- 69 kV Transmission Line Construction
    - Roddickton to St. Anthony Airport (63 km)
    - St. Anthony Airport to St. Anthony (48 km)

- New terminal stations were constructed at all locations associated with these transmission lines, with the exception of Holyrood, Hardwoods, Howley, Sunnyside, Salt Pond, Seal Cove and Berry Hill, where upgrading was completed.

- Installation of subsea power cables to Fogo/Change Islands and Gaultois

- A member of Owner's team which assisted engineering consultants in designing and managing a program of subsea plowing of three alternative cable routes across the Strait of Bell Isle and the preparation of a multi volume report documenting and interpreting information obtained.

Project Manager responsibilities for the following:

- In house design and construction of the 138 kV transmission line from Bottom Brook to Hope Brook Mine Site and associated terminals station (see above).

- Owner's liaison with the engineering consultant's design and project management team for the Roddickton Woodchip Fired Generating Plant.

- In-house design and construction of major modifications to ring bus at Bay D'Espoir, Western Avalon and Stoney Brook Terminal Stations.

October 1977 – December 1981

Owner's site representative and supervised a field staff for the construction of:

- A 25 km access road from Howley to the Hinds Lake Hydro Generating Site.
- A 14 km 138 kV Transmission Line from Howley to the Hinds Lake Hydro Generating Site
- 25 kV distribution line from Hinds Lake Generating to Hinds Lake Dam Site
- A 53 km access road from Long Pond to the Upper Salmon, Hydro Generating Site
- A 51km 230 kV transmission line from the Bay D'Espoir Generating Station to the Upper Salmon Hydro Generating Site.
- Seconded to consultant (Shawmont/Fenco) for one year and acted as construction engineer on construction of Hinds Lake side hill canal and the Hinds Lake main dam with its associated control and spillway structures

May 1974 – October 1977

- Provided on site inspection for the civil construction associated with the building of a 50 MW gas turbine generating plant at Stephenville NFLD. This included construction of a new site, generating unit foundations, control building, terminal station and fuel storage facilities.

- Designed (civil aspects) and provided construction management for new diesel generating plants and associated fuel storage facilities at Rigolet, Postville and Black Tickle, Labrador.

- Associated with the design and construction inspection of a number of upgrades to existing terminal station facilities.

Resume of A. Craig Warren, P.Eng.

Senior Protection & Control Engineer
System Performance & Protection
T.R.O. - Engineering
N&L Hydro

EDUCATION

1987 - Bachelor of Engineering Degree (Electrical) from Memorial University of Newfoundland.

1988 - Completed various technical courses relating to industrial software and hardware applications.

Specific Course/Seminar History:

- ABB INFI-90 DCS Maintenance and Configuration Training Course
- ABB Symphony – Transition to Composer Software Training Course
- Gas Turbine, Co-Generation, Combined Cycle Seminar (EPIC)
- Modicon Monitor Pro – Version 6.6 Training Course
- Modicon Level 2 Modsoft Training Course
- GEC Protective Relaying Course
- Western Protective Relay Conference
- Western Power Delivery Automation Conference
- Various seminars on project management

EXPERIENCE

March 2000 – Present: Senior Protection & Control Engineer, T.R.O. – Engineering
June 1987 – April 2000: Protection & Control Design Engineer

Member of System Performance and Protection section. Duties include but not limited to: detailed design of protection and control schemes; development of electrical schematics and wiring diagrams; budget preparation; project management; power transmission system engineering support including fault analysis and resolution; system engineering support for gas turbine and automation technologies (DCS and PLC); equipment specification and procurement; research and development into new technology applications to utility substations; troubleshooting and revisions to gas turbine controls as required; preparation of research reports on emerging technologies directly related to work classification; supervision of engineering work term students as required.

Specific major project history (in descending chronological order):

Oxen Pond Substation Automation (Phases 1 and 2)

Developed graphical interface using automation software for operator console. Developed database for communication to data concentrator. Purchased data concentrator and developed data collection scheme for digital relays and associated devices. Designed schematics for installation. Purchased all equipment and prepared commissioning package for operations staff. Coordinated work schedule and managed project. Supervised installation and commissioning of new system. Attended engineering configuration training on development software.

Sunnyside / Bay D'Espoir Remote Relay Interrogation System

Assisted in this project in the design stages but solely completed the testing and commissioning. Designed schematics for installation of devices and integration of relays. Developed data organization within relays and collection devices. Visited sites to perform testing.

Stephenville Gas Turbine Controls Replacement

Reviewed existing control and interface schematics in preparation of contract for new control system (ABB INFI-90). Scheduled installation, training and commissioning. Managed project at all levels including technical specification development and administration, supply payment review and approval, scheduling and detailed design. Collected detailed technical data on gas turbines for controls designer to ensure correct operating parameters and procedures. Designed schematics to interface the new distributed control system to the existing gas turbine auxiliary systems. Attended Factory Acceptance Test on control system. Supervised installation and commissioning of control system. Arranged training session for operations staff.

Hardwoods Gas Turbine Controls Replacement

Reviewed existing control and interface schematics in preparation of contract for new control system (ABB INFI-90). Scheduled installation, training and commissioning. Attended engineering configuration training on new system. Managed project at all levels including contract development and administration, supply payment review and approval, scheduling and detailed design. Collected detailed technical data on gas turbines for controls designer to ensure correct operating parameters and procedures. Designed schematics to interface the new distributed control system to the existing gas turbine auxiliary systems. Attended Factory Acceptance Test on control system. Supervised installation and commissioning of control system. Arranged training session for operations staff.

EXPERIENCE (continued)

Holyrood 4160/600V Station Service Controls Refit

Reviewed existing control and interface schematics in preparation of contract for new control system. Attended various project management meetings at site to coordinate work and materials supply in conjunction with outages to thermal generating units. Attended engineering configuration training on new system (Westinghouse WDPF). Scheduled installation, training and commissioning. Managed project at all levels including contract development and administration, scheduling and detailed design. Designed schematics to interface the new distributed control system to the existing 4160V and 600V controls. Supervised installation and commissioning of control system. Arranged and conducted training session for operators.

Various other projects undertaken or participated in as listed:

- 230kV back-up protection modifications
- Stony Brook recloser PLC refit
- Bishops Falls fire system PLC installation
- Massey Drive transformer replacement
- Plum Point / Bear Cove voltage control (PLC)
- Hardwoods B1B2 breaker installation
- Happy Valley capacitor bank controls
- Happy Valley fuel tank farm controls
- Holyrood warm-air make-up system
- Bay D'Espoir data acquisition system
- Miscellaneous P&C panel installations at various terminal stations

Associations

Member of Association of professional Engineers and Geoscientists of Newfoundland (A.P.E.G.N.).

Served on organizing committee for Newfoundland Electrical and Computer Engineering Conference (NECEC) for several years.

CURRICULUM VITAE
OF
ASIM HALDAR, PH.D., P.ENG.

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St. John's, Newfoundland
A1A 3C6
Residence: (709) 753-1041
Office: (709) 737-1348
E-mail: ahaldar@nlh.nf.ca

EDUCATION

Bachelor of Civil Engineering	1969	University of Calcutta Calcutta, India
M.Eng. (Structural Engineering)	1977	Memorial University of Newfoundland, St. John's, Newfoundland
Ph.D. (Ocean Engineering-Offshore Structures)	1985	Memorial University of Newfoundland, St. John's, Newfoundland

Professional Affiliations

- Association of Professional Engineers of Newfoundland - Member
- Canadian Electricity Association (Transmission Section) - Member
  (Nominated by Newfoundland and Labrador Hydro)

Special Appointment

2000 - Adjunct Professor, Faculty of Engineering
Memorial University of Newfoundland
St. John's, Newfoundland

Committee Work (Present)

- Member, Task Force, Ice Management Committee, Newfoundland & Labrador Hydro, (1999-)
- Member, CEA Ice Storm Mitigation Interest Group (1999-)
- Member, Towers, Poles and Conductor Subcommittee, Transmission & Distribution Committee of IEEE (1994-)

- Member (Corresponding), CSA Can C 22.3 M95, Overhead System, (1994-)

- Member, IEEE Task Force 1368, Guide For Conductor Vibration Measurements (1993-)
- Member, CIGRE WG07 (Foundation), Study Committee 22 on Overhead Lines (1996-)

- Delegate, Canadian National Committee-IEC (International Electrotechnical Commission), Technical Committee No.11 on Overhead Lines (1992-)

- Technical Reviewer, IEEE Transaction on Power Delivery, Conductor Dynamics Related Topics (1997-)

- Chairman, Transmission Standard Review Committee, Engineering Standard Review Committee, Newfoundland & Labrador Hydro (1993-)

- Participant (Corresponding), ASCE 7 Sub Committee on Ice Load on Structures, Atmospheric Icing of Overhead Lines, (1994-)

Committee Work (Past)

- Organized one day seminar on Life Extension of Existing Transmission Line which also included Chairing a Panel Discussion session on April 30, 1996, Montreal, CEA Annual Spring Meeting, E&O Division;

- Chairman, Overhead Line Design Subsection, Transmission Section, Canadian Electrical Association, (1994-96)

- Chairman, CEA Task Force (ST331), Wind and Ice Loads On Transmission Lines, (1992); Organized a one day task Force Meeting to develop a Terms of Reference for the CEA Wind & Ice Load Monitoring Project which was subsequently undertaken by Newfoundland & Labrador Hydro, Ontario Hydro and Hydro Quebec through Ecole de technologie superierre of Montreal;

- Chairman, Line Design Committee, Line Security and Ice Accretion Subsection, CEA E&O; Division (1991-94);

- Chairman, Ice Accretion Committee, Line Security and Ice Accretion Subsection, CEA E&O Division (1988-90);

- Vice Chairman, Transmission System R&D Committee, Canadian Electrical Association (1993-94);

- Member, Transmission System R&D Committee, Canadian Electrical Association (1990-94);

- Member, CEA Task Force (ST431), Refurbishment of Existing Transmission Lines, (1994)

- Member, IEEE Meteorological Task Group, (1994-95);

- Member of The Organizing Committee, International Workshop on Atmospheric Icing of Structures (IWAIS, 1996), sponsored by University of Chicoutimi.

Employment Record (Present)

Newfoundland and Labrador Hydro

2000 - present	Specialist Engineer, Transmission and Distribution Engineering Design Transmission & Rural Operations Division
1991- 2000	Senior Engineer Technical Support, Engineering Design Transmission & Rural Operations Division

Responsibility: Supervision of two to four professionals including three work term engineering students per year.

Churchill River Project

Special Project Assignment in 1998 to Develop a Feasibility Study on EHV Transmission Lines in Labrador; work involved development of a Terms of Reference and co-ordination with TransÉnergie, Hydro Quebec as well as Rousseau Sauve & Warren (RSW Consultants) of Montreal; Acted as Project Manager to develop the full feasibility study report completed in March, 1999; Follow up work continued in the remaining part of the year to develop the Terms of Reference for Detailed Engineering Study.

Special Project Assignment in 1998 to Update the Cost Estimate of $\pm$ 400 kV HVDC Inter-tie to the Island; work involved co-ordination with Teshmont Consultants of Winnipeg;

Hydro Internal Study

- Reliability Assessment of Aging Wood Pole Lines on the Avalon Peninsula (1991 -)

- Assessment of Foundation Corrosion Problem with Respect to Tower Grillage Foundation (1999 -)

- Upgrading Study of a Double Circuit Wood Pole Transmission Line (work includes review of consultant's work, 2000 -)

- Reliability Study of Transmission Lines on The Avalon and Connaigre Peninsulas;

- Control of Galloping on 25KV Burgeo Distribution Line;

- Technical Support To Upgrade and/or Rebuild of 20 Km of 138KV Transmission Line, TL212, Sunnyside to Linton Lake;

Research & Development (1991 – 1999)

- *Initiated a Comprehensive Budget Proposal in 1991 for Carrying out Long Term Developmental Work On Wind And Ice Loads on Transmission Line, Conductor Vibration and Testing of Directly Embedded Pole Foundation;*

- Development of Hawke Hill Test Facility and Subsequent Operations For Monitoring Wind & Ice Loads On A Test Line; This project also included calibration of various Icing Models **(CEA contract No. 331T991)**, Wind Models and TOWER Model.;

- Development of Field Measurements of Aeolian Vibration on TL217 Near Witless Bay Line and on TL219 near Bay Largent; (This led to further work on Full Damper Protection Plan For TL217 which was subsequently implemented by Operations; Part of this Project was also jointly carried out with Ontario Hydro and FARGO, the Damper Manufacturer- **Refer To Publication No.15 (Paper)**);

- *Development of Field Testing Program For Various Types of Stockbridge Dampers on TL217 Line;*

- Development of Field Testing Program For Various Vibration Recorders (Currently Available in the market) On TL217 Line; This part of the project provided input directly to the **IEEE Task Force 1368, Guide for Conductor Vibration Measurements.**

- Development of Full Scale Foundation Testing Program for Directly Embedded Steel Pole Foundation; a collaborative project with Faculty of Engineering as part of **CEA contract No. 384T971;**

- Development of Test Bench For Vibration Measurements On Various Types Of Conductors (ACSR, Trapezoidal & Self Damping) At MUN; collaborative project with Faculty of Engineering as part of **CEA Contract No. 319T883**;

- Development of Full Scale Testing Program to study the effect of Mechanical fuse ("Weak Link") on transmission tower. Full scale testing was carried out at MUN;

- Development of a Wood Pole Testing Program at MUN (Full Scale as well as Non-Destructive Methods)

- Full Scale Testing of Grillage Foundation under Vertical and Inclined Uplift Loads.

Newfoundland & Labrador Hydro

1985 – 1990 Senior Specialist
Structural Analysis & Design
Transmission Line Design Department,
Engineering And Construction Division

Responsibility: Supervision of 1 Junior Engineer and one engineering work term student.

Project Manager

- Upgrading work on TL228, East of Grand Lake Crossing, Buchans Plain;
- Preparation of a Study Report which Included thorough Investigation of Various Failures of TL228 Line Over Buchans Plain and Recommendations for Subsequent Upgrading Work in 1990 & 1991; Report entitled "Probabilistic Assessment of the Upgrading and Design work For An Existing 230 KV Transmission Line"; Report # 3-2-51, TL Design Department **(Refer To Publications No. 20 (Paper) & Report No. 8);**
- Uprating Study of a 138 kV Transmission Line From Churchill Falls to Happy Valley-Goose Bay; a joint project between Transmission Line Design (Asim Haldar) and Planning (Mr. Jim Haynes), Consultants: Power Technology Inc. & Black Veatch;
- Upgrading work on TL217, Western Avalon To Hardwood;
- Design and Construction of A 138KV Transmission Line, TL219, Sunnyside To Salt Pond;
- Full Scale Foundation Tests At Sally's Cove As part of TL259 Design Check For Foundation Strength, (Refer to Publication No. 6 under Reports);
- Design and Construction of 138KV Bottom Brook-Hope Brook Transmission System;
- Upgrading work on TL201, Western Avalon to Hardwood;

1979 – 85 Transmission Line Design Engineer
Transmission Line Design Department
Engineering and Construction Division
Newfoundland & Labrador Hydro

Responsibility: Development of various computer software as well as carrying out of numerous design assignments for Transmission Line Projects.

- Development of various Computer Programs such as, CATLDP (Computer Aided Transmission Line Design Program), TOWER (Structural Analysis & Design of Lattice Tower; Rigid & Guyed-v) H-Frame (Analysis of H-Frame Wood Structure) etc;
- Technical Input To the Feasibility and Cost Estimate Study of Early Labrador Infeed (ELI) - ± 400 kV DC Transmission Line System as part of Lower Churchill Development;

- Technical Input To The Design of 230 KV Transmission Line, TL242, Holyrood To Hardwood;
- Actively Participated and Provided On-Going input To The Design of CAT-ARM Transmission System, TL247 & TL248, which Included Design Criteria such as Line Loadings, Review of Analysis of Guyed-V Tower etc;
- Design of 69KV Transmission Line System, TL251 & TL252, Howley-Hampden Jacksons Arm;
- Design of 138KV Transmission Line System, TL239, Deer Lake To Berry Hill Campground (Gros Morne National Park);
- Provided Design Input To The Structural Modification of TL214, Transmission Line, Bottom Brook To Doyles;
- Input To The Design of TL259, Berry Hill To Rocky Harbour, at various stages;
- Design of 69 KV Roddickton Transmission Line System;

Employment Record (Past)

1974 - 79	Graduate Student Faculty of Engineering Memorial University of Newfoundland St. John's Newfoundland, A1B 3X5
1975 - 76	Structural Design Engineer Shawmont Newfoundland Limited P.O. Box 9100, St. John's, Newfoundland, A1A 3C1

Structural Analysis & Design of Reinforced Concrete Powerhouse For A 75MW Generating Unit;

PUBLICATIONS

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