



BATH GROUP, INC.

***POWER ENGINEERING
QUALIFICATIONS***

A quality conscious firm
dedicated to achieving
client expectations through
responsible engineering.

2021

Bath Engineering Corporation / since 1957



BATH GROUP, INC.

Bath Group Inc. (dba Bath Engineering Corporation) is a professional engineering firm that had its founding in 1957 in Corpus Christi, Texas. Today, Bath has 50 employees including twenty graduate engineers and over 1,000 years of combined design experience. The staff is very stable, with many employees having served the firm throughout their careers. Just as an investor considers their bank account to be an appreciating asset because it earns interest, Bath considers its employees to be assets that grow in value every year.

Bath was originally founded as an electrical consulting firm. Although it has evolved into a multi-disciplined engineering firm, electrical design remains one of the firm's strengths. Low, medium, and high voltage systems have been designed for industrial, commercial, institutional, and governmental clients. In addition to providing design services, Bath also offers start up, testing, and troubleshooting of complex electrical systems. Bath has Senior Mechanical Engineers and Electrical Engineers on staff, each licensed as a Professional Engineer, and each having decades of experience in the design, construction, commissioning and validation of Mechanical and Electrical systems. In addition, Bath has on staff Mechanical Designers, Electrical Designers, Construction Managers, Construction Administrators, Commissioning Engineers, and Commissioning Technicians.

As the technology of the industry has evolved, Bath's engineers have been at the forefront of the move toward digital control of process and power systems. When appropriate, Bath's designs incorporate computer and/or programmable controller systems. Scores of high voltage substations, distribution substations, cogeneration systems, power transmission facilities, plant distribution systems, and similar facilities have been engineered by Bath. Our clients have included both utility companies and industrial and commercial power consumers. In addition to designing new power systems for our clients, we have helped them achieve greater economy by using power more wisely. By studying usage patterns, we have aided them in controlling load so as to minimize peaking costs.

Bath has completed power projects in many states and several foreign countries. Our engineers are licensed in several states and can quickly become licensed in other states through the National Council of Examiners for Engineering and Surveying

Electrical power projects have included electrical power generation, power system relay protection and coordination, short circuit studies, power flow (load) studies, dynamic stability studies, protective relay application and coordination, high voltage circuit breaker specification and application, high voltage transformer specification and application, reliability studies and the design of control circuits for substation and power generating station equipment.

OUR INDUSTRIAL CLIENTS

Chevron Energy Solutions
Flint Hills Resources, LP
Valero Energy Corporation
Citgo Refining
Frontera Generation, LP
Marathon
Corpus Christi Polymers
Terra Nitrogen
Koch Ag & Energy
HollyFrontier
Celanese, Ticona Polymers
Corpus Christi Liquefaction
Port Arthur Chemical

POWER

Transmission
Distribution
Arc-Flash Studies
SKM Modeling
Protective Relaying
Power System Analysis
Substation Design
System Commissioning

STARTUP, TESTING, TROUBLESHOOTING

Low, Medium, High Voltage
Substations
Load Flow, Power Factor, Fault
Studies
Electrical Distribution Systems

INSTRUMENTATION

Process Control
SCADA
Field Instrumentation
Applications
PLC Applications
Security Systems

LIGHTING

System Studies
System Designs

AREA CLASSIFICATIONS

Assessments
Analysis



ELECTRICAL INFRASTRUCTURE PROJECT PORT ARTHUR CHEMICAL

Bath Engineering Corporation installed new modern electrical distribution equipment to reduce the risk of electrical power outages resulting in loss of production, environmental impacts, while improving overall electrical safety. The plants internal electrical system design had to meet the performance availability target of 99.23 within a 5 year process unit interval basis.

Bath developed assessments of the electrical systems short comings with an appropriate mitigation plan. Bath proactively worked to mitigate short and long-term risks of equipment nearing end of useful life cycle. Bath improved the maintainability of electrical distribution system equipment and eliminated any single point design failures throughout the systems.

The second objective was to build the new system with consideration of PAC's long term base operational goals. The project installed (4)13.8KV, (3) 5KV, and (6) 480V substation buildings with double ended switch gear, motor starter, and controls. It also included (2) 69KV/13.8KV, (6) 13.8KV/2.4KV, (12) 13.8KV/480V Transformers and re-fed (30)MV motors and (600) low voltage loads. The work was designed and constructed in a FAST TRACK method within 30 months.

Bath also designed and installed an SEL RTAC based SCADA monitoring systems with HMI and Historian. Bath performed all SKM modeling, relay programming, SCADA programing, supervision of construction, testing, and commissioning. The design and construction was completed without interruption to the operation of the plant. Total construction value was \$96MM.

EAST PLANT 138KV/15KV ELECTRICAL SUBSTATION FLINT HILLS RESOURCES

This was a \$12MM electrical power project. Bath provided all electrical design for a new 138kv/15kv Substation with 138kv switch and circuit breaker yard.

The design included a 15kv substation building with 15kv switchgear and protective relays for the yard and feeder breakers. The substation included two (2) new 37.5/50kVA transformers, neutral ground resistors, yard OCB's, PT's, air switches and required structures and foundations.

Bath also performed short circuit studies, power flow studies, and relay and fuse coordination studies for all the 138kv and 15kv main breakers. The protective line relaying was microprocessor-based current differential relays using SEL 411L relays and SEL 311L backup relaying. Additional relaying included Transformer Diff, Arc Flash, and Motor Diff. for a 5500 HP and 11,000 HP.

The project was built while the facility was operating and the loads were cut over in a phased approach with installation of new cable tray systems and 15KV feeder cables throughout the plant.

Bath provided all electrical design and assistance during construction and start up for the electrical system described above. Bath also assisted with the procurement of the major equipment.





WEST CRUDE SUBSTATION FLINT HILLS RESOURCES

Bath Engineering Corporation designed and supervised construction of a new 15KV/5KV/480V substation building with DCS I/O room in accordance with Flint Hills Resources (FHR) and PIP Standards. The substation replaced 15kV outdoor load interrupt switch line-ups consisting of 2 incoming lines and fourteen load switches.

The new 2,500 sqft precast wall substation building was designed by Bath Engineering to exceed hurricane winds and flooding. This project included the installation of the new indoor 15KV/5KV/480V switchgear along with all auxiliary supports. Auxiliary items included battery chargers, batteries, 480V /208/120V station power, UPS Power, fiber communications, DCS I/O and marshalling, lighting and controls. Designs were Main-Tie-Tie-Main to facilitate online testing and maintenance. Switchgear line-ups were laid out and configured for future addition of 5kV equipment planned to serve various critical loads. Schweitzer (SEL) electronic relays were incorporated to improve selectivity and security with Bus Diff, Arc Flash, Transformer Diff, Overcurrent relaying. Bath also designed and installed an SEL RTAC based SCADA monitoring systems with HMI and Historian.

INSTALLED EQUIPMENT INCLUDES:

8 ea 5kV (1,200A) MCC s	2 ea 15KV 10,000 ft. main sub feeders.
2 ea 15kV (1,200A) Switchgear Line ups	2 ea 480V (2,000A) Switchgear
1 ea 5kV (1,200A) Switchgear Line ups	1 ea UPS Backup Systems
1 ea 30kVA Battery Charger	1 ea Lighting Controller System
8 ea 480V (2,000A) MCC & Feeders	2 ea Hazardous area classified HVAC systems
13 ea 15KV feeders to transformers	

New electrical infrastructures of cable trays, raceways, duct banks and bridges were constructed along with existing infrastructure to support new 15KV cable runs installed to re-feed 13 transformer loads located throughout the West Crude Units. Arc Flash study and assessment of the distribution system was performed, along with modeling of existing protection schemes and SKM modeling of backup/ normal load flows. A cutover plan was developed by FHR and Bath Engineering to ensure there were no unplanned shutdowns or safety incidents. Bath Engineering provided start-up assistance including relay settings, configurations, testing and training.

The project was executed through a phase approach with total construction value of \$28MM.



WILLIAM B. STARK, PE, LEED AP, MBA

SENIOR ELECTRICAL ENGINEER

Mr. Stark is President of Bath Group, Inc. and the Principal Engineer in charge of the Corpus Christi office. He is responsible for all aspects of the consulting business including proposal development, fee negotiations, contracting, client relationships, project execution, QA/QC, standards and delivery of projects to clients. Mr. Stark has executed projects ranging from \$5,000 to \$90MM over his 30-year career. He has many years of project management experience with electrical power and distribution, electrical infrastructures, and instrumentation and control system design projects, and commissioning of electrical systems.

EDUCATION

BS Electrical Engineering
University of Missouri, 1990

BS Computer Engineering
University of Missouri, 1990

Master of Business Admin
Texas A&M University, 2003

EXPERIENCE

15 years - Bath Group, Inc.
31 years total

LICENSES/CERTIFICATIONS

Registered Professional Engineer:
Texas - No. 100532
Arizona - No. 73457
Utah - No. 12245102-2202
Oklahoma - No. 25115
California - No. 23173
Kansas - No. 27795
Nevada - No. 028262
Nebraska - No. 22785
NCEES - No. 37129

PROFESSIONAL QUALIFICATIONS:

LEED Accredited Professional (USGBC)

Design Quality Assurance Manager (DQAM)

PROFESSIONAL ASSOCIATIONS

Instrument Society of America (ISA)

National & Texas Society of Professional Engineers (NSPE/TSPE)

OFFICE LOCATION

Corpus Christi, Texas

REPRESENTATIVE PROJECTS

Permian to Ingleside Ship Loading Facility | Flint Hills Resources

Mr. Stark was the Senior Electrical and Design Engineer responsible for providing power and SCADA design services for new terminal connections to pipelines for a new Ship Loading Terminal Facility. Include 60X16X12' prefabricated power and control building with 5KV, 480V, 208/120V AC systems, UPS, SCADA, four (4) 12.47KV primary transformers, Motor Control Center, Switch Gear, and power cabling to pumps, MVCUs, four (4) new Tanks, Tank Mixers, and MOVs. Designed utility power connections, risers, and three (3) additional 480V power and control buildings (12'x12'x12') at remote tankage locations.

Plant Wide Electrical Infrastructure Replacement | Flint Hills Resources

Commissioning and Lead Electrical Engineer for the detail engineering design for a \$93.0M plant power upgrade project. Project included required 11 New Electrical building with Purged/Pressurized HVAC and Aux. Equip. 34.5KV Substation Switching Yard with CB, Air Switches, PTs, CTs, TR, UG feeders. 2- 24/30 MVA 34.5KV to 13.8KV Transformers – Y-Y 8 - 7.50 MVA 13.8/2.3KV Transformers – D-Y, low resistance grounded 8 - 2.0 MVA 13.8/0.48KV Transformers – D-Y, high resistance grounded 3000 ft 36" Underground Horiz. Bore, casing, and 13.8KV distribution. 2500 ft x 10 ft wide 13.8Kv, fiber, and controls duct banks. 14 Sets of 480V, 5KV and 15KV, Fiber Optic Arc Mitigation Switchgear Refeed of 460 Motors and Electrical Loads. Auto Transfer / Auto Restart, Bus Switching capabilities. 11 Operator Station SCADA Station Mr. Stark lead a team of 6 staff members and a testing company to provide testing, commissioning, and startup of all electrical equipment and the SCADA system over the 3 year duration of the project.

Ingleside Modifications | Eagle Ford Crude | Ingleside, TX

Provided MEP engineering services to install piping, pumps and miscellaneous equipment to load barges with crude at a rate of 20,000 bbls/hr. Installed a marine vapor combustor to vent barges during loading. Installed piping to connect existing 10" and 12" Koch pipelines to storage tanks to unload ships, load barges and transfer crude to the plant. The project consisted of instrumentation, electrical and mechanical design. Bath engineered the design and installation of new service out to new PCR building. This included providing a new 12.4kv/2.4kv, 2500kva transformer and an underground ductbank from AEP service to the transformer and from the transformer to the PCR building. Bath worked with the building manufacturer and engineered/managed the fabrication and installation of the modular PCR building. The PCR building consisted of 2.4kv switchgear, MCC's, and 2.4kv/480v, 2000kva transformer. Year completed, total project size, total project costs. In addition, Bath engineered and designed installation of MOV's for new header system and electrical power for relocated metering and proving systems. The new dock loading tower and associated systems were also included in the design.

Power Distribution Expansion | Valero Refinery | Three Rivers, TX

Project Manager for power expansion of PCR buildings connected to a new substation located at West FGR Unit with two (2) 24/40 MVA, 138 kV to 12.47 kV Transformers. Additionally, a second new substation at East FGR loads were supplied with four (4) 12.47kV feeders and the location of this substation will allow for the additional loads existing at the SRU unit. All infrastructure was in place prior to cutovers. Coordination with refinery units resulted in successful cutovers with no shutdown and no unplanned events.



NEAL M. MOSES

SENIOR ELECTRICAL ENGINEER

Mr. Moses is a project manager and design engineer that has been responsible for a variety of industrial, military, and commercial projects involving all facets of engineering from project definition, cost estimating, construction planning, field investigation, detailed design, bid document preparation, equipment specifications, material procurement, construction supervision and equipment testing. He has extensive experience in power and control systems, including high voltage applications. His experience has given him a firm background for project management and execution.

EDUCATION

Bachelor of Science Electrical Engineering, Texas A&M University, 1978

EXPERIENCE

40 years - Bath Group, Inc.
42 years total

OFFICE LOCATION

Corpus Christi, Texas

REPRESENTATIVE PROJECTS

Upgrade 15kV Circuit 6 Feeder | Sheppard Air Force Base | Wichita Falls, TX

Project Manager and design engineer for 15Kv class electrical distribution feeder upgrade. Design included conversion of approx. 3 miles of electrical overhead primary to underground and repair of 3.6 miles of underground primary, including distribution transformers and secondary services. New concrete duct banks and manholes included, utilizing existing duct systems and manholes where possible. Design included new LED lighting along Ave. J & K, and perimeter security lighting in munitions storage area. Provided site visits during construction and construction support.

Switchgear and Electrical Feed Repairs | NAS Whiting Field | Milton, Florida

Project Manager and design engineer for this 15Kv reliability and upgrade power distribution project. Power distribution included 3000 feet of 8 way 6" concrete encased duct bank with parallel runs of 15Kv medium voltage 750Kcmil circuits. Existing loads refeed with underground to overhead feeders with approximately one mile of overhead pole line cabling designed and reconfigured.

34.5kV Reliability Improvements | Naval Station Great Lakes | Great Lakes, IL

Designed protective relay schemes for a figure eight 34.5kV sub-transmission loop comprised of nine loop segments with 34.5kV breakers on the terminals of each line segment. Protective relay schemes included Schweitzer SEL-311L current-differential relays with fiber optic communications lines, high-impedance digital bus-differential relay schemes, breaker failure schemes, and phase step-distance back-up schemes. Designed the closing and re-closing control circuits, and the sequence of operation for the 34.5kV circuit breakers protecting the loop segments. Performed short circuit studies, power flow studies, and calculated relay settings for all the relays in the eight substations in the figure eight sub-transmission loop.

Flint Hills Resources – East Plant Main Substation Replacement Project

Provided concept and detail engineering design for the plant power expansion project.

Project included:

- New 2800 sqft Electrical building with Purged/Pressurized HVAC and Aux. Equip.

- 138KV Substation Switching Yard with GCB, Air Switches, PTs, CTs, TR.

- 2-37.5/50/ MVA 138KV to 15KV Transformers

- 2- High Resistance Grounding Systems

- 1-2000 A 15KV, Fiber Optic Arc Mitigation Switchgear

- Retrofit and upgrade of existing 15KVA Switch Gear (19 VCB)

- Re-feed of existing Main Air Blower (11,000 HP) and Wet Gas Compressor (5500HP) Motors.

- Upgrade of controls for Main Air Blower (11,000 HP) and Wet Gas Compressor (5500HP)

- Motors with Auto Transfer / Auto Restart, Bus Switching capabilities.

Electrical Infrastructure Expansion | Valero Refinery | Three Rivers, TX

Provided concept and detail engineering design for the plant power expansion project. Project included: New 1320 sqft Electrical building, New 2800 sqft Electrical building with Purged/Pressurized HVAC and Aux. Equip., 4-12.5KV/4.160KV 5MVA transformers, 4 5KV/480V 2MVA transformers, 2-1200A 4160V Arc resistant Switchgear, 2-3200A 480V Switchgear, 1-2000 A 15KV, Arc resistant Switchgear, 4- High Resistance Grounding Systems, 4-Low Resistance Grounding Systems, 4 Lineups of 480V MCC's with over 100 starters / feeder breakers, 2-24/32.5/40(44/8) MVA 138KV to 15KV Transformers, Relocation of plant loads from existing substation to new substations.



DOUG CASSELL, PE

PROJECT MANAGER

Mr. Cassell is a project manager and design engineer. He has experience as both owner and consultant. His experience ranges from project development, project design, reliability, and maintenance in a wide variety of industrial projects with a focus on brownfield type projects – including scope definition, cost estimating, field investigation, detailed design, bid document preparation, equipment specifications, material procurement, construction planning, construction supervision and equipment testing. He has extensive experience in power and control systems, including medium voltage applications.

EDUCATION

Bachelor of Science Electrical Engineering, McNeese State University 1992

EXPERIENCE

1.5 years - Bath Group, Inc.
26 years total

PROFESSIONAL CERTIFICATIONS & ASSOCIATIONS

Arkansas – No. 15787
Colorado – No. 0056599
Kansas – No. 23256
Louisiana – No. 28470
Missouri – No. 2018000443
Oklahoma - No. 26678
Texas - No. 115155
Wyoming – No. 17640

REPRESENTATIVE PROJECTS

FCC Electrical Reliability | Valero Refinery | Ardmore, OK

Project manager and lead engineer for replacement existing electrical equipment for the FCC unit. Equipment included final loads of both 4.16KV and 480V. 12.47KV feeders were reconfigured to create a motor bus for large FCC motors.

CCR Backup Power Supply | Valero Refinery | Ardmore, OK

Project manager and lead engineer for replacement of existing Uninterruptible Power Systems for the plant Central Control Room. Backup generator was also replaced with a larger unit and HVAC and lighting circuits were reconfigured for placement on backup power.

600# Steam Boiler Installation | Valero Refinery | Ardmore, OK

Project Manager supervising I&E engineering and design of installation package for new boiler along with CEMS building, Triconex system for BMS, and new DCS node for process controls.

Alkylation APC Project | Citgo Refinery | Lake Charles, LA

Installed all new unit instrumentation needed for conversion of unit controls to APC controls. Compressor control system (CCC) was installed on the Refrigeration Compressor as part of the project.

Substation #10 | Conoco | Lake Charles, LA

Installed new substation #10 along with new 13.8KV feeder cables for the Dock upgrade project at Conoco, Lake Charles. New feeder/control cables were installed for all 2400V and 480V device cut-over

Heater SIS Installation | Holly-Frontier | Tulsa, OK

Project Manager supervising engineering and design of complete design packages for 3 in plant heaters located in their Crude and Unifiner units in their East plant. This was the first implementation of their corporate SIS standard.

Power System Study-Beaumont Mill | North Star Steel (Gerdau) | Beaumont, TX

Power system and device coordination study in ETAP was performed for entire plant. Walkdown of plant electrical equipment and document retrieval was done while on site. Recommendations were made along with replacement of the main switchgear Siemens solid state relays with new microprocessor type relays.

H202A/B BMS Installation | Atofina Port Arthur Refinery | Port Arthur, TX

Installed new BMS system for heaters H202A and H202B at Atofina, Port Arthur. New ControlLogix PLC was installed for each as well as new instrumentation for each BMS. Heaters were FD/ID fan controlled.



DAVID CASH, PE

SENIOR ELECTRICAL ENGINEER

Mr. Cash is a Senior Electrical Engineer with expertise in areas such as standby emergency generators, complex power systems, lighting design, construction administration, local area networks, cctv, fire alarm, security systems and communication systems. Mr. Cash has 33 years of experience in the design of electrical systems in educational, healthcare, commercial, governmental, and military facilities including work with primary systems up to 15kv. Mr. Cash has extensive experience in power quality analysis and in dealing with high harmonic content electrical loads such as computers, VFDs, and laser printers. Mr. Cash has proven leadership skills and is experienced in developing a MEP engineering practice.

EDUCATION

Bachelor of Science Electrical
Engineering, Texas A&M
University, 1987

EXPERIENCE

8 years - Bath Group, Inc.
34 years total

PROFESSIONAL CERTIFICATIONS & ASSOCIATIONS

Texas - No. 84597

I.E.E.E

OTHER RELEVANT TRAINING

SKM : Power System Modeling
PTW Standard Training course
PTW Advanced Training Course
SEL : Power System Relay
Protection
401 Protecting power systems
SEL-751/A Feeder Protection
Relays
SEL 710 Motor Protection
Relays

OFFICE LOCATION

Corpus Christi, Texas

REPRESENTATIVE PROJECTS

High Service Bldg. No. 3 | O.N. Stevens WTP | City of Corpus Christi

Sr. Engineer and Design Engineer for this \$21 million electrical, instrumentation and controls upgrade. Design included new High Service building housing a substation, motor control center, power distribution and control room; routing of medium voltage power distribution below ground, area lighting, 2,000KVA Generator backup installation, and instrumentation and Controls system. Provided Arc flash study and assessment, risk assessment of existing distribution system, analysis and modeling of existing protection schemes with modifications to improve selectivity and security as well as analysis and SKM modeling of the backup/ normal power load flow.

Nueces River Pump Station | City of Corpus Christi | Corpus Christi, TX

Project included the upgrade of 5kv main-tie-main switchgear, addition of two (2) 2 mw 5kv generators, arc flash study and assessment, analysis and SKM modeling of existing protection schemes with modifications to improve selectivity and security as well as analysis and modeling of the backup/ normal power load flow.

Root Cause Analysis of Automatic Power Transfer System Mis-Operation at ONSWTP | City of Corpus Christi

Mr. Cash was in charge of performing an analysis of the root cause of the automatic power transfer system mis-operation that occurred during the annual power system generator test under full load. This included performing a review of the available event records as recorded by the GE multiline relays controlling main circuit breakers M1 and M2 as well as the bus tie circuit breaker M12. Staff members present during the test were also consulted for firsthand observations of the test operation. Results and recommendations were made.

Permian to Ingleside | Flint Hills Resources | Ingleside, TX

Project to provide electrical engineering support to increase Ingleside Terminal outbound capacity by increasing storage capacity (tank) and Vapor Combustion Unit (VCU) capacity to match the expected loading rates. Determined transformer sizing, specified fuse selection, electrical data/equipment information collection, updated SKM model with existing protection schemes and normal power load flow; provided Arc Flash study, assessment, report and labels.

Eagleford Crude to Ingleside | Flint Hills Resources | Ingleside, TX

Project to provide electrical engineering support to upgrade Ingleside Terminal and increase capacity to handle Eagleford Crude and loading out. Project added a new service from AEP to PCR building consisting of 2.4kv switchgear, MCC's, and 2.4kv/480v, 2000kva transformer. Arc flash study and assessment, risk assessment of distribution system, analysis and modeling of protection schemes with modifications to improve selectivity and security, and analysis and SKM modeling of the backup/ normal power load flow.

15kV Electrical Reliability Projects | Texas State University | San Marcos, TX

Provided field investigation and electrical design including drawings, equipment specifications, and assisted with equipment procurement and construction for several projects to improve electrical reliability. These projects included the installation of manholes and concrete duct banks; #350kCM, 15kV, 133% insulated EPR cable; 200amp and 600amp Elastimold terminators; S&C Vista, SF6, 15kV, pad mounted, 3-way 6-way load interrupter switches. Also provided coordination setting for all load interrupter switches.



DAVID POOL

SENIOR SPECIALIST AUTOMATION

Mr. Pool is a Senior Specialist Automation located in the Corpus Christi Office with over 38 years of utility experience with Sunflower Electric Power Corp in Garden City, Kansas. He has experience in all areas of the utility industry both generation and transmission. His last 18 years was as a Relay Technician where he was involved in system design and relay replacement of old mechanical relays to newer SEL microprocessor relays. The last 12 years was spent automating all substations to bring back SCADA data to the local EMS system. Dave joined Schweitzer Engineering Laboratories, Inc. in 2012 as a Senior Specialist Automation.

EDUCATION

Lamar High School, Lamar ,CO

EXPERIENCE

6 years - Bath Group, Inc.
47 years total

PROFESSIONAL TRAINING

1 semester Electronic Circuits,
Garden City Community
College

2 semesters AutoCAD, Garden
City Community College

AVO Advanced Relay
Maintenance – May 1995

Relay School – Hands On,
Washington State University
March 2001

I-44 Conference, August 2003

I-44 Conference, August 2004

21 Hours Synchrophasor
Measurement and Application
September 2005
SEL University Pullman, WA

Subnet Solutions DNP3
Training tour, April 2007

I-44 Conference
20 hrs. Training, Generator
Protection, Real Time
Automation Controller
Intro, Event Analysis
August 2010

I-44 Conference
20 hours training, Real Time
Automation Controller,
Transmission Protection
August 2011

REPRESENTATIVE PROJECTS

System Integration & Technical Support | Texas State University | San Marcos, TX

Provided engineering services that included improvement of functionality to existing local RTAC HMIs for two 15kV substations. Troubleshooting support for communication issues with Siemens Apogee Modbus interface. Added event collection settings and engineering access to existing SEL-3530 configuration for remote retrieval of event reports. Created and facilitated Client specific new user interface training for SEL equipment and RTAC HMI. Provide ongoing technical support as required by the Client.

Electrical Infrastructure Expansion Integration Services | Flint Hills | Port Arthur, TX

Provided technician and commissioning services that included programming testing and commissioning of SEL relays (751, 787, 710, 487, 311, 411) for multiple projects for 480V, 5kV, 15kV switchgear. Advanced logic for Main-Tie-Tie-Main Auto Transfer (ATS) and Auto Re-transfer functions were developed and extensively tested. Complete SCADA systems control which interfaced with SEL components include RTAC, 2730M, 2440, 2100 devices at 12 different substations and a centralized server HMI (CopaData) with historian was implemented.

Electrical System Improvement Project | Flint Hills | Port Arthur, TX

Provided engineering services that included System architecture development and specification of automation equipment including security gateways, manage Ethernet switches, automation controllers, and computing platforms for a total of nine local unmanned HMIs fully integrated to a Master HMI. Composed SEL-3530 automation controller configuration settings enabling IED data access, event collection, engineering access, and controls with interface to the associated local HMIs with a total of approximately 357 IEDs including Micrologic trip units, SEL protection relays, and network components integrated throughout the entire system. Created CopaData Zenon HMI software configuration settings for each local unmanned station to allow close overview of alarms, events, reporting, historical data, and device communications; Zenon HMI software configuration setting for the Master HMI to provide a worldview of the entire system with navigation to each substation, overall annunciator alarms, events, reporting, historical data, and device communications; web server configuration that provides read-only Client access to the system. Performed SCADA factory acceptance testing for each substation and will support complete on-site startup with end to end interface testing for the entire system.

System Integration & SCADA System Design | Flint Hills | Corpus Christi, TX

Provide engineering services to develop, design, configure and setup a local SCADA System at the Flint Hills Terminal. The system integration included communication to multiple devices from multiple manufacturers. The SCADA System was designed using Zenon software, to do SCADA control, monitoring and alarming. The alarm system was developed in the RTAC, it is a totally digital solution. Annunciator inputs come directly from device inputs and can be customized from multiple alarms using logic in the RTAC. These alarms then drive the HMI screen in Zenon. Alarms may then be acknowledged or reset via the touchscreen in Zenon. The RTAC was setup to do data collection from all devices and provide this data to the Zenon HMI system. A local Historian is setup in Zenon and data is archived and backed up to a local NAS drive daily.



QUESTIONS?
CONTACT US NOW

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