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## EDUCATION

- B. Sc. Electrical Engineering, University of Calgary, Calgary Alberta 1991

## PROFESSIONAL REGISTRATION

- Member - Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA )
- Member - Association of Professional Engineers and Geoscientists of British Columbia (APEGBC )

## EXPERIENCE OVERVIEW

- Experience in safety system design and evaluation, SIL assessment, safety lifecycle
- Experience in technical leadership, project management, coordination, and QA
- Extensive experience in a broad range of PLC, DCS, SCADA and HMI systems
- Strong computer networking and architecture skills
- Excellent start-up, troubleshooting, and commissioning skills
- Experience in developing functional specifications, estimating, developing and evaluating bids, and vendor selection
- Project experience in a wide range of applications and industries including gas plants, compressor stations, gas turbine and reciprocating compressor control, oil handling facilities, gas pipelines, offshore oil production platforms
- International work in USA (including North Slope & Gulf of Mexico), Korea, Angola, Singapore, Ecuador, Brazil, Yemen

## HARDWARE/SOFTWARE BACKGROUND

- Emerson DeltaV / DeltaV SIS
- Allen-Bradley – ControlLogix, CompactLogix, PLC-5, PLC-3, PLC-2, SLC-500, PanelView, PanelView Plus, RSVIEW, RSLogix, FactoryTalk ME
- Bently Nevada - 3300, 3500 Series Vibration Monitors
- Triconex – Tricon TMR Safety PLC, Tristation 1131
- GE Fanuc - LM90, Series 6, LogicMaster, Proficy ME, MOST Safety PLC
- Fisher ROC, Control Microsystems SCADAPack, Arcom RTU
- USDATA - FactoryLink on OS2, VMS, and NT platforms; Intellution – IFIX, FIX32
- Microsoft SQL Server, Oracle, Matrikon OPC, Kepware OPC

## EMPLOYMENT HISTORY

Madden Automation Group Inc., Crossfield, Alberta Safety Systems / Process Control Independent Consultant	2009 -
Emerson Process Management, Calgary, Alberta Senior Engineer/Project Manager/Technical Specialist	2001 - 2009
Kenonic Controls Ltd., Calgary, Alberta Junior/Senior Engineer	1991 - 2001

## PROJECT HIGHLIGHTS

### 2013 – Devon Canada – Manatokan Phase 2 PLC Upgrade

- Consulting engineer with MAC Engineering, responsible for specification, design, programming and commissioning of a PLC upgrade from Allen Bradley PLC5 to ControlLogix.
- This was a fast turnaround taking advantage of Rockwell's migration technology, the PLC5 wiring arms were retained so very little physical re-wiring was needed. The other trains in the plant were maintained in operation while the new hardware for the Phase 2 train was installed and tested with the new control system. The Phase 2 train was back in production within 12 hours.
- Forty analog outputs, most with PID control, upgraded to ControlLogix PIDE function blocks. Ninety-six analog inputs and 160 discrete inputs were conditioned and scaled.
- ProSoft Modbus communications to Husky LACT, and Ethernet communications to other PLCs at site were ported over to ControlLogix.
- Extensive simulation and testing of the new program in the office prior to installation allowed the new program to work properly "out of the box", fine tuning was completed within a week.
- The existing Shutdown Key was revised, and I/O drawings were modified taking advantage of the original PLC5 loops rather than having to be re-created.

### 2013 – Devon Canada – Miscellaneous Project Estimates

- Consulting engineer with MAC Engineering, responsible for specification and cost estimates for new SCADA systems at Belloy, Swan Hills, Bonnyville, Lloydminster in partnership with Devon resources. The Swan Hills project also included replacement of 8 older PLCs with ControlLogix.

### 2013 – EnCana – FloBoss 107 Upgrades

- Consulting engineer with MAC Engineering, responsible for commissioning of several RTU upgrades to FloBoss 107.
- Remote programming support to multiple sites.
- HMI upgrades to support new RTU data.

### 2012 – Devon Canada – Manatokan Plant FactoryTalk HMI Upgrade

- Consulting engineer with MAC Engineering, responsible for conversion of existing FactoryTalk plant HMI to Version 6.1.
- Implemented Virtual Machine environment with VMWare Vsphere, multiple hardware servers and SAN.
- Upgrades to plant Ethernet network.

### 2012 - TAQA North – Whitecourt Gas Plant Fire & Gas Detector Upgrade

- Assistance with specification of new fire and gas detectors, commissioning of new detectors in the ControlLogix PLC system and interface to plant ClearSCADA HMI.

### 2011 - TAQA North – Whitecourt Gas Plant Automation Upgrade

- Assistance with commissioning of retrofit ControlLogix PLC system and interface to ClearSCADA HMI, as-built Shutdown Keys, ProSoft Modbus programming.
- Modifications to remote site SLC controllers for enhanced SCADA support.
- Ongoing site support.

### 2011 - TAQA North – East Crossfield Gas Plant Electric Sales Gas Compressor Upgrade

- Project engineer, responsible for design of new ControlLogix PLC system, development of local HMI and interface to plant DCS, elimination of stand-alone surge controller.
- Developed new PLC cabinet design, development of cable schedules and work package for retrofit currently ongoing.

- Worked with plant engineer and automation techs to develop new specifications for modernized instrumentation and controls.
- Responsible for design, testing, commissioning support and startup assistance.

#### 2010 - Cenovus Energy – Weyburn Control System Upgrade Phase 3

- Safety systems consulting engineer, responsible for oversight of Spartan / Emerson safety system development.
- Participated in HAZOP and SIL determination studies, developed specifications for new safety instrumentation.
- Responsible for owner's acceptance of delivered safety system after validation.

#### 2010 - ACM Facility Safety – Machu Picchu Risk Management Pilot

- Interfaced ACM's new real-time risk management software to a DeltaV control system at the Hythe gas plant near Grande Prairie, AB.
- Developed installation procedures for the new software, mapped OPC data from DeltaV to the Machu Picchu server, on-site commissioning and operator training.

#### 2009 - Nexen Yemen – Ruston Bifuel Fuel Manifolding

- Installed a control system and SIS to supply natural gas as a substitute fuel for a power plant with six 3.2 MW diesel generators.
- Designed control system cabinet to support 90-70 process PLC and GE MOST safety PLC, programmed GE 90-70 and MOST safety PLCs, worked with site personnel to develop HMI graphics in RSView.
- Led on-site commissioning and trained the Yemeni maintenance staff to support the new SIS PLC.

#### 2008 - SBM Atlantia – Thunderhawk FPU Commissioning

- Construction, installation and commissioning of the 45k BPD Murphy Oil-leased offshore oil production platform. Located at the Kiewit Offshore Services fabrication yard in Ingleside, TX and on location in the Gulf of Mexico Mississippi Canyon Block 736.
- Worked as lead engineer on rotation. Responsible for last minute design changes, integration of third party hardware, overseeing construction and commissioning of DeltaV with approximately 1000 safety system I/O and 4000 process I/O. Lead a team of 4 automation technicians, with a construction crew of 20+ electricians and 10+ instrument / electrical commissioning technicians.

#### 2008 - EnCana - Weyburn Control System Upgrade Phase 1

- Upgrading the Weyburn Oil Production and CO2 Injection Plant to a DeltaV control system, in association with DPH Focus Engineering and Spartan Controls.
- Responsible for verification of the safety system integrity study and design of a DeltaV SIS safety system node as part of the overall DeltaV installation.

#### 2007 - Washington Group International - Qatar Gas Common Sulfur Plant

- Safety System Lead - responsible for team that designed Triconex SIS hardware and programmed logic, including interface to DeltaV distributed control system (DCS); completed and shipped 40 Triconex system and marshaling cabinets; tested logic prior to final round of customer modifications, developed hardware & software ModPacks for retrofit at site.

#### 2006 - Imperial Oil Resource Ventures Limited; Shell Canada Limited; Conoco-Phillips Canada - Mackenzie Gas Pipeline FEED

- Generated budgetary designs for safety systems, participated in HAZOPs for Inuvik Area Facility Waste Heat Recovery Unit and Storm Hills Blowdown Facility, performed safety integrity level (SIL) assessments; developed safety requirements specifications; developed project documentation including power and grounding specification.

### 2005 - Viking Gas Transmission Company - Chippewa Falls Compressor Station Upgrade

- Programmed modular control system based on Allen-Bradley ControlLogix PLC; led programming efforts for PLC and human machine interface (HMI) using RSLogix 5000 PLC software, Panel-Builder, and RSView HMI software; supervised team of designers and programmers; performed project management tasks. Installed and commissioned the system with VGT technicians. The program provided vibration monitoring, fuel control and anti-surge control for a Solar Centaur centrifugal compressor package and a new station control PLC.

### 2003 - ExxonMobil - Kizomba B Offshore SWHP and FPSO Safety Systems

- This controls system mega-project involved providing controls hardware and programming for a tension leg drilling / production platform and a floating production, storage, and offloading vessel.
- Supervised programming of Triconex TMR SIL-rated safety shutdown PLCs for F&G, ESD, and Process SD; interfaced to DeltaV DCS using Matrikon OPC; performed factory testing with programmable industrial control simulator (PICS); commissioned hardware during construction phase in Korea; provided onsite support during installation and startup of surface wellhead platform (SWHP) offshore Angola.

### 2003 – Southern California Gas Company – Moreno Valley Compressor Station Upgrade

- Programmed modular control system based on Allen-Bradley ControlLogix PLC; led programming efforts for PLC and human machine interface (HMI) using RSLogix 5000 PLC software, Panel-Builder, and RSView HMI software; supervised team of designers and programmers; performed project management tasks. Installed and commissioned the system with SCGC technicians. The program provided vibration monitoring, fuel control and anti-surge control for four Solar Saturn centrifugal compressor packages and a station control PLC.

### 2000 - PrimeWest Energy – East Crossfield Gas Plant PLC and DCS Support

- Programmed interfaces between existing Rockwell PLCs and new DeltaV control system.
- Upgraded PLC logic for Solar Centaur turbine control.
- Programmed Vapour Recovery Unit PLC interface.
- Interfaced temporary inlet compressor interface to DCS.

### 1999 - BP Exploration (Alaska) - Milne Point Unit PLC and SCADA Support

- Maintained FIX SCADA system, comprised of 11 SCADA host computers and over 30 display and control computers running Windows NT; implemented remote viewing capability from North Slope to Anchorage, Alaska, head office; maintained production reporting system, using MS SQLServer and bridging three separate networks.
- Maintained and developed PLC logic for central oil production facility and satellite well pads (using AB PLC-2, 3, 5 and ControlLogix processors communicating with Intellution FIX SCADA host); provided support for PLC logic and FIX SCADA during addition of new wells and facility upgrades.

### 1997 - TransCanada PipeLines Ltd. - 1997 Control Upgrade and New Plant Addition

- PLC programmer responsible for the installation of upgraded compressor station control systems. Developed, tested and commissioned GE LM90 and Series 6 systems at several major compressor stations on the TransCanada mainline.

### 1996 – Pacific Gas Transmission Ltd. – Chemult Compressor Station

- Design engineer and PLC programmer for the installation of upgraded compressor station control system. Developed, tested and commissioned GE LM90 unit control PLC for Rolls Royce Avon turbine and Series 6 station PLC at the Chemult Oregon compressor station on the PGT mainline.

#### 1993 - TransCanada PipeLines Ltd. – SCADA Upgrade

- SCADA programmer responsible for the installation of upgraded compressor station SCADA systems. Developed, tested and commissioned FactoryLink systems at several major compressor stations on the TransCanada mainline.
- SCADA programmer responsible for programming the main SCADA host and Gas Control applications.

#### 1991 - InterProvincial Pipelines Ltd. – Line 3 Automation Upgrade

- HMI programmer responsible for the installation of upgraded pump station operator interface systems. Developed, tested and commissioned FactoryLink systems at several major pumping stations on the IPL Line 3 system.