ELECTRICAL ENGINEERING CONSULTANTS

TO

INDUSTRY

Colwell
& ASSOCIATES, INC.
CONSULTING ENGINEERS
A Message from the President

On behalf of the principals and employees of Colwell & Associates, Inc., I take pleasure in introducing you to our firm. We are proud of our accomplishments and our recognition as a leading consulting engineering firm in the South Texas area.

Colwell & Associates, Inc. is founded on the philosophy of providing engineering excellence, quality services in a professional and timely manner, and personal and responsive attitude to our clients. This philosophy, along with our staff of sincere, motivated and dedicated employees, will keep us focused on our main goals - honesty, cost efficiency and client satisfaction.

Client satisfaction can only be measured by acquiring repeat business from our clients, and this is one of the most gratifying rewards that our company receives. The information presented in this document hopefully will attract you as a client but our commitment to client satisfaction will keep you as a loyal customer.

Sincerely,

Michael E. Colwell, P.E.

Company Background

Colwell & Associates, Inc. was founded in 1989 by Michael E. Colwell, P.E., a consulting engineer who has practiced in the Corpus Christi Area for over thirty years. The firm originally specialized in electrical power engineering but has since added expertise in mechanical, instrumentation and control systems. Other discipline services including civil, structural and architectural are obtained on a sub-consultant basis from leading area firms to provide our clients a complete project approach. This multi-disciplined skills base facilitates the execution of all aspects of a project, from the original planning through design, construction, and commissioning.

Facilities

Corporate offices are located at 4444 Corona Drive in the Park Green Atrium Complex in Corpus Christi, Texas. These facilities are designed to be conducive to quality engineering work. Equipment embraces the latest technologies such as CAD/CAE Systems. A variety of state of the art engineering software enhances the engineering and design process. In particular, SKM Power*Tools for Windows™ is used for electrical power systems modeling and analysis. Windows based software is used for project management and control. Drawing production is performed exclusively utilizing CAD systems. The firm has multiple work stations using the latest versions of AutoCAD and Microstation. An in-house local area network allows all personnel maximum use of software applications and facilitates communication with clients and access to resources.

Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Web</th>
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<td><a href="http://www.colwellengineering.com">www.colwellengineering.com</a></td>
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<td></td>
<td>Fax 361.851.8179</td>
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# Electrical Engineering Services

**Colwell & Associates, Inc.** provides engineering, design and consulting services for a wide variety of facilities including industrial, utility, commercial, institutional, municipal and governmental. Project types range from large, high voltage substations and generation facilities to low voltage service and interior electrical systems for commercial and institutional buildings.

Colwell engineers and designers work hand-in-hand with the client’s or prime consultant’s team to determine the appropriate electrical system based upon many design considerations including cost, reliability, maintainability, operating flexibility and efficiency.

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DESIGN ENGINEERING

Substations
- Primary Substations - 69 to 345 kV
- Air & Gas insulated Designs
- Distribution Substation - to 34.5 kV
- Motor Control Centers
- Turn-Key Installations

Protection & Control
- Protective Device Application and Selection
- Relaying Panel Design and Interconnection
- Automated Substation Control
- SCADA Systems
- Automatic Transfer Schemes
- Metering Systems
- Sequence of Events Recording
DESIGN ENGINEERING

Transmission & Distribution
- Transmission Line Design
- Plan and Profile Development
- Aerial Distribution
- Underground Distribution
- Conduit & Cable Tray Systems

Motors
- Motor Selection & Application
- Motor Installation Design
- Motor Efficiency Measurements
- Adjustable Speed Drive Systems

Power Quality
- Power Conditioning
- Harmonic Analysis and Filtering
- Lightning Protection

Power Generation
- Distributed Generation
- Cogeneration
- Prime and Standby
- Peak Shaving
- Uninterruptible Power Systems
PROJECT EXPERIENCE - ELECTRICAL SYSTEM STUDIES

ELECTRICAL DISTRIBUTION SYSTEM COMPUTER MODEL/DAPPER
Equistar Chemicals, L.P., Corpus Christi, Texas

PROTECTIVE RELAYING COORDINATION & ELECTRICAL RELIABILITY STUDY
Coastal Refining & Marketing, Inc., Corpus Christi, Texas

FCC UNIT 7000 HP MAIN AIR BLOWER — MOTOR STARTING ANALYSIS
Coastal States Refining, Corpus Christi, Texas

PLANT SHORT CIRCUIT AND RELAY COORDINATION STUDY
Occidental Chemicals Corporation, Ingleside, Texas

ELECTRICAL SYSTEM PROTECTION AND LOAD STUDY
Nalco Chemical Company, Freeport, Texas

BOILER HOUSE BH-1 ELECTRICAL RELIABILITY STUDY
Celanese Chemicals, Bishop, Texas

SHORT CIRCUIT & RELAY COORDINATION STUDY
BASF Corporation, Freeport, Texas

ELECTRICAL SYSTEM MASTER PLANNING STUDY
Southwestern Refining Company, Corpus Christi, Texas

POWER SYSTEM STUDY UPDATE
Valero Refining Company, Three Rivers, Texas

138 KV SUBSTATION POWER FACTOR CORRECTION STUDY
Champlin Petroleum Company, Corpus Christi, Texas

ELECTRICAL SYSTEM RELIABILITY ANALYSIS - COMPLEX 7
Valero Refining Company, Corpus Christi, Texas

GAS ENGINE VS. ELECTRIC MOTOR PUMP DRIVER ECONOMIC FEASIBILITY STUDY
O.N. Stevens Water Treatment Plant, City of Corpus Christi, Texas

CIRCUIT BREAKER SHORT CIRCUIT TEST FACILITY ANALYSIS
Eaton Controls, McAllen, Texas

SHORT CIRCUIT & RELAY COORDINATION STUDY
Qualitech Steel Corporation, Corpus Christi, Texas

PROTECTIVE DEVICE COORDINATION STUDY—VCM SHIP DOCK-SUBSTATION ECR-4
Oxy-Chem, Ingleside, Texas
PROJECT EXPERIENCE — PRIMARY SUBSTATIONS

138 KV CANTWELL SUBSTATION (120 MVA)
Valero Refining -Texas, LP, Corpus Christi, Texas

69 KV WEST PLANT SUBSTATION ADDITIONS
Coastal Refining & Marketing, Inc., Corpus Christi, Texas

138 KV, 25 MVA TRANSFORMER TR-3 INSTALLATION
BASF Corporation, Freeport, Texas

138 KV, 50 MVA PPG AREA SUBSTATION
Champlin Refining & Chemicals, Inc., Corpus Christi, Texas

138 KV, 50 MVA NUECES BAY SUBSTATION
Champlin Refining & Chemicals, Inc., Corpus Christi, Texas

138 KV SUBSTATION TRANSFORMER TR-4 INSTALLATION
BASF Corporation, Freeport, Texas

69 KV, 15 MVA TRANSFORMER T-4E ADDITION
Coastal Refining & Marketing, Inc., Corpus Christi, Texas

138 KV, 30 MVA SUBSTATION
Hoffman La Roche, Inc., Freeport, Texas

69 KV, 10 MVA PRIMARY SUBSTATIONS (3)
Texas Eastern Products Pipeline Co., Princeton, Indiana

66 KV, 7.5 MVA SUBSTATION AND TRANSMISSION LINE
Arcadian Trinidad Ammonia, Ltd., Trinidad, West Indies

138KV SUBSTATION PP-SS2 - REPLACE 138KV CIRCUIT SWITCHERS WITH GAS CIRCUIT BREAKERS
Occidental Chemical Corporation, Ingleside, Texas

138KV COGENERATION UNIT BC-1500 SUBSTATION
BASF Corporation, Freeport, Texas

COMPLEX 8 69KV SUBSTATION - UTILITY METERING INSTALLATION
Valero Refining Company, Corpus Christi, Texas

138KV SUBSTATION - TR-5 ADDITION
Ultramar Diamond Shamrock Corp., Three Rivers, Texas
PROJECT EXPERIENCE — DISTRIBUTION SUBSTATIONS

6000 KVAR SUBSTATION CAPACITOR BANKS INSTALLATION
Phillips Chemicals, Inc., Pasadena, Texas

13.2 KV REGULATED BUS INSTALLATION
Nalco Chemical Company, Freeport, Texas

12.47 KV, 12000 KVAR CAPACITOR BANK INSTALLATION
Southwestern Refining Company, Corpus Christi, Texas

12.47 KV - 4.16 KV UTILITIES SUBSTATION
Citgo Refining & Marketing, Inc., Corpus Christi, Texas

12.47 KV SWITCHING STATION SS-2
Southwestern Refining Company, Corpus Christi, Texas

12.47 KV PONTIAC SUBSTATION
Champlin Refining Company, Corpus Christi, Texas

H. F. ALKYLATION UNIT SUBSTATION
Southwestern Refining Company, Corpus Christi, Texas

13.8 KV SUBSTATION BC-2
Badische Corporation, Freeport, Texas

GASOLINE LOGISTICS TRANSFER FACILITIES SUBSTATION
Champlin Refining Company, Corpus Christi, Texas

12.47 KV - 4.16 KV SUBSTATION 622
Citgo Refining & Chemicals, Inc., Corpus Christi, Texas

WASTEWATER TREATMENT UNIT SUBSTATION
Coastal Refining & Marketing, Inc., Corpus Christi, Texas

HIGH SERVICE PUMP BUILDING NO. 1 & 2 PCR BUILDINGS
O.N. Stevens Water Treatment Plant , City of Corpus Christi, Texas

2.4 KV SEEIGSON PIPELINE SUBSTATION
Coastal States Crude Gathering Co., Premont, Texas

13.8 KV SUBSTATION BC-4
BASF Corporation, Freeport, Texas
PROJECT EXPERIENCE — LARGE MOTOR APPLICATIONS

6900 HP, 13.2 KV MAIN AIR BLOWER INSTALLATION  
Coastal Refining & Marketing, Inc.  
Corpus Christi, Texas

11000 HP, 12.47 KV MAIN AIR BLOWER INSTALLATION  
Southwestern Refining Company  
Corpus Christi, Texas

3500 HP, 13.2 KV WET GAS COMPRESSOR INSTALLATION  
Coastal Refining & Marketing, Inc.  
Corpus Christi, Texas

4 - 500 HP, 4.16 KV VARIABLE SPEED DRIVE LIFT PUMPS  
Oso Lift Station No. 3  
City of Corpus Christi, Texas

25,000 HP, 13.8 KV COMPRESSOR FIELD TESTING AND START-UP  
Coastal Javelina, Inc.  
Corpus Christi, Texas

4 - 8000 HP, 18.8 KV AND 4.16 KV SYNCHRONOUS MOTOR COMPRESSORS, FIELD DRY-OUT, TESTING AND START-UP  
Fish Engineering & Construction, Inc.  
Houston, Texas

FEASIBILITY STUDY FOR STEAM TURBINE TO ELECTRIC MOTOR CONVERSION  
Southwestern Refining Company  
Corpus Christi, Texas

5500 HP, 12.47 H.O.C. CAT COOLER BLOWER/MOTOR STARTING ANALYSIS  
Valero Refining Company  
Corpus Christi, Texas

1500 HP, 4.16 KV COKER OFF GAS COMPRESSOR INSTALLATION  
Coastal Refining & Marketing, Inc.  
Corpus Christi, Texas

8000 HP, 13.8 KV AMBIENT AIR COMPRESSOR  
BASF Corporation  
Freeport, Texas
PROJECT EXPERIENCE — TRANSMISSION & DISTRIBUTION

138 KV CO-GENERATION UNIT TRANSMISSION LINE
BASF Corporation, Freeport, Texas

69 KV CO-GENERATION PLANT TRANSMISSION LINE
Coastal Refining & Marketing, Inc., Corpus Christi, Texas

12.47 KV LOOP DISTRIBUTION SYSTEM
Coastal Bend Youth City, Driscoll, Texas

12.47 KV LOOP DISTRIBUTION SYSTEM - DIOCESAN PASTORAL CENTER
Diocese of Corpus Christi, Corpus Christi, Texas

REPLACE 12.47 KV FEEDERS TO FCC NO. 1 MAIN AIR BLOWER
Champlin Refining Company, Corpus Christi, Texas

12.47 KV ELECTRICAL DISTRIBUTION SYSTEM ALTERATIONS
Laughlin Air Force Base, Del Rio, Texas

13.8 KV ELECTRICAL DISTRIBUTION SYSTEM MODIFICATIONS
Dow Badische Company, Freeport, Texas

12.47 KV ELECTRICAL SYSTEM MODERNIZATION
Schenectady Chemicals, Inc., Freeport, Texas

12.47 KV, 15 MVA FEEDER F-6 TO QUINTANA PLANT
Coastal States Refinery, Corpus Christi, Texas

OVERHEAD LINE TO CABLE TRAY CONVERSION - 700 BLOCK
BASF Corporation, Freeport, Texas

12.47 KV PRIMARY ELECTRICAL SYSTEM UPGRADE - PHASE I
Texas A & M University - Kingsville, Texas
PROJECT EXPERIENCE — GENERATION FACILITIES

100 MEGAWATT COGENERATION FACILITY
BASF Corporation
Freeport, Texas

56 MEGAWATT COGENERATION PLANT
The Coastal Corporation
Corpus Christi, Texas

10 MEGAWATT COGENERATION PLANT CONVERSION
Saber Refining Company
Corpus Christi, Texas

60 MEGAWATT IN-PLANT COGENERATION STUDY
NUCOR Steel
Plymouth, Utah

4500 KW GENERATOR PLANT
Amoco Production Company
Willamar, Texas

HURRICANE EMERGENCY POWER GENERATION PLANT
BASF Corporation
Freeport, Texas

COGENERATION SYSTEM ELECTRICAL TIE-IN PRELIMINARY DESIGN AND COST ESTIMATE
Corpus Christi Petrochemical Company
Corpus Christi, Texas

60 MEGAWATT TURBINE GENERATOR SWITCHGEAR ELECTRICAL TESTING AND CHECKOUT
Saber Refining Company
Corpus Christi, Texas

6000 KW STANDBY GENERATOR SYSTEM
O. N. Stevens Water Treatment Plant
City of Corpus Christi, Texas

AUTOMATIC GOVERNOR CONTROL SYSTEM
Gregory Power Partners, LP
Gregory, Texas

LOAD SHED CONTROL SYSTEM
Oxy-Chem Cogeneration Project
Ingleside, Texas
REPRESENTATIVE CLIENTS

Industrial
Alcoa Alumina & Chemicals, Inc.
American Rice, Inc.
BASF Corporation
Celanese Ltd.
Champlin Refining & Chemicals, Inc.
Citgo Refining & Marketing, Inc.
Coastal Javelina, Inc.
Coastal Refining & Marketing, Inc.
Eaton Corporation
El Paso Field Services
Equistar Chemicals, LP
Fina Oil and Chemical Company
Gregory Power Partners, LP
Kiewit Offshore Services, Ltd
Koch Refining Company
Occidental Chemical Corporation
PCS Nitrogen—Trinidad
Powell Control, Inc.
Powell Electric Manufacturing Company
Qualitech Steel Corporation
Reynolds Metals Company
Roche Vitamins, Inc.
Southwestern Refining Company
Texas Eastern Pipeline Products Company, LP
Trigeant, Ltd.
Ultramar Diamond Shamrock
Valero Pipeline Company
Valero Refining Company

Municipal and Governmental
Alice Water Authority
City of Corpus Christi, Texas
City of Mathis, Texas
City of Portland, Texas
Port of Brownsville, Texas
Port of Corpus Christi Authority
San Patricio Municipal Water District
South Texas Water Authority
Texas Parks & Wildlife Department

Constructors
Aqua Terra Contracting, Inc.
Constructora Bay de Mexico
Fairbairn Electric, Inc.
Gulf Marine Fabricators
J. E. Merit Constructors, Inc.
Rabalais I & E Constructors
Walker Electrical Contractors

Engineering Firms
BHP Engineering & Construction, Inc.
Coym, Rehmet & Gutierrez Engineering, Inc.
Goldston Engineering, Inc.
JD Consulting, Inc.
Jones & Neuse, Inc.
KTI/Fish Engineering, Inc.
LNV Engineering
Naismith Engineering, Inc.
Shiner + Moseley & Associates, Inc.

Utilities
Central & South West Services, Inc.
Central Power & Light Company

Commercial
HEB Grocery Company, LP
NBGS International (Schlitterbahn)