

In the Matter of: Entergy Nuclear Operations, Inc.  
(Indian Point Nuclear Generating Units 2 and 3)

<b>ASLBP #:</b> 07-858-03-LR-BD01	<b>Identified:</b> 10/15/2012
<b>Docket #:</b> 05000247   05000286	<b>Withdrawn:</b>
<b>Exhibit #:</b> ENT000235-00-BD01	<b>Stricken:</b>
<b>Admitted:</b> 10/15/2012	
<b>Rejected:</b>	
<b>Other:</b>	

**DR. HOWARD G. SEDDING - CURRICULUM VITAE**

**BSc in Electrical and Electronic Engineering**, University of Strathclyde, Glasgow, Scotland, 1980.

**PhD in Electrical Engineering and Applied Physics**, Brighton Polytechnic, Brighton, England, 1984.

**MSc in Crystallography**, University of London, London, England, 1986.

**CITIZENSHIP:** British and Canadian

**EMPLOYMENT HISTORY**

Principal Research Engineer, Kinectrics Inc. (formerly Ontario Hydro Research Division), Toronto, Canada (1988 – present).

Science & Engineering Research Council (SERC) post-doctoral research fellow, Brighton Polytechnic, Brighton, UK and Ontario Hydro Research Division, Toronto, Canada (1986 – 7).

SERC post-doctoral research fellow, Brighton Polytechnic, Brighton, UK (1983 – 6).

Research Assistant, Brighton Polytechnic, Brighton, UK (1980 – 3).

**WORK EXPERIENCE**

Since joining the Research Division of Ontario Hydro in 1988 and through the subsequent changes that led to the evolution of Kinectrics, I have been involved in, or responsible for, numerous projects related to the specification, testing, monitoring and maintenance of solid, liquid and gaseous electrical insulation systems in a wide range of high voltage electrical equipment. Many of these projects not only require technical expertise but also the ability to communicate with all levels within an organization, from shop floor to boardroom. Further, the majority of this work is performed in the field thus requiring the ability to manage logistics and interface with several other organizations. Some key projects and responsibilities include,

**Rotating machines**

- Providing electrical diagnostic field testing and condition assessment services throughout North America for turbine and hydroelectric generators and motors.
- Operating a laboratory facility providing quality assurance testing of rotating machine insulation, e.g. voltage endurance, thermal cycling, turn insulation capability, etc., to utilities, independent power producers and process industries.
- Development of the stator slot coupler (SSC) and associated technology enabling routine on-line partial discharge measurements on large turbine generators. This technology is now used on hundreds of machines worldwide.
- Development of other condition monitoring technologies for rotating machines including rotor temperature monitoring, detection and risk assessment of stator winding coolant channel plugging, core monitor optimization and detection and location of interturn stator short circuits in induction motors.
- Delivering consulting services in the areas of rotating machine electrical insulation application, performance, testing, maintenance and failure analysis.

These services have been provided to a wide range of clients including OPG, Alstom, Siemens-Westinghouse, TransAlta, Duke Energy, US Army Corps of Engineers, Electricite de France.

## **Cables and switchgear**

- Leading a team of three engineers and four technologists providing field testing of medium voltage cables and switchgear in substations and generating stations.
- After-laying high voltage commissioning and partial discharge testing of transmission class cable circuits. These projects have been executed in Canada, the US and Mexico as well as overseas including Qatar and Saudi Arabia. Cable installations of this type are usually associated with major infrastructure projects and require the ability to liaise with several organizations and deal with cultural and language differences that exist on overseas sites.
- Development of cable condition monitoring and life assessment strategies for nuclear generating stations.
- Development of wireless temperature sensors for electrical contact monitoring in medium voltage metalclad switchgear in various hydroelectric generating stations.
- Maintenance and commissioning testing of medium voltage cables, switchgear and bus.
- Failure analysis of oil-paper and solid extruded polymer cable and accessories.

Among the clients to whom such services have been provided are OPG, Bruce Power, Hydro One, Siemens, LS Cables, Southwire and Iberdrola.

## **Transformers**

- Consulting services in the areas of performance, testing, maintenance, failure analysis of oil-filled and dry-type transformers.
- Applying low frequency diagnostic test methods to transformer condition assessment.
- Transformer end-of-life assessment.

## **TECHNICAL COMMITTEE WORK**

### **Institute of Electrical and Electronic Engineers (IEEE)**

The IEEE is a transnational organization, based in New Jersey, that develops standards for electrical and electronic equipment. These standards are principally used in North America.

Chair, Toronto Chapter, Instrumentation and Measurement Society, 1991 - 4.

Member, Administrative Committee of the Dielectrics and Electrical Insulation Society, 1994 - 9.

Served on IEEE Working Groups (WGs) responsible for the following standards,

- WG 43-2000, Recommended Practice for Testing Insulation Resistance of Rotating Machinery.
- WG 1434-2000, Guide for Partial Discharge Measurements for Rotating Machines.
- WG 1043-1996, Recommended Practice for Voltage Endurance Testing of Form-Wound Coils and Bars.
- WG 1553-2002, Standard for Voltage-Endurance Testing of Form-Wound Coils and Bars for Hydrogenerators.

Current IEEE standards activities include participation in the revision and development of,

- Chair of WG 433, Recommended Practice for Insulation Testing of Large AC Rotating Machinery at Very Low Frequency.

- WG 434, Guide for Functional Evaluation of Insulation Systems for AC Electric Machines.
- WG 522, Guide for Testing Turn-to-Turn Insulation on Form-Wound Stator Coils for Alternating-Current Rotating Electric Machines.
- WG 1310, Recommended Practice for Thermal Cycle Testing of Form Wound Stator Bars and Coils for Large Generators.
- WG 1776, Recommended Practice for Thermal Evaluation of Unsealed or Sealed Insulation Systems for AC Electric machinery Employing Form Wound Preinsulated Stator Coils for Machines Rated 15,000 V or below.

### **International Electrotechnical Commission (IEC)**

The IEC, an organization based in Geneva, develops worldwide standards for all electrical and electronic equipment. I have been appointed to serve as the Canadian member or expert on the following committees and working groups.

- Canadian Subcommittee of Technical Committee 2: Rotating Machinery.
- Canadian Subcommittee of Technical Committee 15: Solid Insulation.
- Canadian Subcommittee of Technical Committee 15B: Endurance Testing of Insulation Systems.
- Canadian Subcommittee of Technical Committee 42: High Voltage Test Techniques.
- Chair, Canadian Subcommittee of Technical Committee 112: Evaluation & Qualification of Electrical Insulating Materials & Systems.
- Working Group 11 of Technical Committee 42: Revision of IEC 270, Partial Discharge Measurements.
- Working Group 29 of Technical Committee 2: Rotating Machine Partial Discharge Measurements.
- Working Group 27 of Technical Committee 2: Form wound rotating machines for inverter fed applications.
- Maintenance Team 10 of Technical Committee 2: Revision of IEC 60034-15 and 18 documents.
- Maintenance Team 1 of Technical Committee 112, WG3: Revision of IEC 61934.
- Maintenance Team 2 of Technical Committee 112, WG3; Revision of IEC 61251.

### **Conference International de Grands Reseaux Electriques (CIGRE)**

CIGRE, a Paris-based organization, provides an international forum for discussion of experiences in the operation of large power systems. This organization is key in guiding the development of high voltage equipment standards within IEC. I have been appointed as the Canadian member or expert to the following study committees or working groups

- Convenor, Working Group D1.07: Solid Insulating Materials for Rotating Machines.
- Member, Working Group D1.11: Service-Aged Materials.
- Member, Working Group D1.16: Nanodielectrics
- Member, Working Group D1.17: HV Asset Condition Tools, Data Quality and Expert Systems.
- Member, Advisory Group D1.04 : Solid Insulation.
- Member, SC TF D1.19, Solid Insulation Endurance Under Transient Voltages.
- Canadian National Member, Study Committee A1: Rotating Machines.
- Member, Working Group A1.01: Turbine Generators.
- Member, Working Group A1.06: High Voltage Motors
- Member, Working Group D1.41: Radiation Ageing of Polymeric Insulation Materials

## **AWARDS**

Best Paper, 1989 Electrical and Electronics Insulation Conference, Chicago, IL, "A discharge locating probe for rotating machines, pp 225 - 7.

Best Paper, 1994, IEEE Power Engineering Society, "A new sensor for detecting partial discharges in operating turbine generators", IEEE Trans. EC-6, pp 700 - 6, 1991.

Best Paper, 1994, Electric Machinery Committee of IEEE Power Engineering Society, *ibid*.

IEE Ayrton Premium, 1994, J.W. Wood, H.G. Sedding, W.K. Hogg, I.J. Kemp and H. Zhu, "Partial discharges in HV machines: initial considerations for a PD specification", Proc. IEE, Part A, Vol. 140, 1993, pp 409 - 16.

## **PATENTS**

H.G. Sedding, B.A. Lloyd and J. Penman, "Method and Apparatus for Detecting Stator faults in Rotary Dynamoelectric Machines", US Patent No. 5,252,915, Canadian Patent Application No. 2086641-1 and European Patent Application No. 93300513.4.

F.Y. Chu, B.A. Lloyd, R.M. Cilic and H.G. Sedding, "Electronic Rotor Temperature Sensor", US Patent No. 5,257,863.

S.R. Campbell and H.G. Sedding, "Method and Device for Distinguishing Between Partial Discharge and Noise", US Patent No. 5,475,312.

## **PROFESSIONAL QUALIFICATIONS**

Chartered Engineer, Member of the Institution of Electrical Engineers, elected 1988.

## **OTHER RELEVANT ACTIVITIES**

Invited speaker

- International Symposium on On-line Monitoring of Electric Power Plants, Kitakyushu, Japan, November 16, 2001
- International Diagnostics for Rotating Machines Conference, Changwon City, Korea, July 3, 2002.

IEEE International Symposium on Electrical Insulation

Publications chair – 2000

Vice-chair – 2004

Chair – 2006

Electrical Insulation Conference

Vice-chair (technical program) 2001 – 2003

## PUBLICATIONS

H.G. Sedding, W.K. Hogg, and R. Miller, "Fundamental mechanisms of surface flashover on muscovite mica in air at NTP", Paper 45.05, Fourth International Symposium on High Voltage Engineering, Athens, Greece, September 1983.

H.G. Sedding, W.K. Hogg, and R. Miller, "Surface flashover damage substructures in muscovite mica", Fourth International Conference on Dielectric Materials, Measurements and Applications, Lancaster, England, September 1984.

W.K. Hogg and H.G. Sedding, "Surface flashover related to solid dielectric substructure damage", Fifth International Symposium on High Voltage Engineering, Braunschweig, West Germany, August 1987.

H.G. Sedding and W.K. Hogg, "Implications of the overvoltage test for nondestructive evaluation in large machines", 18th Electrical and Electronics Insulation Conference Proceedings, pp 130 - 4, Chicago, Illinois, USA, October 1987.

G.C. Stone, H.G. Sedding, B.A. Lloyd, and B.K. Gupta, "The ability of diagnostic tests to estimate the remaining life of stator insulation", IEEE Trans. Energy Conversion, EC-3, December 1988.

H.G. Sedding, G.C. Stone, J.M. Braun, and W.K. Hogg, "The relationship between partial discharge activity and hydrogen diffusion in epoxy resin and epoxy/mica composites", Fifth International Conference on Dielectric Materials, Measurements and Applications, pp 211 - 4, Kent, England, June 1988.

H.G. Sedding and W.K. Hogg, "The initiation mechanism of slot and end-winding discharges in hv high power electrical machines", *ibid*, pp 207 - 10.

G.C. Stone, H.G. Sedding, and B.A. Lloyd, "Monitoring and diagnostic tests under development for rotating machine insulation", EPRI Seminar on Rotating Machine Windings and Repair/Rewind Practices, Scottsdale, Arizona, USA, December 1988.

H.G. Sedding and J.M. Braun, "Partial discharge behaviour in laminated structures: effect of gaseous diffusion and penetration", Proceedings of Third International Conference on Conduction and breakdown in Solid Dielectrics, pp 127 - 31, Trondheim, Norway, July 1989.

N. Fujimoto, G.C. Stone, H.G. Sedding, and S. Rizzetto, "Improved partial discharge detection methods for epoxy spacers in gas-insulated switchgear", Paper 15.04, Sixth International Symposium on High Voltage Engineering, New Orleans, Louisiana, USA, August 1989.

G.C. Stone, H.G. Sedding, and G.S. Klempner, "Developments in rotating machine on-line partial discharge testing", CIGRE Colloquium on Electrical Machines Maintenance and Monitoring, Montreal, Canada, September 1989.

H.G. Sedding, B.A. Lloyd, G.C. Stone, J.M. Braun, and J.C. White, "Development of novel instrumentation and expert system concepts in turbine generator condition monitoring", Fourth International Conference on Electrical Machines and Drives, IEE Conf. Publ. 310, London, England, September 1989, pp 177 - 81.

G.C. Stone and H.G. Sedding, "New monitors to detect aging in rotating machine insulation systems", AIM Conference, Liege, Belgium, September 1989.

I. Culbert, H.G. Sedding, and G.C. Stone, "A method to estimate the insulation condition of high voltage stator windings", 19th Electrical and Electronics Insulation Conference Proceedings, Chicago, Illinois, USA, September 1989, pp 236 - 41.

H.G. Sedding and G.C. Stone, "A discharge locating probe for rotating machines", *ibid*, pp 225 - 7, and IEEE Electrical Insulation Magazine, pp 14 - 6, September/October 1989.

G.C. Stone, H.G. Sedding, and B.S. Bernstein, "Assessing the condition of rotating machine insulation", Presentation to EEI Electrical System and Equipment Committee, Mahwah, New Jersey, October 1989.

G.C. Stone, H.G. Sedding, and B.S. Bernstein, "Improved thermal monitoring of rotating machine insulation", EPRI Workshop on Environmental Monitoring in Nuclear Plant, Baltimore, Maryland, USA, April 1990.

G.C. Stone and H.G. Sedding, "Improved techniques for partial discharge testing of rotating machine insulation", Proceedings of the Sixth International Conference on Electrical Insulation, Brighton, England, May 1990, pp 340 - 4.

G.C. Stone, B.K. Gupta, J.F. Lyles, and H.G. Sedding, "Experience with accelerated aging tests on stator bars and coils", Conference Record of the IEEE International Electrical Insulation Symposium, Toronto, Canada, June 1990, pp 356 - 60.

G.C. Stone, H.G. Sedding, B.A. Lloyd, J.M. Braun, B.S. Bernstein, and J.C. White, "Improved rotating machine insulation condition assessment", Paper 11-201, CIGRE, Paris, France, September 1990.

H.G. Sedding and G.C. Stone, "Improved rotating machine insulation condition assessment", 58th Doble Client Conference, Boston, MA, April 1991.

J.M. Braun, B.K. Gupta, B.A. Lloyd, R.M. Morra, H.G. Sedding and G.C. Stone, "Electrical testing of aged station cables", Third International Conference on Polymer Insulated Power Cables, Paris, France, June 1991, pp 375 - 81.

H.G. Sedding, G.C. Stone and S.R. Campbell, "Measurement of partial discharges on operating turbine generators with a novel wide band coupler", Third International Conference on Properties and Applications of Dielectric Materials, Tokyo, Japan, July 1991, pp 773 - 6.

T.L. Churchill, J.S. Edmonds, B.A. Lloyd, H.G. Sedding and G.C. Stone, "Real-time condition monitoring of turbine generators", International Conference on the Evolution and Modern Aspect of Synchronous Machines, Zurich, Switzerland, August 1991.

H.G. Sedding, S.R. Campbell and G.C. Stone, "On-line partial discharge detection in turbine generators", Fifth International Conference on Electrical Machines and Drives, London, England, September 1991, pp 250 - 4.

J.M. Braun, R.M. Morra and H.G. Sedding, "Assessment of cable insulation by low-frequency dielectric characterization", Conference on Electrical Insulation and Dielectric Phenomena, Knoxville, TN, October 1991, pp 408 - 13.

S.R. Campbell and H.G. Sedding, "Distinguishing partial discharge from noise on the basis of pulse width", International Symposium on Digital Techniques in High Voltage Measurements, Toronto, Canada, October 1991, pp 2-17 - 21.

B.K. Gupta, I.M. Culbert and H.G. Sedding, "Practical problems in diagnostic tests on generators", EPRI Utility Motor and Generator Predictive Maintenance Workshop, Scottsdale, AZ, December 1991.

H.G. Sedding, G.S. Klempner, S.R. Campbell and G.C. Stone, "On-line partial discharge testing of turbine generators", *ibid*.

J.M. Braun, G.L. Ford, H.G. Sedding, G.C. Stone and M. Vainberg, "Advanced monitoring tools for generator and motor insulation systems", *ibid.*

H.G. Sedding, S.R. Campbell, G.C. Stone and G.S. Klemptner, "A new sensor for detecting partial discharges in operating turbine generators", *IEEE Trans. on Energy Conversion*, EC-6, December 1991, pp 700 - 7.

H.G. Sedding, "The partial discharge calibration problem in rotating machines", Panel Session on Digital Techniques for Partial Discharge Measurement in Rotating Machines, *IEEE Winter Power Meeting*, Publication 92 THO 425-9 PWR, New York, NY, February 1992, pp 24 - 8.

G.C. Stone, H.G. Sedding, N. Fujimoto and J.M. Braun, "Practical implementation of ultrawideband partial discharge detectors", *IEEE Trans. on Electrical Insulation*, EI-27, February 1992, pp 70 - 81.

J.M. Braun, G.C. Stone and H.G. Sedding, "Application of dynamic mechanical analysis to endurance testing of generator stator bars", *IEEE International Symposium on Electrical Insulation*, Baltimore, MD, June 1992, pp 469 - 72.

S.R. Campbell, G.C. Stone and H.G. Sedding, "Application of pulse width analysis to partial discharge detection", *ibid.*, pp 345 - 8.

P. Werelius, R. Eriksson, J.M. Braun and H.G. Sedding, "Temporal characteristics of partial discharge in voids under dc excitation", *Proceedings of the Nordic Insulation Symposium*, Vasteras, Sweden, June 1992, pp 1.2:1 - 10.

H.G. Sedding, G.S. Klemptner, J. Kapler, S.R. Campbell, G.C. Stone and A. Kingsley, "A new on-line partial discharge test for turbine generators", *CIGRE*, Paris, France, September 1992, paper 11-303.

G.J. Anders, J. Endrenyi, G.L. Ford, J.F. Lyles, H.G. Sedding, J. Maksymiuk, J. Stein and D. Loberg, "Maintenance planning based on probabilistic modeling of aging in rotating machines", *ibid.*, paper 11-309.

W.K. Hogg, I.J. Kemp, H.G. Sedding and J.W. Wood, "Studies of partial discharge in HV machines: initial considerations for a PD specification", *Sixth International Conference on Dielectric Materials, Measurements and Applications*, Manchester, England, September 1992, pp 154 - 57.

J.M. Braun, G.L. Ford, J. Levine, H.A. Maureira and H.G. Sedding, "Partial discharge testing of unshielded cables", *ibid.*, pp 346 - 9.

J.P. Steiner, J.P. Quinlan, J.M. Braun, R.M. Morra and H.G. Sedding, "A new low frequency high voltage insulation analyzer using transient methods", *Conference on Electrical Insulation and Dielectric Phenomena*, Victoria, Canada, October 1992, pp 328 - 33.

J.M. Braun, G.L. Ford, J.P. Levine, H.A. Maureira and H.G. Sedding, "Partial discharge assessment of shielded and unshielded cables", *EPRI Power Plant Cable Condition Monitoring Workshop*, San Francisco, CA, February 1993.

J.M. Braun, H.G. Sedding and J. Stein, "Electrical testing of aged station cables", *54th American Power Conference*, Chicago, IL, April 1993.

S.R. Campbell, G.C. Stone, H.G. Sedding, G.S. Klemptner, W. McDermid and R.G. Bussey, "Practical on-line partial discharge tests for generators and motors", *IEEE Summer Power Meeting*, Vancouver, Canada, July 1993, paper 93 SM 353-3 and *IEEE Trans. on Energy Conversion*, EC-9, June, 1994, pp 281 - 7.

Y. Mizuno, J.M. Braun, R.J. Densley, N. Fujimoto and H.G. Sedding, "Temporal evolution of partial discharge in voids and electrical trees", Eighth International Symposium on High Voltage Engineering, Yokohama, Japan, August 1993.

G.C. Stone and H.G. Sedding, "Experience with partial discharge testing of operating motors and generators", Proceedings of the 25th Symposium on Electrical Insulating Materials, Nagoya, Japan, September 1993, pp 23 - 9.

G.C. Stone and H.G. Sedding, "In-service evaluation of motor and generator stator windings using partial discharge tests", IEEE Industrial Applications Society Conference, Toronto, October 1993 and IEEE Trans. on Industry Applications, IAS-31, March/April, 1995, pp 299 - 303.

G.C. Stone and H.G. Sedding, "New technology for the partial discharge testing of operating motors and generators", 21st Electrical and Electronics Insulation Conference, Chicago, IL, October 1993 pp 667 - 72.

J.M. Braun, D.J. Horrocks, J.P. Levine and H.G. Sedding, "Development of on-site partial discharge testing for transmission class cables", Third International Conference on Power Cables and Accessories 10 kV - 500 kV, London, UK, November 1993.

D.J. Wallis, D.J. Petty and H.G. Sedding, "On-line measurement of rotor wedge temperatures", EPRI Utility Motor and Generator Predictive Maintenance and Refurbishment Workshop, San Francisco, CA, December 1993.

J.M. Braun, B.K. Gupta and H.G. Sedding, "Testability and quality assurance for large air-cooled stator windings", EPRI Utility Motor and Generator Predictive Maintenance and Refurbishment Workshop, San Francisco, CA, December 1993.

J.F. Lyles, T.E. Goodeve and H.G. Sedding, "Parameters required to maximize a thermoset hydro-generator stator winding life. Part I - Design, manufacture, installation", IEEE Winter Power Meeting, New York, NY, February 1994, Paper No. 94 WM 033-1 EC and IEEE Trans. on Energy Conversion, EC-9, September 1994, pp 620 - 7.

J.F. Lyles, T.E. Goodeve and H.G. Sedding, "Parameters required to maximize a thermoset hydro-generator stator winding life. Part II - Monitoring, maintenance", IEEE Winter Power Meeting, New York, NY, February 1994, Paper No. 94 WM 034-9 EC and IEEE Trans. on Energy Conversion, EC-9, September 1994, pp 628 - 35.

J. Penman, H.G. Sedding, B.A. Lloyd and W.T. Fink, "Detection and location of interturn short circuits in the stator windings of operating motors", IEEE Winter Power Meeting, New York, NY, February 1994, Paper No. 94 WM 105-7 EC and IEEE Trans. on Energy Conversion, EC-9, December 1994, pp 652 - 8.

G.C. Stone, H.G. Sedding and J.W.R. Smith, "Advances in partial discharge test technology for assessment of operating generators and motors", Seventh BEAMA International Electrical Insulation Conference, Brighton, UK, May 1994, pp 6 - 10

I.J. Kemp, H. Zhu, J.W. Wood, H.G. Sedding, and W.K. Hogg, "Partial discharge detection in high power plant-problems associated with signal modification", *ibid*, pp11 - 15

J.W. Wood, H.G. Sedding, W.K. Hogg, I.J. Kemp and H. Zhu, "Partial discharges in HV machines: initial considerations for a PD specification", Proc. IEE, Part A, Vol. 140, 1993, pp 409 - 16.

S.R. Campbell, G.C. Stone and H.G. Sedding, "Characteristics of Partial Discharge Pulses from Operating Rotating Machines", 1994 IEEE International Symposium on Electrical Insulation, Pittsburgh, PA, June 1994, pp 229 - 32.



G.C. Stone, and H.G. Sedding, "Experience with the partial discharge testing of operating motors and generators", Proceedings of the 4th International Conference on Properties and Applications of Dielectric Materials, Brisbane, Australia, July 1994, pp 566 - 9

H.G. Sedding, R. Jeffreys, G.S. Klempner, D.J. Wallis, G. Tontini and T.R. Wait, "The effect of flexible operation in reliability and ageing of generating equipment", CIGRE, Paris, France, Sept. 1994, paper 11-203.

B. Reichmann, J. Stein, D. Loberg, G.J. Anders, H.G. Sedding, M. Vainberg and J.F. Lyles, "Application of a maintenance planning tool for rotating machines", *ibid*, paper 11-204.

D.J. Wallis, A. Meredith, C.S. Cross, H.G. Sedding, J.R. Capener, B. Leigh, D. T. Lloyd, D.M. Ward, and A.B. Wooldridge, "Generator rotors on load wedge temperature measurement and off load remote in-situ NDT inspection", *ibid*, paper 11-207.

J. Penman, A. Stavrou, H. G. Sedding, B.A. Lloyd and W.T. Fink, "Shorted turn detection and location in operating motors", International Conference on Electrical Machines, Paris, France, Sept. 1994.

J. He, J.M. Braun, R.J. Densley, N. Fujimoto and H.G. Sedding, "Partial discharge characteristics of electrical trees in polymeric cable insulation", Conference on Electrical Insulation and Dielectric Phenomena, Arlington, TX, Oct. 1994.

G.C. Stone and H.G. Sedding, "In-service evaluation of motor and generator stator windings using partial discharge tests", IEEE Trans. on Industry Applications, IAS-31, March/April 1995, pp 299 - 303

J.M. Braun, D.J. Horrocks, J.P. Levine, H.G. Sedding, L. Hiivala and M. Hartley, "Ultra-wide bandwidth measurements: application to open-air testing of 230 kV XLPE cables", Fourth International Conference on Polymer Insulated Cables, Versailles, France, June 1995, pp 666 - 70.

T. Kalicki, J.M. Braun, R.J. Densley, N. Fujimoto and H.G. Sedding, "Partial discharge pulse characteristics of electrical trees in XLPE cable insulation", Fifth International Conference on Conduction and Breakdown in Solid Dielectrics, Leicester, UK, July 1995, pp 528 - 32.

J. Kapler, G.C. Stone and H.G. Sedding, "Partial discharge pulse phase patterns on operating motors and generators", IEE Japan International Symposium on Electrical Insulation Materials, Tokyo, Japan, September 1995.

J.M. Braun, B.K. Gupta and H.G. Sedding, "Quality assurance testing for large air-cooled generator stator winding insulation", Proceedings of the 22nd Electrical & Electronics Insulation Conference, Chicago, Ill., September 1995, pp 691 - 5.

G.C. Stone, S.R. Campbell and H.G. Sedding, "Applicability of partial discharge testing for 4 kV motor and generator stator windings", *ibid*, pp 665 - 8.

T. Kalicki, J.M. Braun, R.J. Densley and H.G. Sedding, "Pulse shape characteristics of partial discharges within electrical trees in polymeric materials", Conference on Electrical Insulation and Dielectric Phenomena, Virginia Beach, Va., October 1995.

G.C. Stone, T.E. Goodeve, H.G. Sedding and W. McDermid, "Unusual partial discharge pulse phase distributions recorded in operating rotating machines", IEEE Trans. on Dielectrics and Electrical Insulation, DEI-2, August 1995, pp 567 - 77.

J.M. Braun, R.J. Densley and H.G. Sedding, "Application of ultra-wide bandwidth PD measurements to testing of high stress components", Proceedings of 1995 High Voltage Workshop, Salt Lake City, UT, October 1995.

I.J. Kemp, H. Zhu, H.G. Sedding, J.W. Wood and W.K. Hogg, "Towards a new partial discharge calibration strategy based on the transfer function of machine stator windings", Proc. IEE - Meas. Sci. & Technol., vol. 143, no. 1, January, 1996, pp 57 - 62.

G.C. Stone, H.G. Sedding, and M.J. Costello, "Application of partial discharge testing to motor and generator stator winding maintenance" IEEE Trans. on Industry Applications, IAS-32, March/April 1996, pp 459 - 64

G.C. Stone, S.R. Campbell, S.R. H.G. Sedding, and J. Levine, "A continuous on-line partial discharge monitor for medium voltage motors", Proceedings of 4th International Conference on Generator and Motor Partial Discharge Testing, Houston, TX, May 1996

H. Dhirani, H.G. Sedding, and W.J. Ferguson, "On and off-line partial discharge testing of a 500 MW nuclear generator, ibid

H.G. Sedding, H. Dhirani, H. and G.S. Klemper, "Investigating the correlation between TGA and conventional on-line partial discharge measurements, ibid

H.G. Sedding, H. Dhirani and G.S. Klemper, "Application of partial discharge measurements to maintenance management of large hydrogen-cooled steam turbine generators", CIGRE/EPRI Colloquium on Maintenance and Refurbishment of Utility Turbogenerators, Hydrogenerators and Large Motors, Florence, Italy, April 1997

K. Itoh and H.G. Sedding, "Partial discharge characteristics of artificial defects in mica-epoxy composite materials", Proceedings of 5th International Conference on Properties and Applications of Dielectric Materials, Seoul, South Korea, May 1997 pp 833 - 8

J.M. Braun, R.J. Densley, N. Fujimoto and H.G. Sedding "Electrical diagnostics for station equipment: the need for robust interpretation of monitoring data" ibid pp 198 - 201

G.C. Stone, B.A. Lloyd, S.R. Campbell, S.R. and H.G. Sedding, "Development of automatic, continuous partial discharge monitoring systems to detect motor and generator partial discharges" Record of the 1997 IEEE International Electric Machines and Drives Conference, Milwaukee, WI, May 1997

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S. Tetrault, G.C. Stone, and H.G. Sedding, "Monitoring partial discharges on 4 kV motor windings" Record of Conference Papers, IEEE Industry Applications Society 44th Annual Petroleum and Chemical Industry Conference, Banff, Canada, September 1997, pp 159 - 65 and IEEE Trans. On Industry Applications, IAS-35, May/June 1999, pp 682 - 8

B.K. Gupta, H.G. Sedding and I.M. Culbert, "Improving the reliability of stator insulation systems in rotating machines", Proceedings of 4th CANDU Maintenance Conference, Toronto, Canada, November 1997

G.C. Stone, S.R. Campbell and H.G. Sedding, "Analysis of the effect of adjustable speed drive surges on motor stator winding insulation", CIGRE, Paris, France, September 1998, paper 11-202

H.G. Sedding, G.C. Stone, G. Beckerdite, R. Johnsen, A. Penaziev and D.M. Lam, "On-line partial discharge measurements on turbine generators: experience with stator slot and bus couplers", ibid, paper 11-207

G.C. Stone, S.R. Campbell and H.G. Sedding, "Adjustable speed drive surges: how they affect motor stator windings", *ibid*, paper 1067

H.G. Sedding, B.K. Gupta, I.M. Culbert, H. Dhirani, G. Haines & G.S. Klempner, "Experience with partial discharge measurements on rotating machines in Ontario Hydro", Proceedings of the 24<sup>th</sup> Electrical & Electronics Insulation Conference, Cincinnati, OH, October, 1999, pp 344 - 8.

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