

**Hydro One Networks Inc.**

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**Joanne Richardson**

Director – Major Projects and Partnerships  
Regulatory Affairs

BY COURIER

May 15, 2018

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
Suite 2700, 2300 Yonge Street  
P.O. Box 2319  
Toronto, ON M4P 1E4

Dear Ms. Walli:

**EB-2017-0364 – Hydro One Networks Inc.'s Lake Superior Link Project Application –  
Technical Conference Witness Curricula Vitae**

Please find enclosed the curricula vitae for Hydro One Networks Inc. witnesses in the technical conference scheduled for May 16 and 17, 2018.

An electronic copy of this has been filed through the Ontario Energy Board's Regulatory Electronic Submission System (RESS).

Sincerely,

ORIGINAL SIGNED BY JOANNE RICHARDSON

Joanne Richardson

Encls.

## **CURRICULUM VITAE OF ANDREW SPENCER**

### **EDUCATION**

**Queen's University**  
Kingston, Ontario (2002)  
Bachelor of Applied Science, Electrical Engineering

### **INDUSTRY EXPERIENCE**

**2002 – Present: Hydro One Networks Inc.**

2017 - Present	Vice President, Transmission & Stations
2009 - 2017	Vice President, Engineering
2017 - 2017	Director, Engineering Services
2014 - 2017	Sr. Manager, Stations Sustainment Investment Planning
2011 - 2014	Manager, Investment Integration & Maintenance Planning
2009 - 2011	Manager, Maintenance Technical Services
2002 - 2006	Maintenance Engineer/Specialist, Maintenance Technical Services

### **APPEARANCE(S) BEFORE THE ONTARIO ENERGY BOARD**

EB-2014-0140:	2015 & 2016 Transmission Revenue Requirement & Rates Application - Stakeholder Presentation for Settlement
EB-2012-0031:	2013 & 2014 Transmission Revenue Requirement & Rates Application
EB-2010-0002:	2011 & 2012 Transmission Revenue Requirement & Rates Application

## **CURRICULUM VITAE OF BING YOUNG**

### **EDUCATION**

**University of Toronto**  
Toronto, Ontario (1993)  
Master of Engineering

**University of Toronto**  
Toronto, Ontario (1986)  
Bachelor of Applied Science

### **PROFESSIONAL REGISTRATION**

Professional Engineers Ontario

### **INDUSTRY EXPERIENCE**

**2009 – Present:   Hydro One Networks Inc.**

2017 - Present     Vice President, Engineering Services  
2009 - 2017        Director, System Planning  
                      Director, Transmission System Development

**2006 – 2009:     Ontario Power Authority**

Director, Transmission Integration

**1986 – 2006:     Hydro One Networks Inc./ Ontario Hydro Networks Company Inc. /  
                      Ontario Hydro**

2004 - 2006        Manager, Transmission System Development  
1998 - 2004        Senior Network Management Engineer, Investment Planning  
1998 - 2000        Senior Engineer, System Development  
1994 - 1998        Systems Engineer, Grid System Strategies and Plans  
1986 - 1994        Assistant Engineer, Power System Operations Division

**INDUSTRY REPRESENTATION:**

Independent Electricity System Operator Technical Panel  
International Council on Large Electric Systems (CIGRÉ) Canada Executive  
Ontario Energy Board Industry Affairs Standing Committee (ends 2017)  
Ontario Energy Board Regional Planning Process Advisory Group – Interim Chair (ends 2017)  
North American Electric Reliability Corporation Planning Committee (ends 2017)  
North American Transmission Forum Resiliency Technical Advisory Group (ends 2017)  
Northeast Power Coordinating Council Members Committee (ends 2017)

**APPEARANCE(S) BEFORE THE ONTARIO ENERGY BOARD:**

EB-2016-0160:	2017 & 2018 Transmission Revenue Requirement & Rates Application
EB-2016-0013:	s92 Union Gas Ltd. Leaminton Expansion Project
EB-2013-0421:	s92 SECTR– Technical Conference
EB-2010-0002:	2011 & 2012 Transmission Revenue Requirement & Rates Application
EB-2007-0707:	Ontario Power Authority Integrated Power System Plan
EB-2002-0001:	Sithe Energies Canadian Development s92 Application

## **CURRICULUM VITAE OF CHRISTINE GOULAIS**

### **EDUCATION**

**University of Toronto**

Toronto, Ontario (2006)

Masters of Social Work – specialization in Social Justice and Diversity

**University of Ottawa**

Ottawa, Ontario (2004)

B.A. Honours, Psychology

### **INDUSTRY EXPERIENCE**

**2010 – Present: Hydro One Networks Inc.**

2012 - Present Senior Manager, Indigenous Relations

2010 - 2012 Senior Advisor, First Nations and Metis Relations

**2008 – 2010: Ministry of Community Safety and Correctional Services**

Senior Policy Advisor, Aboriginal Policy and Coordination Unit

**2006 – 2008: Ministry of Health and Long Term Care**

Policy Analyst, Aboriginal Health Strategy Unit

## **CURRICULUM VITAE OF ELISE CROLL**

### **EDUCATION**

**McMaster University**  
Hamilton, Ontario (1995)  
Honours Bachelor of Science

### **PROFESSIONAL REGISTRATION**

Association of Professional Geoscientists of Ontario  
Qualified Person (Ontario Regulation 153/04 under Environmental Protection Act)

### **INDUSTRY EXPERIENCE**

**2016 – Present: Hydro One Networks Inc.**

Director, Environmental Services

**2012 – 2016: Metrolinx/GO Transit**

Director, Environmental Programs and Assessment

**2007 – 2012: Infrastructure Ontario/Ontario Realty Corporation**

2009 - 2012      Manager, Environment and Heritage

2007 - 2009      Environmental Specialist

**1999 - 2007 Terrapex Environmental Ltd.**

2001 - 2007      Project Manager

1999 - 2001      Project Scientist

**1997 - 1999 Conor Pacific Environmental Technologies Inc.**

Project Scientist

**1997 Environmental Software Associates**

Compliance Software Planner

**1996**                      **O'Connor Associates Environmental Inc.**  
Environmental Field Technician

**1995**                      **Severn Sound Remedial Action Plan**  
Environmental Field Technician



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## MAGDI ISHAC, Ph.D., P.Eng., M.Eng.

Mr. Magdi Ishac, P. Eng., has over 43 years experience in the areas of nuclear power generation and transmission lines engineering. He has a broad background in analysis, design, construction and maintenance of overhead transmission lines. Mr. Ishac is an active member of IEEE, ASCE, CEA, CIGRE and IEC. He also serves on many technical committees developing standards and guidelines for the design, construction, maintenance and operation of transmission lines. Mr. Ishac joined SNC-Lavalin T & D in 2009 as Principal Lines Engineer. In 2010, he was elected as a Fellow of the American Society of Civil Engineers (F.ASCE) for his continuous service to the society's technical committees and the development of standards and design manuals related to overhead transmission line structures. Mr. Ishac is fluent in English and also speaks French and Arabic.

### SECTORS OF EXPERTISE

#### Power

- › Power Transmission and Distribution; Transmission Lines in Alternating Current; Transmission Lines in Direct Current; Rural and Urban Electrification; Distribution Systems

### EDUCATION

1979	Ph.D, McMaster University, Hamilton, Ontario, Canada
1976	M.A. Sc. Structural Engineering, McMaster University, Hamilton, Ontario, Canada
1972	B.A.Sc. Civil Engineering, Cairo University, Cairo, Egypt

### EXPERIENCE

#### SINCE 2009 | SNC-LAVALIN T&D, TORONTO, ONTARIO, CANADA

*Power Transmission & Distribution - Toronto*

#### Since 2011 | Chief Lines Engineer

Team Lead for the following projects:

- › L-6613 138 kV Line Design (60 km) in Nova Scotia for Nova Scotia Power Inc.
  - Engineering Management of a team of 2 lines engineers in charge of establishing TL design criteria & prepare technical specifications for TL design & construction of 60 km wood pole line
- › Review & approve a complete line BOM & a line construction package ready for tendering DCAT 230 kV Lines (75 km) in British Columbia for BC Hydro
  - Engineering Management of 5 lines engineers in charge of establishing TL design criteria, line optimization studies & prepare technical specifications for TL design & construction
  - Review and evaluate submitted tenders for design & detailing of lattice towers & steel poles
  - Review and evaluate materials testing procedures, witness & evaluate FAT and approve final testing reports for Insulators & Hardware
  - Review & evaluate submitted line construction tenders & provide technical support to line construction crews
- › FATD Area Development 138 kV & 240 kV Lines (140 km) in Alberta for Altalink
  - Engineering Management of 2 engineering teams of 4 lines engineers in each team, in charge of establishing TL design criteria & prepare technical

#### Years of Experience

- › 46 years

#### Years with SNC-Lavalin

- › 9 years

#### Key Positions

- › Consultant
- › Engineering Specialist - Civil
- › Engineering Specialist - Structural

#### Languages

- › English
- › French
- › Arabic

#### Site Experience

- › Canada
- › China
- › Egypt

#### Computer Applications

- › PLS-TOWER, PLS-POLE, PLS-CADD, MFAD, CU-FAD ABAQUS, ANSYS





- specifications for TL design & construction
- › Follow up from conceptual line design, to regulatory approval, to detailed line design, materials procurements and line construction specifications, to line construction and as-built drawings final submission to AltalinkHATD Area Development 138 kV & 240 kV Lines (100 km) in Alberta for Altalink
  - Engineering Management of 2 engineering teams of 4 lines engineers in each team, in charge of establishing TL design criteria & prepare technical specifications for TL design & construction
  - Follow up from conceptual line design, to regulatory approval, to detailed line design, materials procurements and line construction specifications, to line construction and as-built drawings final submission to Altalink
- › Red Deer Area Development 138 kV Lines in Alberta for Altalink
  - Technical Advisor for couple of engineering teams working out of the Calgary office
- › Panama 230 kV Line (120 km) Conceptual Design and EPC Specifications
  - Owner Engineer responsible for Conceptual Line Design Specifications for double circuit 230 kV lattice steel towers line
- › Red Lake 115 kV (10 km) wood pole line in Northern Ontario for Goldcorp mining company
  - Engineering Management of a team of 2 lines engineers in charge of establishing TL design criteria & prepare technical specifications for TL design & construction of 10 km wood pole line
  - Review & approve a complete line BOM & a line construction package ready for tendering
  - Follow up with Construction & Commissioning of the line

*Team Lead, A7L / R1LB - 115 kV Transmission Line Refurbishment, Mechanical and electrical, Hydro One, Northern Ontario, Ontario, Canada, CA \$100 000 (01/2017 - present)*

Conceptual Engineering & Feasibility Study for Line Refurbishment of 100 km 80 years old line  
Replacing the conductor, OHGW with OPGW, Insulator & Hardware  
Reinforcing the Towers & Foundations

*Team Lead, D2H / D3H - 115 kV Transmission Line Refurbishment, Engineering, Hydro One, Northern Ontario, Ontario, Canada, CA \$100 000 (03/2017 - present)*

Conceptual Engineering & feasibility study for Line Refurbishment  
Replacing the conductor, OHGW with OPGW, Insulators & Hardware  
Reinforcing Towers & Foundations

*Team Lead, N21W / N22W 230 kV Line Refurbishment, Engineering, Hydro One, Southern Ontario, Ontario, Canada, CA \$600 000 (01/2016 - present)*

Transmission Lines Upgrading due to change in ice & wind loading that required major reinforcement for the towers & foundations

Leading a team of 3 engineers for the assessment and refurbishment of existing Transmission Line Structures & Foundations

*Team Lead, D2L 115 kV Line Refurbishment, Mechanical and electrical, Hydro One, Sudbury, Ontario, Canada, CA \$600 000 (01/2016 - present)*

Transmission Line Refurbishment including replacing the conductor, OHGW with OPGW, Insulators & Hardware.  
Reinforcing the Structures & Foundation

Engineering Management of a team of 3 lines engineers in charge of establishing TL design criteria & prepare technical specifications for TL design & construction of 60 km Steel Tower line  
Review & approve a complete line BOM & a line construction package ready for tendering



*Team Lead, TL266 230 kV Transmission Line - 18 km, Engineering, NALCOR, St. John's, Newfoundland and Labrador, Canada, CA \$600 000 (06/2016 - 12/2016)*

Engineering Management of a team of 2 lines engineers in charge of establishing TL design criteria & prepare technical specifications for TL design & construction of 18 km 230 kV steel tower line  
Review & approve a complete line BOM & a line construction package ready for tendering  
Follow up with Materials Procurement & Construction

2009 - 2011

*Power Transmission & Distribution - Toronto*

#### **Principal Lines Engineer**

- HVDC +/- 500 kV Line, Edmonton to Calgary (350 km) for Altalink
  - Engineering Management of 3 engineering teams of 4 lines engineers in each team, in charge of establishing TL design criteria & conceptual line design for the first HVDC line in Alberta
  - Leading Line Engineering Teams from Calgary, Toronto & Montreal to deliver within a tight time frame an optimum line design
  - Tower spotting for more than 1200 km of alternative line routes to establish an accepted preferred line route by the property owners & the regulator within a limited ROW width
  - Carry out Conductor & Line optimization studies, V-String versus I-String design evaluation
  - HVDC 500 kV Lattice Steel Tower Development & HVDC 500 kV Tubular Steel Pole Development
- Contribute to the AESO Tower Development technical committee, +/- 500 kV HVDC overhead transmission line design rules & specifications for AlbertaSouth East Development Project, 240 kV & 138 kV Lines
- Engineering Management of 2 engineering teams of 4 lines engineers in each team, in charge of establishing TL design criteria & prepare technical specifications for TL design & constructionContribute to the AESO Tower Development of the 2-cct 240 kV overhead transmission lines in Alberta
- Contribute to the AESO Tower Development, of the 1-cct & 2-cct 500 kV overhead transmission lines in Alberta

2000 - 2009

**HYDRO ONE, TORONTO, ONTARIO, CANADA**

#### **Senior Design Engineer Specialist**

Hanmer TS x Mississagi TS, 1-cct 500 kV overhead transmission line, Northern Ontario (1985-1988)  
Longwood TS x Nanticoke GS, 1-cct 500 kV overhead transmission line – Southwestern Ontario (1987-1990)  
Lennox TS x Hawthorne TS, 1-cct 500 kV overhead transmission line, Eastern Ontario (1987-1990)  
Lennox TS x Kanata TS, 1-cct 500 kV overhead transmission line, Eastern Ontario (1987-1990)  
Ontario – Manitoba Interconnection, +/- 450 kV DC / 1-cct 500 kV AC transmission line (Definition Stage), Northern Ontario (1990-1992):  
Transmission Line Engineer Specialist  
Reviewed and established transmission line design criteria  
Performed transmission line optimization studies  
Performed analysis and design of lattice and pole steel structures  
Prepared technical specifications for the line design and construction requirements  
Reviewed and evaluated submitted tenders, testing procedures and evaluated the tower testing reports  
Provided technical support to the line construction crew.

1979 - 2000

1984 - 1987

**ONTARIO HYDRO, TORONTO, ONTARIO, CANADA**

#### **Research Engineer**

Darlington Nuclear Generation, Bowmanville, Ontario, Canada  
Structural Engineer – Research and Development  
Provided consultation for linear / non-linear stress analysis of complex structures  
Provided capability and technical support for the finite element modelling, heat transfer analysis and thermal stress

analysis.

1979 - 1984

*Power Transmission & Distribution - Toronto*

**Senior Design Engineer Specialist**

Darlington Nuclear Generation, Bowmanville, Ontario, Canada

Bruce Nuclear Generation, Bruce, Ontario, Canada

Structural Design Engineer Specialist

Performed analysis and design of the nuclear power plant structures

Developed seismic qualification procedures for piping and equipments by analysis and testing

Contributed to safety reports and seismic safety assessments of equipments

Developed mathematical and numerical models for several complex structures.

1974 - 1979

**MCMASTER UNIVERSITY, HAMILTON, ONTARIO, CANADA**

*Engineering and Technologies ON*

**Research Assistant**

Research & Development in Earthquake Engineering & Seismic Analysis of Structures

## PROFESSIONAL ASSOCIATIONS

**SINCE 2015**

Association of Professional Engineers of Nova Scotia (APENS)

**SINCE 2011**

Professional Engineers & Geoscientists of Newfoundland & Labrador (PEGNL)

**SINCE 2010**

Engineers & Geoscientists British Columbia

**SINCE 2009**

Association of Professional Engineers and Geoscientists of Alberta (APEGA), Membership no. 105512

**SINCE 1993**

Canadian Standards Association (CSA)

**SINCE 1990**

Institute of Electrical & Electronic Engineers

**SINCE 1990**

American Society of Civil Engineers (ASCE)

**SINCE 1978**

Professional Engineers Ontario (PEO), Membership no. 21438015

**SINCE 1972**

Egyptian Engineers Syndicate

## PROFESSIONAL DEVELOPMENT

**2010**

CIGRE General Meeting, CIGRE, Paris, France

**2009**

TC 7 & TC 11 Meetings, IEC, Cairo, Egypt

**2009**

Conference on Transmission Line Design, ASCE, Fort-Worth, Texas, United States

**2008**

General Meeting, CIGRE, Paris, France

**2007**

General Meeting & TC 7 & TC 11 Meetings, IEC, Paris, France

**2007**

SC B2 General Meeting, CIGRE, Helsinki, Finland

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2006	Conference on Transmission Line Design, ASCE, Birmingham, United States
2006	General Meeting, CIGRE, Paris, France
2005	C B2 General Meeting, CIGRE, Rio de Janeiro, Brazil
2003	Conference on Transmission Line Design, ASCE, Omaha, United States
2003	General Meeting & TC 7 & TC 11 Meetings, IEC, Montreal, Quebec, Canada

## COMMITTEES

SINCE 2000	IEEE Std. 1138 (OPGW) / IEEE Std. 1222 (ADSS)
SINCE 1996	IEC / TC 11 Overhead Transmission Lines
SINCE 1996	Present IEC / TC 7 Overhead Conductors
SINCE 1996	IEEE Towers, Poles & Conductor (TP&C) Subcommittee, Line Design WG, Loading and Strengths of OH Lines WG, Wood Structures WG, Management of Existing OH Lines WG, Construction of Overhead Lines WG
SINCE 1996	ASCE Committee on Electrical Transmission Structures / Design of Latticed Steel Structures (ASCE-10)
SINCE 1993	CSA C22.3 No. 1 "Overhead Systems" Committee
2002 - 2008	ASCE Committee on Electrical Transmission Structures / Design of Steel Transmission Pole Structures (ASCE-48)
2000 - 2008	CIGRE / SC B2 / WG 13 Management of Existing Overhead Transmission Lines
2000 - 2008	CIGRE / SC B2 / WG 16 Meteorological Effects on Overhead Transmission Lines
1996 - 2008	ASCE Committee on Electrical Transmission Structures / Guidelines for Electrical Transmission Line Loading (ASCE Manual 74)
2002 - 2006	ASCE Committee on Electrical Transmission Structures / Sub-Committee on Utility Poles RBD (ASCE Manual 111)
2003 - 2005	CSA O15 Wood Utility Poles and reinforcing stubs
1994 - 1997	ASCE Committee on Electrical Transmission Structures / Design of Guyed Electrical Transmission Structures (ASCE Manual 91)
1993 - 1996	CEA Task Force Advisor on Utility Pole Structures

## AWARDS AND SCHOLARSHIPS

2008	CSA Award of Merit for exceptional contributions to the development of Electro-technical / Electrical Standards in the area of Overhead Systems, CSA, Canada
1979	Ph.D. in Structural Engineering, McMaster University, Hamilton, Ontario, Canada
1976	M.Eng. in Structural Engineering, McMaster University, Hamilton, Ontario, Canada



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**MAGDI ISHAC, Ph.D., P.Eng., M.Eng.**

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## **ACADEMIC POSTS**

<b>1974 - 1979</b>	Research and Teaching Assistant, Civil Engineering Department, McMaster University, Hamilton, Ontario, Canada
<b>1972 - 1974</b>	Research and Teaching Assistant, Civil Engineering Department, Cairo University, Cairo, Egypt

**Curriculum Vitae**  
**For**  
**Sanjiv (Sonny) Karunakaran**

Mr. Sanjiv (Sonny) Karunakaran has over 20 years of experience in the management and delivery of projects across the globe, within the Power and Infrastructure sectors. Mr. Karunakaran has a proven track record of working effectively with diverse groups of people to resolve issues quickly and deliver projects on time and on budget. He joined SNC-Lavalin in 2010 as Director of Engineering and has since held positions as VP Engineering, VP Marketing and Proposals and presently is the VP Transmission & Distribution, overseeing the Clean Power T&D Operations globally.

**EDUCATION**

1995 Bachelor of Engineering (Electrical) Honours, University of New South Wales, Australia  
1992 Bachelor of Science (Computer), University of New South Wales, Australia

**EXPERIENCE**

**2010 to Present          SNC-LAVALIN, Toronto, Ontario, Canada**

*Vice President, Transmission & Distribution (2017 to present)*  
Accountability for global T&D Operations

*Vice President, Marketing & Proposals (2015 – 2017)*  
Overseeing the front end sales activities associated with the T&D business unit.

*Vice President, Engineering (2011 – 2015) / Director of Engineering (2010 – 2011)*  
Long and medium term strategic planning for the Engineering department to support the projects being executed by the T&D business unit in multiple operating regions

**2006-2010      UNITED GROUP INFRASTRUCTURE PTY LTD. / UGL CANADA INC.  
(formerly UNITED KG PTY LTD.), Australia/Canada**

*Design Manager / Support Services Manager (2006 – 2008)*

Development and delivery of wastewater and water infrastructure projects under an alliance contracting framework

*Engineering and Business Development Manager (2008 – 2010)*

Establishment of UGL Canada Inc. Development of foundation contract for UGL Canada Inc. with ATCO Electric to deliver transmission systems in Alberta under an alliance framework in conjunction with Balfour Beatty.

Engineering and Business Development activities to grow the infrastructure business for UGL in Canada, including the delivery of substation projects for British Columbia Transmission Corporation.

**2004-2006      BARCLAY MOWLEM LTD., Australia**

*Electrical Project Engineer*

Management and delivery of projects in the water and mining sector across Australia

**2002-2004      UNITED KG PTY LTD. (formerly KILPATRICK GREEN PTY LTD.),  
Australia**

*Project Engineer / Project Manager*

Management and delivery of a number of projects in the Power and Water sectors across Australia.

**2001-2002      KIER INTERNATIONAL LTD., Romania**

*Mechanical & Electrical Manager*

Provided water supply systems to remote rural villages in six counties of Romania; delivered a total of 103 schemes under this program of works

**1995-2001      KILPATRICK GREEN PTY LTD., Australia**

*Design Engineer / Site Engineer*

Design, construction, supervision and commissioning of a range of projects in the Water and Power sectors across Australia and South-East Asia.