



# Seventh CNS International Conference on CANDU Maintenance

## Sunday, November 20, 2005

Registration 16:00 – 20:00

Welcome Reception 18:00 – 20:00

King II (Sponsored by GE Canada)

## Monday, November 21, 2005

Registration & Coffee / Speakers' Breakfast 07:30 – 08:30

King I (Sponsored by ZETEC Inc.)

PLENARY SESSION 08:30 – 10:00

Regency A, B, C

Welcoming Remarks

**Brent Murchie**, Conference Chair, Bruce Power

**John Coleby**, Honorary Chair, Pickering A Site

Vice President, Ontario Power Generation

Keynote Speakers

**Mark Elliot**, **Ken Ellis**, **Bill Pilkington**

Coffee Break 10:00 – 11:00

(Sponsored by SNC – Lavalin Nuclear Inc.)

SESSION 1 11:00 – 12:00

1A: MANAGEMENT

Regency Salon A

Chair: John Robert — Bruce Power

1B: ENVIRONMENTAL QUALIFICATION

Regency Salon B

Chair: Mark Toffolon — INTECH International

1C: FEEDERS — GENERAL 1

Regency Salon C; Chair: Malcolm MacKenzie — Babcock and Wilcox Canada

1D: FUEL CHANNEL CONDITION MONITORING

Regency Salon D

Chair: Ed Price — AECL (retired)

Luncheon 12:00 – 13:30

King I (Sponsored by Ontario Power Generation)

Guest Speaker : Cmdr. Marcel Hallé

Royal Canadian Navy

SESSION 2 13:30 – 15:00

2A: CHEMISTRY

Regency Salon A

Chair: Mahvash Mirzai — AECL

2B: ELECTRICAL EQUIPMENT

Regency Salon B

Chair: Doug Mahler — GE Canada

2C: FEEDERS — GENERAL 2

Regency Salon C

Chair: Mike Furniss — Bruce Power

2D: STEAM GENERATOR TUBE INSPECTION

Regency Salon D

Chair: Mary Addario — Babcock and Wilcox Canada

Coffee Break 15:00 – 15:30

(Sponsored by CANSPEC Group Inc.)

SESSION 3 15:30 – 17:00

3A: HEAT TRANSPORT SYSTEM

Regency Salon A

Chair: Wolf Reinhardt — Babcock and Wilcox Canada

3B: PROCESSES

Regency Salon B

Chair: John Slade — NB Power

3C: FEEDER INSPECTION

Regency Salon C

Chair: Tracy Gendron — AECL

3D: STEAM GENERATOR CLEANING

Regency Salon D

Chair: Janice Keating — NB Power

Reception 17:15 – 18:00

King II (Sponsored by Black and McDonald,

Power Generation Division)

Dinner 18:00

King I (Sponsored by AECL / B&W Canada)

Guest Speaker : Warren MacDonald

Inspirational Adventure Speaker

(Courtesy of National Speakers' Bureau)

## Tuesday, 22 November 2005

Registration & Coffee / Speakers' Breakfast 07:30 – 08:30

King I (Sponsored by INTECH International Inc.)

SESSION 4 08:30 – 10:00

4A: PLANT LIFE MANAGEMENT

Regency Salon A

Chair: Peter King — Babcock and Wilcox Canada

4B: INSPECTION — GENERAL

Regency Salon B

Chair: Colette Taylor — AECL

4C: FUEL CHANNEL INSPECTION TECHNIQUES 1

Regency Salon C

Chair: Frank Didomizio — GE Canada

4D: STEAM GENERATOR INSPECTION

Regency Salon D

Chair: Doug Lee — Babcock and Wilcox Canada

Coffee Break 10:00 – 10:30

(Sponsored by Nuclear Logistics Inc.)

SESSION 5 10:30 – 12:00

5A: PREVENTATIVE MAINTENANCE

Regency Salon A

Chair: Jeff Millman — Babcock and Wilcox Canada

5B: CONTAINMENT

Regency Salon B

Chair: Nauman Qadri — INTECH International

5C: FUEL CHANNEL INSPECTION TECHNIQUES 2

Regency Salon C

Chair: Neill Allen — OPG

5D: STEAM GENERATOR MAINTENANCE & MODIFICATIONS

Regency Salon D

Chair: Jim Nickerson — AECL

Luncheon 12:00 – 13:30

King I (Sponsored by NB Power, Hydro-Québec & Bruce Power);

Guest Speaker : William Schneider, B&W Canada

SESSION 6 13:30 – 14:30

6A: RELIABILITY

Regency Salon A

Chair: Horst Paetzold — OPG

6B: DOSE REDUCTION

Regency Salon B

Chair: Dave Guzonas — AECL

6C: FUEL CHANNEL ASSESSMENT

Regency Salon C

Chair: Navid Badie — AECL

6D: PROJECT MANAGEMENT

Regency Salon D

Chair: Revi Kizhatil — Babcock and Wilcox Canada

November 20 – 22, 2005  
Holiday Inn On King, Toronto, Canada

## PLENARY SESSION

### ■ Welcoming Remarks

**Brent Murchie**

*Conference Chair  
Bruce Power*

**John Coleby**

*Honorary chair  
Pickering A Senior Vice President  
Ontario Power Generation*

### ■ Keynote Speakers

**Mark Elliot**

*Director of Station Engineering  
Pickering B  
Ontario Power Generation*

**Ken Ellis**

*Vice President Maintenance  
Bruce Power*

**Bill Pilkington**

*Director of Performance Improvement &  
Strategic Initiatives  
NB Power*

## MANAGEMENT

Chair: John Robert — Bruce Power

- **Implementing a Customer Focused Continual Business Improvement Program to Improve the Maintenance Process**  
**G. Kharshafdjian, C. Fisher, T. Beres, S. Brooks, S. Forbes, M. Krause, K. McAuley, M. Wendorf**  
*AECL*
- **Leading the Pickering A Return to Service Project Through Effective Information Management and Performance Reporting**  
**H. Sherwood**  
*OPG*



## ENVIRONMENTAL QUALIFICATION

Chair: Mark Toffolon — INTECH International

- Preserving EQ as Per CSA N290.13: EQ of Equipment for CANDU NPP

**H. Bordeleau**

*Services H. Bordeleau*

- Assisting Maintenance in Sustaining Environmental Qualification

**L. Boville**

*Bruce Power*



**FEEDERS — GENERAL 1**

Chair: Malcolm MacKenzie — Babcock and Wilcox Canada

■ **Local Effects In Flow-Accelerated Corrosion Wall Thinning**

**J. Pietralik**

*AECL*

■ **Condition of Feeders at Embalse Nuclear Generating Station**

**C. Schiersman, R. Sainz**

*Nucleoelectrica Argentina SA*

**T. Ramakrishnan, J. Howieson**

*AECL*



## FUEL CHANNEL CONDITION MONITORING

Chair: Ed Price — AECL (retired)

■ Fuel Channel Life Monitoring

**B. Guler, E. Harmer, M. Echlin, A. Celovsky**

*AECL*

■ In-Service Inspection System for Coolant Channels of Indian PHWRs —  
Evolution and Experience

**R. Puri, M. Singh**

*Bhabha Atomic Research Centre*



## CHEMISTRY

Chair: Mahvash Mirzai — AECL

- The Feasibility Study of Using Deuterated Gadolinium Nitrate for Moderator-Poisoned Shutdown and Excess Reactivity Control in CANDU Reactors

J. Li, A. Everatt

*AECL*

- Maintenance, Outages and Chemistry Really Can Be Compatible

J. Roberts, R. Deaconescu

*Bruce Power*

- An Assessment of the Use of AECL's Wetproofed Recombiner Catalyst for the Moderator Cover Gas System in CANDUs

S. Suppiah

*AECL*



## ELECTRICAL EQUIPMENT

Chair: Doug Mahler — GE Canada

- Preventive Maintenance and Periodic Testing Program Optimization of Emergency Diesel Generator

**R. Vaillancourt, M. Croteau, M. Drouin**

*Hydro-Québec*

- On-Site Refurbishment of Electrical Equipment – Battery Charger Example

**C. Irish**

*Nuclear Logistics, Inc.*

- Strategies for Ensuring Reliability of Electric Motors

**M. Radulski**

*Schulz Electric Company*





## FEEDERS — GENERAL 2

Chair: Mike Furniss — Bruce Power

■ Qualification of a Motorized Scanner for Feeder Bend Inspection

**P. Martin**

*NB Power*

**G. Rousseau**

*Hydro-Québec*

**E. Lavoie**

*Institut de recherche d'Hydro-Québec*

■ Feeder Elbow Replacement at Pickering A

**D. Pink, A. Lopez**

*B&W Canada*

**E. Tang, C. Liew**

*AECL*

**W. Lee, J. Bouchi**

*OPG*



## STEAM GENERATOR TUBE INSPECTION

Chair: Mary Addario — Babcock and Wilcox Canada

■ **Eddy Currents Inspection of CANDU Steam Generator Tubes Using Zetec's ZR-1 Robot: Experience in Romania**

**S. Hower**, *Zetec Inc*

**M. Serban**, *CNE-Prod*

**L. Vladu**, *COMPCONTROL ING*

■ **Overview of Magnetic Bias X-Probe Qualification and Inspection on PNGS Monel 400 Steam Generator Tubing**

**B. Lepine**, *AECL*

**J. van Langen**, *OPG IMS*

**L. Obrutsky**, *AECL*

■ **Field Experience With Eddy Current X-Probes in CANDU Steam Generators and Heat Exchangers**

**S. Sullivan**, **R. Lakhan**, **V. Cecco**, *Zetec Inc.*



## HEAT TRANSPORT SYSTEM

Chair: Wolf Reinhardt — Babcock and Wilcox Canada

- Degraded Condition of the Reflux Tube Bundles in Pickering B  
C. Lorencez, D. Redden  
*OPG*
- High Heat Transport System Leakage to D<sub>2</sub>O Collection System  
C. Lorencez, D. Redden, P. Zvonar  
*OPG*
- Wall Thinning of CANDU Large Bore Primary Heat Transport System Piping  
C. Schefski, J. Pietralik, Z. Walker  
*AECL*  
R. McAlister, O. Naeem  
*OPG*  
A. Guillermo  
*NB Power*



## PROCESSES

Chair: John Slade — NB Power

■ Field Trial of ThermAND™ at PLGS

G. Burton, G. McKay, M. Thompson, C. Turner, *AECL*

S. Robertson, *NB Power*

■ Preventive and Predictive Maintenance as a Function of Spare Part Management —  
A Point of View from a Procurement Specialist and a Supplier

R. LaRose, *AECL*

P. Sloski, *Seals Unlimited*

■ Condition Monitoring — A Key Component in the Preventive Maintenance

C. Isar, *SNN, NPP UI Cernavoda*



## FEEDER INSPECTION

Chair: Tracy Gendron — AECL

### ■ Crack Detection Tools For Feeder Inspection

**E. Lavoie**, *Institut de recherche d'Hydro-Québec*

**G. Rousseau**, *Hydro-Québec*

**E. Lavallée**, *Institut de recherche d'Hydro-Québec*

**J.-F. Côté**, *Hydro-Québec*

### ■ Eddy Current Array Probe for Detection of Surface Breaking Cracks in the Extrados of Feeder Bends

**L. Obrutsky, R. Cassidy, K. Chaplin**, *AECL*

**P. Martin**, *NB Power*

**J. Bureau**, *Zetec Inc.*

### ■ Inspection of CANDU Feeder Pipes in Areas Adjacent to Welds

**R. tenGrotenhuis**, *OPG*



## STEAM GENERATOR CLEANING

Chair: Janice Keating — NB Power

- Steam Generator Tubesheet Waterlancing at Bruce B  
R. Persad, *B&W Canada*  
D. Eybergen, *Bruce Power*
  
- Steam Generator Secondary Side Chemical Cleaning at Gentilly-2  
S. Plante, *Hydro-Québec*
  
- Radiological Pathways Analysis for Spent Solvents from the Boiler Chemical Cleaning at the Pickering Nuclear Site  
N. Garisto, Z. Eslami, *SENES Consultants Limited*  
S. Hodgins, *OPG*  
T. Beaman, *T.A. Beaman & Associates*  
S. von Svoboda, J. Marczak, *OPG*



## PLANT LIFE MANAGEMENT

Chair: Peter King — Babcock and Wilcox Canada

■ Inspection Program for Embalse Nuclear Generating Station

**J. Devegili, G. Diaz, C. Schiersman, R. Sainz**

*Nucleoelectrica Argentina SA*

**T. Ramakrishnan, J. Howieson**

*AECL*

■ Plant Life Management Processes and Practices for Heavy Water Reactors

**K-S. Kang, J. Cleveland, C. Clark**

*IAEA*

■ CANDU Life Cycle Management Workshop on “HTS Aging Management”

**P. Kundurpi, J. Nickerson, D. Meneley**

*AECL*

**J. Plourde**

*OPG*



## INSPECTION - GENERAL

Chair: Colette Taylor — AECL

- **Contribution to Detection and Sizing Linear Defects by Phased Array Ultrasonic Techniques**  
*P. Ciorau, OPG IMS*
  
- **Improving Accuracy of ET Measurement of LISS Nozzle to Calandria Tube Clearance**  
*S. Craig, T. Krause, J. Schankula, AECL*
  
- **Reverse Engineering of 3-D Crack-like EDM Notches and Phased Array Ultrasonic Results on Low-Pressure Turbine Components Mock-ups**  
*P. Ciorau, OPG IMS*  
*W. Daks, H. Smith, CAD Wire*





## FUEL CHANNEL INSPECTION TECHNIQUES 1

Chair: Frank Didomizio — GE Canada

■ **Innovation in Pressure Tube Rolled Joint Sampling  
(Circumferential Sampling Tool Technology)**

**B. Guler, J. King, R. Wray**

*AECL*

■ **Pressure Tube Replication Techniques Using the Advanced NDE System**

**A. Isherwood, D. Jarron, J. Travers, K. Hanley**

*OPG IMS*

■ **Advanced NDE (ANDE) and Its Application for Pressure Tube Inspections  
in OPG Reactors**

**D. Jarron , M. Trelinski, S. Kretz**

*OPG ISD*



## STEAM GENERATOR INSPECTION

Chair: Doug Lee — Babcock and Wilcox Canada

- **Measurement of Oxide Loadings Within Steam Generator Tubes at CANDU Nuclear Stations**  
*A. Husain, J. Krasznai, Kinectrics, Inc.*
  
- **An Improved Ultrasonic Downcomer Flow-Measurement System for CANDU Steam Generators**  
*V. Janzen, B. Luloff, AECL*  
*K. Sedman, G. Galan, Bruce Power*
  
- **Boiler Tube Support Plate Degradation in Bruce Unit 8**  
*K. Sedman, G. Galan, B. Dicks, Bruce Power*



## PREVENTATIVE MAINTENANCE

Chair: Jeff Millman — Babcock and Wilcox Canada

■ Preventive Maintenance Optimization at the Gentilly 2 NGS:  
Initial Results and Lessons Learned

M. Darragi, D. Komljenovic, R. Vaillancourt, M. Croteau, *Hydro-Québec*

■ “What Did You Learn From Your Maintenance Program Today?” —  
A Living Maintenance Program at Bruce Power

I. Rowley, *Bruce Power*

E. Niemkiewicz, *Insert Key Solutions, Inc.*

■ Pickering NGS A Reactor Building 1 Dome Refurbishment —  
Long-Term Monitoring of Coating

J. Deans, *Kinectrics, Inc.*

P. Chan, R. Gomme, *OPG*



## CONTAINMENT

Chair: Nauman Qadri — INTECH International

- Bruce 'B' Primary Heat Transport Pump Containment Penetration Bellows Seal Replacement

**D. Bhattacharyya**

*Bruce Power*

- Bruce B 2004 Vacuum Building Outage —  
Fiberglass Spray Header Refurbishment Program

**M. Diebel**

*Bruce Power*

- Open Airlock Doors During Outages at Pickering B

**R. Russell, G. MacDonald, G. Clarke**

*OPG*



## FUEL CHANNEL INSPECTION TECHNIQUES 2

Chair: Neill Allen — OPG

■ TSS Tool Measurements in CANDU Reactors — Results and Issues

L. Popescu, *NSS Ltd.*

N. van den Brekel, *OPG*

A. Wallace, *Kinectrics*

L. Micuda, *Bruce Power*

■ Advanced In-Fuel Channel Gauging Tool —  
Instrumenting a SLAR Tool for Dual Purpose

G. Rousseau, M. Cantin, *Hydro-Québec*

D. Champagne, S. Cecco, *Institut de recherche d'Hydro-Québec*

■ Ultrasonic Device to Measure Gap Between Calandria Tube and LISS Nozzle

T.R. Kim, S.M. Sohn, J.S. Lee

*Korea Electric Power Research Institute*



## STEAM GENERATOR MAINTENANCE & MODIFICATIONS

Chair: Jim Nickerson — AECL

■ Maintenance and Plugging Technology for CANDU Steam Generator Tubing

J. Prince, A. Nicholson, J. Hare, L. McGoey, T. Stafford

*OPG IMS*

P. Gowthorpe

*INTECH International*

■ Identification of Leaky Steam Generators by Iodine Mapping Technique and Development of Tools for Cutting of Tubes of Steam Generators of Indian PHWRs

D. Rao

*Nuclear Power Corporation of India*

■ Steam Generator Primary Manway Modifications for Wolsong Unit #1

J. Vandenberg, P. Volder

*B&W Canada*



## RELIABILITY

Chair: Horst Paetzold — OPG

■ Maintenance Feedback — The Key to a Successful Integrated-Equipment Reliability Improvement Program (i-ERIP™)

**J. Anderson, W. Pike**, *Anderson, Chavet & Anderson Inc.*

**T. Mairs**, *OnMarc Consulting Inc.*

**K. Hart**, *PPL Susquehanna SES*

**G. Polowy**, *Callaway NP*

**B. Coffey**, *FPL Turkey Point*

■ GRA/RIAM Model Development at Darlington Nuclear

**J. Plourde**, *OPG*

**R. Parmar**, *NSS Ltd.*



## DOSE REDUCTION

Chair: Dave Guzonas — AECL

- Effect of IX Column Maintenance on Carbon-14 Concentration in Moderator Systems

**C. Gallagher, A. Tripple**

*AECL*

- Reducing Plant Radiation Fields by Source Term Reduction — Tracking Cobalt and Antimony to Their Sources at Gentilly-2

**P. Gauthier**

*Hydro-Québec*

**D. Guzonas**

*AECL*





## FUEL CHANNEL ASSESSMENT

Chair: Navid Badie — AECL

- Some Applications Related to the Structural Integrity Analyses of CANDU 6 Pressure Tubes

**V. Radu**

*Institute for Nuclear Research, Romania*

- Generic Assessment of Tight Fitting Annulus Spacer Mobility

**J. Robertson**

*NSS Ltd.*

**L. Micuda**

*Bruce Power*

**N. van den Brekel**

*OPG*



## PROJECT MANAGEMENT

Chair: Revi Kizhatil — Babcock and Wilcox Canada

- Economic Analysis for Upgrade Decision-Making Using a Control System Replacement Example

**J. de Grosbois, R. Wichman, G. Hepburn, R. Basso**

*AECL*

**V. Kumar, D. Deregowska**

*Carleton University*

- Unit 1 Return to Service — Experiences in Managing a \$1 Billion Project

**C. Pattison**

*OPG*

