

## ***RESUMÉ***

### **CHARLES WESLEY FROMÉN**

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#### **PERSONAL DATA**

Rua Bernardino Machado, 569  
Granja Julieta – CEP 04722-120  
São Paulo - Brazil  
Work phone # (055-11) 5696-3843  
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56 years  
Married  
2 children (21 and 19 years)  
Work e-mail: charles@eletropaulo.com.br  
Private e-mail: cfromen@hotmail.com

#### **KNOWLEDGEABLE**

- Design and Protection of Electric Generation, Transmission, and Distribution Systems;
- Electrical and Electronic Circuit Design;
- Electric and Magnetic Field Measurements.

#### **EXPERIENCES**

##### **Superintendent of Electrical System Development – Eletropaulo – Brazil**

- Responsible for improving the performance of the National and the Eletropaulo System, analyzing and implementing the changes (1999 – present)

##### **Examples of Projects implemented / In implementation**

- Change Transmission Substation location (save US\$30 million – In Transmission get away cost) - In implementation.
- Identified design changes for a new Transmission Substation - EPTE -Transmission Company in São Paulo (increase the capacity of the Substation from 960 MVA to 1440 MVA / reducing almost 50% the cost for equipment) - In approval stage with Transmission Company
- Distribution Expert System (reduce the time from 15<sup>+</sup> minutes to less than 30 seconds to identify problems on the Distribution System), in final implementation
- Install the third Transformer in existing substations (save US\$ 10 million each for 3 Substations / There are 43 similar existing substations future saving possible US\$ 400 million) - 2000
- Change the Transmission Line to feed Substations from Underground to Overhead (save US\$ 3 million), 1998
- Change Transmission Get away from SF6 to Outdoor Air (save US\$ 2,5 million) - 2000
- Change the Relays Settings (7000 relays, obtained 18% improvement of performance of the circuits) - 1999

##### **Technical representative of Reliant Energy team, during the take over - Eletropaulo - Brazil (1998)**

- Analyzed and evaluated the conditions of the system. Helped to develop the plan for system improvement.

##### **Technical Representative of Reliant Energy International**

- Chile: Evaluated the Region 5 System, 1999
- Peru: Evaluated the Luz Del Sur System (Lima), 1999

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- Colombia: Increase 5% the output capacity of selected hydroelectric generators, 1997  
Found lower cost way to serve Buenaventura (saving approximately  
US\$ 4 million), 1997
- Argentina: EDELAP – System Failure Analysis, 1997  
Designed 138 kV YPF Refinaria Substation Layout, 1997

#### **Senior consulting engineering – Reliant Energy /HL&P - (1984-1998)**

Review entire electric system and implement change (from substations Projects point of view).

- US PATENT (N. 5.245.289 – Sept-14/1993) related to Automated Circuit Breaker  
Testing
- HL&P technical Committee member “Joint HVDC Agricultural Study” in conjunction with Department  
of Energy and Bonneville Power Administration, Portland, Oregon. Study effect of HVDC electric field  
on cattle - 1992
- Electric Reliability Council of Texas (ECORT) HL&P MEMBER OF ECORT metering Standards Task  
Force, which produced “Guide for Uniform practices in Inter-Utility Metering” – 1989
- Technical representative on Welsh – Monticello HVDC Tie (reduced cost of tie US\$ 30 million by  
changing the configuration) - 1988
- Chairman of HL&P SF6 GIS Substation Committee (saved Company money by avoiding building SF6  
substations where Air Bus would work) – 1987
- Consultant - South Texas Nuclear Power Plant for Transmission, Substation and Generation Protective  
Relaying - 1987
- Technical representative on Walker County – South Texas HVDC Project – 1986

**Engineer (junior to Senior Consulting) of Distribution, Transmission and Generation Protective – (1968-1984)**

#### **PUBLICATIONS/ SEMINARIES/ CONFERENCE PAPERS**

- Review research at the Texas Center for Superconductivity at the University of Houston, 1998 - present
- Participated in Research and Development Projects pertaining to Digital Simulator Development, Expert  
System Disturbance Analysis (Distribution, Transmission and Generation), 1995-present
- Author/Co-author of more than 20 IEEE and Conference Papers related to Electric System Protective  
Relaying and Expert Systems, 1970 – present
- Award Received EPRI Innovators Relay Test Workstation Helps HL&P avoid Plant Shutdowns, 1995
- Member of conference for protective Relay engineer at Texas A&M University (Planning Committee),  
1987-1998

#### **EDUCATION/ LANGUAGES**

- BSEE – Texas A&M University , 1968
- Spanish – intermediate level
- Portuguese – Basic level

October 6<sup>th</sup>, 2000

**PUBLICATIONS BY CHARLES WESLEY FROMÉN**

<b>TITLES</b>	<b>DATES</b>	<b>ADDITIONAL AUTHORS</b>
Digital Fault Recorder File Classification and analysis using Expert System and Signal Processing Techniques	93	M. Kezunovic; P. Spasojevic - (Texas A&M University)
Acquiring Transient, Fault and disturbance Data for Automated Computer Analysis (Prepared by a Working Group of the Relay Practices Subcommittee of the IEEE - Power System Relaying Committee) - Special Publication	93	J. A. Bright; E.A. Baumgartner; J.D. Brandt; T.W. Cease; R.W. Dempsey; E.C. Fennell; R.J. Fernandez; R.F. Gustin; A.T. Howard; M. Kezunovic; D.J. Lawrence; M. Lefrancois; H.I. Mehta; R.J. Murphy; B.A. Pickett; L.E. Smith; M.A. Xavier; C.W. Barnett; D.M. Clark; C.H. Castro; J. Parker; H.S. Smith
Electronic Relay Surge protection Capacitor and Cable Capacitance Cause Unadvertent Trip	03/94	
(Presented to the Forty-Seventh Annual Conference for Protective Relay Engineers Texas A&M University College Station - Texas)		
HL&P 138 kV Capacitor Bank Relaying (Presented to the Forty-Seventh Annual Conference for Protective Relay Engineers)	03/94	
HL&P Considerations When Selecting a Protective Relay System (Presented at the Forty-Eight Annual Conference for Protective Relay Engineers - Texas A & M University - College Station - Texas)	04/95	John S. Lucey and Don S. Sevcik (HL&P)
An advanced Method For Testing Of distance Relay Operating Characteristic	96	
Transmission Power Quality & it's Effects on ASD Selection (Presented at the Forty-Ninth Annual Conference for Protective Relay Engineers- Texas A & M University - College Station - Texas)	04/96	John S. Lucey (HL&P)
Real Time Generator Monitoring System	06/96	M. Kezunovic - (Texas A&M University)
Real Time Data Acquisition and processing For Generator Monitoring	07/06	I. Rikalo; M. Kezunovic; A. Abur - (Texas A&M University) and D.R. Sevcik; K.W. Tielke (HL&P)
A new Approach to Distance Relay Evaluation Using Digital Simulators	10/96	M. Kezunovic - (Texas A&M University)
Distance Relay Application Testing Using a Digital Simulator	01/97	M. Kezunovic; Y.Q. Xia; Y. Guio (Texas A&M University) and D. R. Sevcik (HL&P)
Mathematical Models for Current, Voltage and Coupling Capacitor Voltage Transformers - (Prepared by a Working Group of the Relay Input Sources Subcommittee of the IEEE - Power System Relaying Committee)	04/97	Demetrios Tziouvaras; Dr. Peter McLaren; George Alexander; Douglas Dawson; Jules Esztergalyos; Dr. Mieczek Glinkowski; Irwin Hasenwinkle; Dr. Madlen Kezunovich; Dr. Ljubomir Kojovic; Bill Kuffel; Jerry Nordstrom; Stanley Zocholl
Relay Trip Circuit Design (IEEE Relay Special Publication by PSRC Relay Trip Circuit Design WG)	08/98	D.C. Blackburn Jr; S.P. Conrad; S. E. Grier; R. W. Haas; R.E. Hart; I. O. Hasenwinkle; J.D. Huddleston; M.J. McDonald; G.P. Moskos; R.P. Onate; J.E. Stephens; D.A. Tziouvaras

**PUBLICATIONS BY CHARLES WESLEY FROMÉN**

<b>TITLES</b>	<b>DATES</b>	<b>ADDITIONAL AUTHORS</b>
Substation Voltage Regulation	10/70	
Network, spot Network, Automatic Rollover and High Capacity Radial Services	10/70	
The HL&P CO. Primary Breaker Spot Network Protector Scheme (Presented at the Twenty-Fourth Annual Conference for Protective Relay Engineers Texas A & M University – College Station – Texas)	04/71	
Primary Network Breaker Protection (Presented at the Southwest Underground Distribution Exchange Abilene – Texas)	04/71	
The Application of Current- Limiting Fuses to Pad-Mounted Unt Systems (IEEE Conference and Exposition on Underground Distribution)	09/71	Robert G. Drawe (HL&P) John D Borst (Westinghouse E. Co) Aamur M Lockie (Westinghouse E. Co)
Transmission Relaying Houston Chapter of IEEE	01/74	
The HL&P CO. Backup Protection for Relay and Breaker Failure (Thirty-Third Annual Conference for Protective Relay Engineers - Texas A & M University – College Station – Texas)	04/80	
HL&P CO. Experiences with Ferroresonance Problems on EHV Equipment (Presented to Thirty-Fourth Annual Conference for Protective Relay Engineers - Texas A & M University – College Station – Texas)	04/81	Don R. Sevcik (HL&P)
Transmission Line Protection (IEEE Fall Seminar)	11/87	
Utility Prospect For Microprocessor-Based Protection Relay And Substation Applications	04/89	
New test Approach for Microprocessor-Based Power System Automation Equipment (IEEE – Electronic Conference and Exposition)	09/90	M. Kezunovic, A. Abur, H Singh, V. Skendzic (Texas A&M University)
Dyna-Test Simulator for Relaying Testing (Presented at IEEE Power Engineering Society 1991- Winter Meeting)	11/90	L.J. Kojovic; M. Kezunovic; A. Abur; V. Skendzic; H. Singh - (Texas A&M University)
Clip on Current Transformers Make Easy Work of Transformer Differential Checking (Easy Phase Angle) (Presented at forty-fourth Annual Conference For Protective Relay Engineers - Texas A & M University – College Station – Texas)	04/91	
Trouble Shooting Maintenance Of protection Relays Using Digital Simulators	01/92	L.J. Kojovic; M. Kezunovic; V. Skendzic - (Texas A&M University)
Principles and Practices of Synchronization (Develop training Program )	08/92	Don R. Sevcik (HL&P)
Experimental Evaluation of EMTP-Based Current Transformer Models For Protective Relay Transient Study	08/92	L.J. Kojovic; M. Kezunovic; A. Abur - (Texas A&M University); F. Philippe (Electric Power Research Institute) and D.R. Sevcik (HL&P)
A New Method for the CCVT Performance Analysis Using Field Measurements, Signal Processing And EMT Modeling (IEEE Paper and presented in Summer meeting)	93	L.J. Kojovic; M. Kezunovic - (Texas A&M University) and Don R. Sevcik (HL&P)