Company Profile
introduction

Based in Houston, Texas, Gulf Interstate Engineering Company (Gulf) has served the energy industry since 1953, providing quality project management services to the oil and gas industry worldwide.

Gulf specializes in the management and engineering of pipeline systems, a focus that covers onshore and offshore pipelines, gathering systems, production facilities, pump and compressor stations, storage terminals and loading facilities. Gulf’s experience and capabilities encompass all aspects of oil and gas production and transportation, from the wellhead to the export terminal.

Gulf also performs turnkey services in partnership with U.S. and international construction firms. Through corporate divisions and affiliates, Gulf provides field inspection services and contract operations and maintenance for oil and gas transportation and storage systems.

Gulf has completed projects all over the world under some of the harshest conditions that nature offers, from the icy expanse of Alaska and Siberia to the searing desert heat of the Middle East. On land or sea, in mountainous terrain or pristine valleys that must be returned to their original condition, the Company has successfully executed oil and gas projects characterized by the most complex logistics.

In the past ten years, Gulf has managed the implementation of projects having a combined capital cost in excess of $10 billion. During the same period, Gulf procured and delivered, on behalf of clients, more than $2.0 billion dollars of project materials and equipment.

With hundreds of specialists on staff, Gulf offers a flexible and adaptive approach for project execution. The Company is large enough to handle the most complex assignments, yet small enough to tailor solutions to individual problems, whether it’s a need for special care in a sensitive ecological habitat or the requirement for remote data sharing with clients through a Web-based interface.

Gulf has achieved a reputation for producing designs that transform concepts into easily managed facilities which operate smoothly and efficiently, today and tomorrow. Whether it’s a feasibility study involving a single expert or technical consulting team, or complete EPCM services requiring a management and engineering task force, Gulf Interstate Engineering provides a quality and cost effective solution.

It is the policy of Gulf Interstate Engineering to provide quality engineering services to our clients, meeting or exceeding contract goals. Gulf recognizes the fundamental importance of an effective Quality Assurance Program as an integral part of the Company’s scope of work. Gulf is committed to a process of continuous quality improvement in the production of engineering work products and management services.
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types of projects

- onshore and offshore pipelines
- pump and compressor stations
- gathering systems

- oil & gas production facilities
- corrosion protection systems; scada and communications systems
- export loading facilities

- storage and export terminals
- field power generation, transmission and distribution
- infrastructure facilities
The staff of Gulf Interstate Engineering, Gulf Interstate Field Services, and L&T-Gulf Private Limited includes project management, engineering, design, procurement, construction management, inspection, and operations and maintenance personnel possessing a wide range of management and engineering talents, comprising a worldwide staff of more than 1,200 specialists.

Cumulative design experience

pipeline systems
100,000 miles

production and processing facilities
2,000,000 bpd

pump stations
700,000 hp

compressor stations
5,000,000 hp

storage and export loading systems
4,000,000 bbls
In addition to the offices shown here, Gulf also has a number of project, alliance partner and joint venture offices worldwide.
Gulf utilizes a comprehensive Project Management System that addresses project planning, budgeting, cost accounting, scheduling, progress measurement, risk management and forecasting. This System takes advantage of a combination of in-house developed and third party software applications to streamline the management of project data and generate reports that allow us to effectively analyze and track a project’s schedule, costs and progress.

We develop logic-based Critical Path Method (CPM) schedules utilizing Primavera or MS Project software. These schedules are used to monitor schedule performance and are designed to provide summarization at various levels of detail to support project execution analysis and project management reporting requirements, including the activities of subcontractors and third party participants.

Using the System’s generic templates, Gulf develops and customizes a cost database for projects. The cost database is used to define commitments and cash flow, record actual project costs incurred and forecast remaining expenditures. The project budget is maintained as a separate module, or table, within the cost database.

Gulf’s Project Management System is a state-of-the-art, web-based application that allows clients as well as our management team to work collaboratively on projects regardless of their work location. The System allows for accurate, timely reporting of project progress, whether in the design phase or during construction.
Gulf uses the earned value method for measuring and tracking project progress. A Work Breakdown Structure (WBS) is developed during the planning phase to organize the components of the project. For each WBS component, activities and deliverables are assigned a weighted value in proportion to that item’s relationship to the overall project budget. Our database application, LOGS, accommodates the line item entry for each activity and deliverable required, defining the engineering and procurement documentation for the project. Periodic production milestones for each item are defined and a date for each milestone is scheduled. As the work progresses and milestones are achieved, the cumulative value of the work progress is calculated and compared to the plan. This physical percent complete information produced by the LOGS program correlates with the actual man hours and schedule time expended to yield an earned value with respect to the plan. Comparative analysis of this result indicates productivity achievements, supports predictions of future progress and directs project management attention to items that are lagging. Results are displayed in graphic and tabular formats for reporting and analysis purposes. Similar earned value techniques are used for monitoring the progress of Gulf’s subcontractors or other contractors for whom we have reporting responsibility.
technology and innovation

In each area of the company’s operations, Gulf stays at the forefront of technology and proactively invests in the hardware, software, systems, tools and training that will add value to all the projects we complete. Using an array of industry standard and proprietary software, Gulf addresses computing requirements for all functions related to project management, financial analysis, engineering, design and construction management. These investments pay off for our clients in greater efficiencies from reduced costs and improved schedules.

Web-based solutions developed by Gulf support remote officing capabilities. These include corporate and project Intranets for project and construction management reporting. Document control, remote drawing reviews, file transfer and information sharing are other features of Gulf’s virtual office approach. All project reporting, from engineering progress through daily field inspection reports is Web-enabled, allowing project personnel, corporate management and clients to review and comment via a browser interface.

Gulf has obtained licenses for the lead CAD software products in general use today: AutoCAD and MicroStation. In addition, Gulf has obtained licenses for several CAD third-party software programs that tailor the generic CAD drawing environment to a particular design discipline; i.e., Mapping, Piping or Electrical. These software programs offer additional tools and capabilities not available in the standard AutoCAD or MicroStation environment.

Gulf uses 3D CAD models and “smart” software for its facilities design. Benefits of Gulf’s engineering approach are automated interference detection, accurate Bills of Materials, reduction in checking time and minimal construction delays. Specific software applications for engineering and design solutions include commercial and proprietary applications to address hydraulic modeling, flow analysis, stress analysis, process simulations and other multi-disciplinary requirements of oil and gas facilities design. Gulf’s engineers are accomplished in the use of these programs for problem solving and to enhance their work products.

Gulf’s offices contain hundreds of engineering and business workstations fully networked for complete sharing of information and system resources. A collection of peripheral devices provides Gulf with an extensive capability to process and print large format, full-color graphic images for mapping applications and management presentations. E-mail, electronic conferencing and knowledge management are supported by round-the-clock high-speed Internet connections.
clients  a partial listing

AGL Resources
Algonquin Gas Transmission
AK Transneft (Russia)
Amerada Hess Oil Company
Amoco Gas Company
Anadarko Petroleum Corporation
Aramco Services Company
Bay State Gas
Bebtech Corporation
Benton Oil & Gas
BP Development
British Petroleum
Buckeye Pipeline
Canadian Occidental Petroleum Ltd.
Caspian Pipeline Consortium
CenterPoint Energy
Chevron Nigeria Limited
Chevron Texaco
China Petroleum Engineering & Construction Corp.
Colonial Pipeline Company
Columbia Gas Transmission Corp.
Conoco Phillips
Dakota Gasification Company
DCP Midstream
DNQ Yemen AS
Dominion
El Paso Energy Company
Enbridge (U.S.) Inc.
EnCana
Energia Mayakan
Enterprise Products
EPCO, Inc.
ExxonMobil
Florida Gas Transmission Company
Gas Authority of India Limited
Gasoductos de Chihuahua c/o El Paso Mexico Mgmt.
Gazprom (Russia)
Gulf Interstate California Pipeline
Harken International
Hocol (South America)
Hunt Oil Company
INGAA Foundation
Iroquois Gas Transmission System
Jilin Oilfield Company (China)
Kern River Gas Transmission
Kinder Morgan, Inc.
Koch
Korea Petroleum Development Corporation
Kuwait Oil Company
Litwin Management Services, LLC
Lucky Development (Korea)
Mojave Pipeline Operating Company
National Gas Company of Trinidad & Tobago
Nisource
Northern Border Pipeline Company
Northwest Alaskan Pipeline Company
Northwest Pipeline Corporation
Occidental Companies
OJSC Surgutneftegash
Orgenergogas (Russia)

Ozark Gas Transmission
Pacific Gas & Electric
Pacific Gas Transmission
PanHandle Energy
PEMEX Refinacion
Peru LNG S.R.L.
Perusahaan Gas Negara (Indonesia)
Petromin (Saudi Arabia)
PetroPeru
Petrozuata (Maraven/Conoco, Venezuela)
Polar Gas Company
Promigas, S.A. (Colombia)
Ralph M. Parsons Company
Ranger Plant Constructional Company, Inc.
Reliance Industries Limited
Rookies Express Pipeline LLC
Santa Fe Pacific
Saudi Aramco
Saudi Kuwaiti Cement Manufacturing Company
Shell Companies
SINOPEC
Sonoco Logistics
Southern Natural Gas Company
Southern Union Oil Products Company
Spectra Energy
State Committee of Oil & Gas (Ukraine)
Sui Gas Transmission Company, Ltd. (Pakistan)
Surgutneftegas
Suriname Crude Oil Pipeline
Techint (Argentina)
Teppco
Terasen Pipelines
Texas Oil and Gas Corporation
Texas Pipeline Company
TNK-BP
Total Austral (Argentina)
TransCanada PipeLines
U.S. Department of the Interior
U.S. Navy
Unocal
Urengoi (Russia)
USAID
USTDA
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Valero Hydrocarbons Company
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Williams Gas Pipeline
Wisconsin Gas Company
Yacimientos Petroliferos Fiscales Bolivianos
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### Major Projects—Pipeline Systems

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<th>Project Name</th>
<th>Scope of Work</th>
<th>Contract Award</th>
<th>Completion Date</th>
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</table>
| PREPA Via Verde Pipeline Project | Ray Architects & Engineers | Gulf provided advisory services to Ray Architects & Engineers to select a suitable route and configuration for the PREPA Via Verde Pipeline Project. The Project starts near the EcoElectrica LNG Terminal, traverses the island in a northeasterly direction and then proceeds eastward to PREPA’s Palo Seco and San Juan Power Plants near San Juan, with the goal of transporting gas from the south coast to the north coast of Puerto Rico. Specifically, Gulf’s scope included providing advice for routing and constructability through densely populated areas, river and road crossings, pipeline and facility studies, and other pipeline issues. Gulf also advised during the development of detailed engineering and design deliverables to achieve issue for Construction quality documents and drawings. | contract award–2010 | completion–2012
| White Kitchen to Yoakum Project | EPCO, Inc. | Phase I of the White Kitchen to Yoakum Project consisted of approximately 80-miles of 30-inch gas pipeline from White Kitchen Compressor Station to Falls City Compressor Station. Phase II consisted of approximately 67-miles of 36-inch gas pipeline from Falls City Compressor Station to Yoakum Compressor Station. In addition, each pipeline has a launcher and receiver at each end, a launcher and receiver at the midpoint, a meter station at the beginning of each segment, a slug catcher, and condensate tanks at the termination of each section. The design included approximately 5-miles of 36-inch loop line that terminates at a receiver located at the Eagle Ford Tie-In Site. There is also a 12-inch hot tap on an existing 20-inch pipeline located at the Falls City Compressor Station suction side; feeding a bidirectional meter station. Gulf’s scope of work on the White Kitchen to Yoakum Project consisted of project management and progress reporting, engineering, design/drafting and material procurement. Gulf prepared class location studies with GIS to support the gas pipeline expansion. | contract award–2010 | completion–2011
| Acadian Haynesville Extension & Metering Project | EPCO, Inc. | Gulf provided project management, engineering, design, procurement, geotechnical engineering, HDD design, and construction support services for EPCO Inc.’s Acadian Haynesville Extension Project. Gulf prepared class location studies with GIS to support the gas pipeline expansion. This telescoping 42-inch, 36-inch and 20-inch 250-mile natural gas pipeline traverses through the state of Louisiana, starting south of Bossier City, LA and continuing southeast to Napoleonville, LA. As designed, the pipeline was expected to transport from 1.8 Bcf/d to as much as 2.1 Bcf/d of natural gas from interconnects with interstate natural gas transmission systems through central Louisiana. This extension project is providing critically needed natural gas take-away from the Haynesville Shale area and providing producers with access to additional markets. Gulf provided the project management, engineering, design, procurement, surveying, no-rise certification, geotechnical engineering, and project support for the 28 metering stations and a pressure regulating station associated with the Acadian Haynesville Extension Project. The metering stations consisted of both receipt and delivery stations, intrastate and interstate stations, and vary in size and flow rates. Laterals from the Acadian Haynesville pipeline to the meter stations were included in the scope of supply. | contract award–2009 | completion–2011
| CPC Expansion Front End Engineering and Design | Caspian Pipeline Consortium – & RK | Gulf continues to work on the Caspian Pipeline Consortium (CPC) Expansion Project – Detail Design Completion. Gulf’s present scope of work includes revising the Technical and Economic Substantiation of Construction (TEOC), project management, risk analysis, expert reviews, engineering and preparing Final Investment Decision (FID) package. In addition to the engineering services in 2011, Gulf has signed with CPC the Project Construction Services Contract for project management, contracts management, project controls, quality assurance/ quality control, document control, project management software systems, and commissioning and start-up services. These services are being provided to assist the CPC Expansion Project management team during construction. Project includes 88 km pipeline, 5 to be expanded and 10 new pump stations and export terminal on Black sea. | contract award–2004 | completion–2014
| Alberta Clipper/ Southern Lights Projects | Enbridge Energy Company, Inc. | The Alberta Clipper Project included 326-miles of 36-inch diameter crude oil pipeline from the US/Canadian border to Superior, WI and three new 12,000 hp pump stations. The Southern Lights Project consisted of 136-miles of 20-inch diameter crude oil pipeline and 190-miles of 20-inch diameter diluent pipeline. The Southern Lights Project also included four new 6,500 hp pump stations, one new 8,000 hp pump station, the reversal of flow at one existing pump station, conversion of two existing pump stations and seven new 250,000 bbl storage tanks. | contract award–2007 | completion–2009
| PLNG Pipeline Transportation Project | Peru LNG S.R.L. | Gulf Interstate Engineering Peru SAC provided detailed engineering, design, and procurement services on the Peru LNG Pipeline Project. The project included the installation of a 34-inch diameter gas pipeline for the transportation of natural gas from Chiquintirca in the Andes Mountains, east of Ayacucho, to a LNG Plant at Pampa Melchorita, located in the coastal area. The pipeline system is approximately 400 kilometers in length and includes metering facilities and SCADA system. | contract award–2006 | completion–2009
major projects--pipeline systems
projects including a pipeline system which may also include station facilities

East-West Gas Pipeline Project
Reliance Industries Limited
This major project included the installation of a 1,385-km, 48-inch diameter natural gas pipeline and associated spur pipelines. The East-West Gas Pipeline Project traverses across the country of India from the Onshore Gas Processing Terminal (OGPT) at Gadimoga near Kakinada on the east coast of India to Bharuch on the west coast of India. The pipeline system included mainline block valves, pigging stations, compressor stations, metering and regulating (M&R) stations, cathodic protection system, supervisory control and data acquisition (SCADA) system, process measurement and control instrumentation, fire alarm and fire protection system, control room and other buildings, and other associated facilities. Gulf’s scope of work included process design and other engineering works required for the preparation of RFQ packages through successful completion of purchase/work orders for the long lead, critical items, construction work packages and related project management services. The pipeline system is designed to initially transport 80 MMSCMD and is forecasted to grow to 80 MMSCMD.

Rockies Express Pipeline LLP Project
Rockies Express Pipeline LLC
The 1,679-mile, 42-inch diameter natural gas pipeline system originates in Rio Blanco County, Colorado and stretches east to Monroe County, Ohio. REX traverses eight (8) states including Colorado, Wyoming, Nebraska, Kansas, Missouri, Illinois, Indiana and Ohio, and transports 1.8 billion cubic feet per day of capacity. Gulf provided Front-End Engineering and Design (FEED) services, including a detailed route selection, constructability analysis and the development of a project schedule. After successful completion of the front-end engineering activities, Gulf was subsequently awarded the detailed engineering and design, procurement, and project management and construction management support services.

Escravos Gas Project (EGP) 3B Pipeline
Chevron Nigeria Limited
Gulf provided Front End Engineering and Design (FEED) to perform the required studies and develop the recommended alternative for gathering, compressing and delivering associated gas from EGP 3B to the tie-in point on the EGP 3A pipeline to shore. EGP 3B gathers the associated gas produced from the North Offshore Area, as well as Delta PP and Tapa PP in the South Offshore Area, compresses the gas and delivers it to the EGP 3A tie-in point. The EGP 3B project gathers associated gas from nine production platforms and consists of a gathering pipeline network of nine pipelines. In May 2005, Gulf was additionally awarded basic engineering that included MTO’s, engineered equipment and long lead items, Class 3 cost estimate schedule, EPCI contracting strategy, preliminary and final FEED report, and a lessons learned report.

Cypress Pipeline Project
Southern Natural Gas Company
The Cypress Project will be constructed in three phases. Phase I will include the initial pipeline of 167-miles of 24-inch pipe. Phase II and III will add compression at three locations and 10-miles of 30-inch loop pipeline. Specifically on Phase I, Gulf provided project management, FERC filing support, field engineering support, detailed engineering and design, right-of-way and environmental support, and engineering support services during construction of the project. During the FERC application phase, Gulf managed all field activities and supervised Southern’s direct contractors, including the environmental and right-of-way specialists, along with its own subcontractors performing alignment and geotechnical surveys.

Mier-Monterrey Pipeline Project
Kinder Morgan Inc.
Gulf provided full EPC services for the Mier-Monterrey Pipeline in partnership with a U.S. and Mexican construction firm. This major project involved installation of 90-miles of 30-inch pipeline and three meter stations in Mexico, as well as an additional 9-miles of 30-inch pipeline and one meter station in the United States. The project supplies up to 375 MMscf/day from southeast Texas to an existing power plant near Monterrey.

Camisea Natural Gas Transmission System
Transportadora de Gas del Peru SA
Gulf acted as Project Manager/Owner’s Engineer for this state-of-the-art natural gas and NGL transportation system in Peru. Running from the Malvinas compression and pumping station located near the Camisea field, this telescoping 26-, 24-, and 18-inch, system transits the Andes from Malvinas to Lima, for a distance of approximately 697-km. The NGL pipeline (14-, 8-, 10-inch) parallels the gas pipeline for approximately 575-km, terminating at a fractionation facility on the coast at Pampa La Clarita. The gas system required an additional pressure reducing station and the NGL system contains three additional pumping stations and two pressure reducing stations. The pipeline system traverses approximately 195-km of Peruvian rainforest, 250-km across the Andes and 250-km across the Peruvian Coastal Plain.
major projects—pipeline systems
projects including a pipeline system which may also include station facilities

### Kern River Gas Transmission
**Williams Gas Pipeline Company**

Gulf provided project management, engineering, design and procurement services for the 2003 Kern River Expansion Project. This major expansion project involved the looping of approximately 717-miles of the existing Kern River System, increasing system capacity by 1 BCFD. The pipeline loops occurred in the states of Wyoming, Utah, Nevada and California. The pipeline traversed through environmentally sensitive areas and approximately 30-miles of densely populated land requiring the use of Class 2 and 3 pipe. In addition to pipeline looping, there were five meter station additions and modifications at existing meter stations.

### OCP Integrated Management Team
**Oleoducto de Crudos Pesados (OCP) Consortium**

The OCP Project consisted of 313-miles (504-km) of pipeline with four pumping stations, two pressure reducing stations, terminal facilities and an initiating pump station at Lago Agrio, onshore storage terminal facilities and offshore tanker loading facilities at Esmeraldas, in the Republic of Ecuador. Gulf provided the project management and construction management for the project and also performed incidental technical services in support of the project. Gulf previously was responsible for the development of the preliminary engineering for the pipeline, including preparation of engineering studies, calculations, hydraulic analyses and equipment specifications.

### Pipeline Construction Management Program
**TransCanada PipeLines**

TransCanada's Winter and Summer Pipeline Construction Program, Spreads 99B and 98E included approximately 61-km of 42-inch diameter pipeline, located between Longlac, Ontario and Matawa, Ontario and 87-km of 42-inch mainline loops located in the North Bay and Toronto areas. Gulf prepared project procedures, inspection guidelines, quality plans and other documents necessary to support construction management. The project team ensured contractor compliance with all applicable regulations, specifications and quality standards throughout the construction of the pipeline facilities. Construction progress was reported to TCPL over the Internet from Gulf’s online website.

### WGC Lateral Line Project
**Wisconsin Gas Company**

Wisconsin Gas Company filed a FERC application for approximately 37-miles of a natural gas pipeline lateral for its proposed Guardian Pipeline Project. The pipeline is located 30-miles to the northwest of Milwaukee. Gulf’s scope of work consisted of four phases; each divided into four separate years. In 1999, Gulf established a field office in Wisconsin to coordinate activities of subcontractors who provided information from the field that was incorporated into the technical sections of the FERC filing. Gulf also prepared a FERC level project cost estimate. In 2000, Gulf provided technical support for the FERC application. In 2001, Gulf provided all detail engineering design and procurement of equipment and material. Finally in 2002, Gulf provided all aspects of construction management including inspection, commissioning and start-up of the system.

### Hawiyah Gas Development
**Saudi Arabian Oil Company (Saudi Aramco) and Parsons International**

This project included various pipelines: 218-km, 56-inch diameter; 155-km, 48-inch diameter; 57-km, 30-inch diameter; and, 20-km, 24-inch diameter gas distribution pipelines. Also included are four 20-km, 22-inch diameter and three 40-km, 26-inch diameter gas transmission pipelines; and, 20-km of condensate pipelines. Additionally, an existing 150-km, 48-inch diameter crude oil pipeline was converted to gas service. Scraper launchers and receivers, a pressure control and releasing station, gas cleaning and sales gas metering facilities supported with power and utilities were also included. The pipelines have SCADA and communications systems. All pipelines are cathodically protected and equipped with a leak detection system via pressure/temperature transmitters.

### Venezuelan Extra–Heavy Oil Project (VEHOP)
**Petrozuata a joint venture between Conoco and Maraven**

This project included two parallel pipelines running between the Jose industrial complex on the north—central Caribbean coast and the Petrozuata heavy oil (bitumen) field in the Orinoco belt, approximately 200-km south of Jose. One pipeline carries diluent to the production field and the other pipeline carries a diluent–bitumen blend to Jose for refining and export. Each pipeline had an initial pump station using electric motor–driven centrifugal pumps ranging from 2,000 to 4,000 hp. Initial capacity of the blend pipeline was 160,000 BPD at 190°F. Initial capacity of the diluent pipeline was 40,000 BPD.

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**Gulf scope of work**

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<td>Williams Gas Pipeline Company</td>
<td>project management engineering design/drafting procurement FERC application support</td>
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<td>Pipeline Construction Management Program</td>
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<td>TransCanada PipeLines</td>
<td>contract award–1999 completion–2002 project management engineering design/drafting procurement construction management FERC application support</td>
</tr>
<tr>
<td>Wisconsin Gas Company</td>
<td>contract award–1999 completion–2003 project management engineering design/drafting procurement construction management FERC application support</td>
</tr>
<tr>
<td>Saudi Arabian Oil Company (Saudi Aramco) and Parsons International</td>
<td>contract award–1999 completion–2001 project management detailed cost estimate basic engineering LSTK bid package preparation</td>
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<tr>
<td>Venezuela Extra–Heavy Oil Project (VEHOP)</td>
<td>contract award–1998 completion–1999 engineering management preliminary design major material procurement detail design cost estimate</td>
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major projects—pipeline systems

projects including a pipeline system which may also include station facilities

Gas Transmission and Distribution System
Perusahaan Gas Negara (PGN)

For PGN in Indonesia, this project included a 544-km, 28-inch diameter onshore natural gas pipeline from Gersik to Duri on the island of Sumatra and a 280-km, 20-inch diameter offshore natural gas pipeline between Sumatra and Bataam Island. A low pressure distribution system for Bataam Island is included as well as a SCADA and communications network for the entire pipeline system. This project was financed by the Asian Development Bank.

Shaybah Pipeline and Terminal Facilities
Saudi Arabian Oil Company (Saudi Aramco) and Parsons International

This project included a 638-km, 46-inch diameter crude oil pipeline from the Shaybah Central Producing Facilities in the Rub’ Al Khali to Abqaiq Plants with scraper launching and receiving facilities; instrumentation for pipeline leak detection; an impressed current cathodic protection system and remote area accommodations for pipeline operations and maintenance personnel. The pipeline was designed to transport 660 MBOD of Arabian Extra-Light crude oil to Abqaiq Plants for stabilization.

Seaway Pipeline Conversion–Stage 1
ARCO Pipeline Company

An existing 500-mile, 30-inch diameter natural gas pipeline was converted to crude oil service. The pipeline system originates in Freeport, Texas and terminates at a refinery in Cushing, Oklahoma. The project included: internal inspection, decommissioning and rehabilitation of the existing pipeline; installation of 7-miles of new 42-inch diameter pipeline; dredging operations and meter installation at the existing dock facility in Freeport, Texas; piping modifications and pump installation at the existing storage terminal located adjacent to the dock facility and installation of three new mainline pump stations on the converted pipeline.

Chad–Cameroon Pipeline System
Exxon Corporation International

This pipeline system included a 1,054-km, 32-inch diameter crude oil pipeline system from an oil field in the Doba Basin area of Chad through Cameroon to a new offshore export terminal. The scope also included four pump stations and a marine export terminal. This system is the largest heated crude oil pipeline in the world.

CO₂ Pipeline System
Dakota Gasification Company

This system consisted of a compression, pumping and metering facility located in the Great Plains Synfuels Plant near Beulah, North Dakota, as well as approximately 205-miles of pipeline, to deliver CO₂ to PanCanadian’s Weyburn oil field in southern Saskatchewan. The CO₂ will be used for enhanced oil recovery in this 40-year old field. Project scope also included the initial route selection and preliminary engineering studies associated with the proposed pipeline.

PGT–PG&E Pipeline Expansion
Pacific Gas Transmission–Pacific Gas & Electric

The natural gas pipeline system running from the Canadian border through Washington, Oregon and into California was expanded by the addition of 745-miles of 42-inch diameter and 100-miles of 36-inch diameter pipeline designed to accommodate 755 MMSCFD of additional gas supply. This project included modifications to 12 existing turbine compressor stations which added 350,000 extra horsepower for the expanded pipeline system. Two metering facilities were modified for the increased flow rates.

Alyeska Pipeline System
United States Department of the Interior

The Alyeska Pipeline System is a 798-mile, 48-inch diameter above ground and buried crude oil pipeline running from the North Slope to Valdez, Alaska. The pipeline system included eight pump stations rated at 25,000 HP each. Gulf provided expert assistance to the U.S. Dept. of the Interior during the four year engineering and construction period. Gulf reviewed and provided recommendations on all engineering and design aspects of the pipeline portion of the project and reviewed, from a technical perspective, all construction permit applications. Gulf’s resident field engineering audit staff on-site in Alaska monitored and reported on all construction activities for the pipeline. Gulf’s resident staff averaged some thirty personnel from the beginning of haul road construction in 1974 through start-up and commissioning of the system in 1977.

engineering for oil and gas production, transportation and storage systems
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<th>Project Schedule</th>
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<tbody>
<tr>
<td>Apex Expansion-Compression Detailed Engineering Kern River Gas Transmission</td>
<td>Gulf scope of work</td>
</tr>
<tr>
<td>Gulf provided detailed engineering services on the compression facilities associated with the Apex Expansion Project. The project entailed adding 75,000 incremental horsepower of compression at one new and three existing compressor stations, and replacing a compressor unit at one existing station. Specifically, the facilities included one new Solar Titan 250 and three Solar Mars 100 turbine-driven compressor and ancillary equipment at a grassroots site, Milford Compressor Station, in Utah; installing additional compression at Coyote Creek Compressor Station in Wyoming, Elberta Compressor Station in Utah and Dry Lake Compressor Station in Nevada; and replaced a compressor unit at Fillmore Compressor Station in Utah.</td>
<td>contract award—2009 completion—2011 project management engineering design/drafting procurement</td>
</tr>
<tr>
<td>Ruby Pipeline Compressor Stations</td>
<td>Ruby Pipeline, LLC</td>
</tr>
<tr>
<td>Gulf’s scope of work on the project included engineering and design/ drafting services required for the following: - Robber Creek - Three Siemens 23,000 hp electrical drive centrifugal compressor units. - Wildcat Hills - Two Solar Turbines Mars 100 C65 natural gas driven centrifugal compressor units. - Wieland Flat - Two Solar Turbines Titan 130 C65 natural gas driven centrifugal compressor units. - Desert Valley Compressor Stations - One Solar Turbine Titan 130 C65 natural gas driven centrifugal compressor units. Along with associated piping, buildings and ancillary equipment for all stations.</td>
<td>contract award—2009 completion—2011 project management engineering design/drafting</td>
</tr>
<tr>
<td>PG&amp;E Delevan K1 &amp; K2 Replacement Project Pacific Gas And Electric Company</td>
<td>Gulf, in association with a U.S. construction company, provided engineering, procurement and construction services on the Delevan Compressor Station – Units K1 &amp; K2 Replacement Project. Specifically, Gulf’s scope of work on the project included project management, engineering, procurement and commissioning services in addition to the supply of equipment and materials. The project included the demolition of certain existing equipment and facilities and the installation of two new 13,000 HP Variable Frequency Electric Motor Driven Gas Compressors to replace the existing K1 and K2 units. Gulf performed various station upgrades to improve the operability of the Delevan Compressor Station.</td>
</tr>
<tr>
<td>CenterPoint Stations - Cove, Beirne, Poteau CenterPoint Energy</td>
<td>Gulf provided scope development, project management, detailed engineering, design/ drafting, procurement services and construction support for three grassroots compressor station projects in Oklahoma and Arkansas. Gulf also provided the engineering support for the Poteau FERC application. The project included the installation of 15,000 HP Solar Mars, 6,100 HP Solar Centaur and 10,300 HP Solar Taurus turbine units.</td>
</tr>
<tr>
<td>Los Algodones Compressor Station Project Gasoducto Bajanorte S.R.L.</td>
<td>Gulf, together with a U.S. and Mexican construction firm, provided EPC services for the construction and installation of the Los Algodones Compressor Station Project. This major cross border compressor station project is located in Baja California, Mexico near the border town of Los Algodones. The project included the installation of two Solar Mars 100 gas turbine/ compressor unit packages, including gas discharge after-coolers, control systems, unit auxiliaries, buildings, station piping and a water system. The compressors are arranged to operate in a 1 X 1 configuration so that one unit is on standby as a 100% backup unit. In addition, the station is able to operate in the Series and Bi-Directional mode as needed. Since the facility was constructed adjacent to farmland, special consideration was given to the local environment; the final design and construction ensured containment within the facility for all process water and storm water runoff.</td>
</tr>
<tr>
<td>Vector Pipeline Compressor Station Expansion Enbridge (U.S.) Inc.</td>
<td>Gulf provided FEED services including permitting assistance, basic engineering, engineering surveys, cost estimates, and schedule estimate for three compressor stations. The project included initial installation of one 15,000 HP gas turbine / compressor unit at two stations, and 2 units with gas aftercoolers at the third. Gulf was subsequently awarded the project management, detailed engineering and design and procurement activities for the installation of the first two compressor stations.</td>
</tr>
<tr>
<td>Spearhead Project Enbridge (U.S.) Inc.</td>
<td>Gulf provided project management and engineering services for the refurbishment of seven existing pump stations, installation of one new pump station, and installation of the Hartsdale Lateral to achieve reverse flow for the Spearhead Pipeline. The pipeline consists of 655-miles of 22-inch to 24-inch refurbishment pipeline from Hartsdale, IN to Cushing, OK. The pump stations are as follows: Hartsdale (new) and seven existing: Flanagan, Forest, Quincy, Key, Gunn, Caney and Cushing.</td>
</tr>
</tbody>
</table>
### major projects—station facilities

**The Mayakan Project**

**Energia Mayakan**

Gulf, in association with a Mexican construction company, provided engineering, procurement and construction services on the Mayakan Project for the installation of one compressor station (CS#2) with two turbo compressors, associated facilities and delivery station. Gulf’s scope of work included project management, engineering, design, and procurement services.

- **contract award—2004**
- **completion—2005**
- **project management**
- **engineering**
- **design/drafting**
- **procurement**

**Express Expansion Casper Terminal**

**Terasen Pipelines**

Gulf provided engineering and procurement services for the installation of two new 150,000 BBL oil storage tanks and support facilities located at the Casper Terminal located in Casper, Wyoming. The scope of the project included the addition of pump stations between the existing stations, as well as construction of storage tanks at multiple locations. Gulf’s role on the project was to provide the detailed engineering, design and procurement services for the expansion of the facilities at the Casper Terminal.

- **contract award—2004**
- **completion—2005**
- **project management**
- **engineering**
- **design/drafting**
- **procurement**

**Kern River Gas Transmission**

**Williams Gas Pipeline Company**

Gulf carried out the preliminary engineering and prepared the EPC bid documents for the three (grassroots) and five add-on compressor stations. In addition, Gulf provided, in conjunction with a U.S. construction company, the detail engineering, design, procurement and construction services (EPC) for one (grassroots) and three add-on compressor stations. The stations included a total of 12 Solar Mars 100 units providing an addition of 180,000 HP, increasing system capacity by 1 BCFD.

- **contract award—2001**
- **completion—2003**
- **project management**
- **preliminary and detail engineering**
- **design/drafting**
- **procurement**
- **EPC bid packages**

**Clean Air Program**

**Williams Gas Pipeline Company**

The Clean Air Program (CAP) Project scope consisted of providing the infrastructure engineering and design to support the installation of high-pressure fuel injection (HPFI) on selected reciprocating engines in order to reduce exhaust emission. Activities included the engineering and design of new high-pressure fuel gas systems at the stations, which typically consisted of HP fuel gas yard piping from existing pipeline taps to the compressor building, including a new HP fuel gas header. Initial work began in Georgia, Alabama and Louisiana and additional work continued for stations in Texas, South Carolina, North Carolina and Virginia. Over 60 units have been modified.

- **contract award—2000**
- **completion—2007**
- **engineering**
- **design/drafting**
- **procurement**

**FGT Phase IV & V - Compressor Stations**

**Florida Gas Transmission Company**

These projects’ facilities included the installation of four 15,700 HP, two 10,350 HP, five 7,200 HP natural gas turbine driven centrifugal compressors, two 12,000 HP electric driven compressors and two 3,500 HP reciprocating compressors. The project included adding facilities at 14 existing and four grassroots compressor stations. The FGT stations are located in Alabama and Florida.

- **contract award—1999 & 2000**
- **completion—2000 & 2002**
- **project management**
- **engineering**
- **detail design**
- **procurement**

**The Chicago Project**

**Northern Border Pipeline Company–Enron Engineering & Construction Co.**

This project was an expansion and extension of Northern Border’s existing 42-inch diameter natural gas pipeline system that begins at the Canadian border in Montana to Harper, Iowa. The pipeline extends to a point near Chicago in Manhattan, Illinois. The compressor station modifications associated with this project included the addition of six new 35,000 HP gas turbine stations; one new 12,000 HP and one new 6,000 HP electric motor–driven stations. Retrofitting five existing gas turbine stations included removing the existing 20,000 HP gas turbine compressor packages and installing new 35,000 HP gas turbine compressor packages. Other station facility work included unit and station control system upgrades, re-aero and dry seal conversions and the relocation of gas scrubber units.

- **contract award—1996**
- **completion—1998**
- **project management**
- **preliminary engineering**
- **engineering**
- **design/drafting**
- **procurement**
- **construction management**
- **commissioning and start-up**

**PGT–PG&E Pipeline Expansion**

**Pacific Gas Transmission–Pacific Gas & Electric**

This project included modifications to 12 existing turbine compressor stations which added 350,000 extra horsepower to the expanded pipeline system. These modifications included additional turbine compressor packages and/or piping modifications to handle the additional flow. Two metering facilities were modified for the increased flow rates.

- **contract award—1990**
- **completion—1992**
- **preliminary engineering**
- **engineering**
- **detail design**
- **procurement**
Development of Surface Infrastructure Concept in Yamal and North Krasnoyarsk Krai Regions
TNK-BP, ROSPAN International

Gulf developed a comprehensive assessment of Rospan’s oil and gas portfolios, as well as possible synergies with 3rd parties during Project implementation. Resultantly, Gulf selected the optimal regional infrastructure organization option(s) within the Yamal region and North of Krasnoyarsk Krai. Due to the complex nature of this project, Gulf first selected 3 options out of 9 evaluated. This expansive project includes the Suzun, Tagul, Russkoye, and the Russko-Rechenskoye fields. These results served as the template for future work. Gulf’s scope of work included: methodology/DBM; analyze previous results (subsurface/drilling); develop matrices of facilities and block process diagram; develop comprehensive options; economic evaluation and risk analyses; and select recommended option. Subsequently, Gulf optimized and integrated the regional infrastructure of the Yamal and North of Krasnoyarsk Territory development.

Comprehensive Development East Urengoy and NovoUrengoy Licensed Areas
TNK-BP, ROSPAN International

Gulf provided engineering, design and technical support to the coordination and control activities of TyumenNiigiprogaz. These services included the development of a project investment justification, as well as, the provision of weekly, monthly and phase reports. Gulf analyzed and reviewed documentation issued by the Russian Design Institute for compliance with the task orders, and provided recommendations. Gulf applied specialized technical expertise of process design solutions developed by the Institute to analyze various options. Gulf developed the following project documents: independent project schedules in Primavera format; design basis; project change management guidelines; alternative project cost estimate; and performed qualitative and quantitative analysis of project risks. Gulf also monitored the project cost structure to ensure it followed the approved budget.

Concept Development for Uvat Project Surface Infrastructure
TNK-BP, TNK-Uvat

Gulf’s project scope included selection of the most efficient option for surface infrastructure development for the Uvat group of fields: Radonezhsky, Petegsky, South Petegsky, North Tyamkin, Tyamkin, Kosukhinsky, Taltyisky, Protozanovsky and North Tamarginsky. The final recommendations included a full technical and economic justification, as well as HSE justification. This enabled TNK-Uvat to plan the design and survey preparation, and implementation work related to field facilities and infrastructure construction. Currently no infrastructure/facilities exist in the Central Uvat region, except for trunk pipeline CPF Ust-Teguss Field - Kalchinsky Field, and exploration wells.

1.8 MMBOPD Phase - 1 Development Project
Abu Dhabi Company for Onshore Oil Operations (ADCO)

Gulf provided conceptual engineering and Front End Engineering and Design (FEED) services for the 1.8 MMBOPD Phase - 1 Development Project. Specifically, Gulf’s scope of work included performing engineering and design services on the pipelines and associated facilities, including scraper traps and intermediate block valves. The project included over 770-kilometers of crude oil, natural gas and water pipelines. The Qusahwira and Bab fields are being developed first and additional fields may be added to the project at a later date.

Yemen LNG Upstream Project
Yemen Hunt LNG Company LLC

Gulf provided Owner’s Engineer (OE) services to adapt and expand Yemen LNG’s upstream field facilities to support the Yemen LNG Export Project. This project includes the modification of three existing facilities and addition of a new cryogenic plant designed to process an additional 420 MMSCFD of field gas. Gulf will prepare technical bid packages, perform detailed engineering for the facilities modifications and provide expediting and inspection services. Gulf will also provide on-site construction management and quality assurance services in addition to commissioning assistance.

Nabrajah Field Development
DNO Yemen AS

This oil field development project is located in the Sayun-Masila basin, in the Republic of Yemen. Gulf’s scope of work included FEED services to determine the technical basis for gathering, processing and export facilities, determine equipment needs, optimize the process facilities, prepare cost estimates, perform an HSES review and HAZOPS, prepare long lead item requisitions and deliver final documents at an Approved for Design (AFD) status.
major projects—field development

**Alcaravan Field Development**

Harken International

This oil field development project was located in the Llanos Basin of Colombia. The field development included crude oil gathering systems, production facilities and pipelines to export up to 50,000 BPD of heavy crude oil.

*contract award—1997*  
*completion—1999*

**Aguada Pichana Gas Field Development**

Total Austral S.A.

This gas field development in Argentina’s Nuequen Basin included a gathering system for 51 wells and four production clusters with natural gas and NGL product delivery facilities. The field development included 144-km of gathering pipelines, 120-km of gas and condensate export pipelines, metering stations, a power transmission network and a communications system.

*contract award—1994*  
*completion—1995*

**Yemen—Masila Export Project**

Canadian Occidental Petroleum Ltd.

In the Hadramaut region of the Republic of Yemen this grassroots oil field development included: 31 well gathering system; 120,000 BOPD central production facility; 36 MW central power plant with power transmission and distribution system; 5,100 HP pump station; 140-km, 24-inch diameter crude oil export pipeline; marine export terminal with 2,500,000 bbls onshore storage; 5-km, 36-inch diameter offshore loading line and single point mooring buoy for 300,000 DWT tanker capacity.

*contract award—1991*  
*completion—1994*

**Payamino Field Development**

Oryx Ecuador Energy Company and BP Development Ltd.

This oil field development project was located in the Amazon region of Ecuador. The scope included a 10,000 BPD production unit with manifold; two separators and one test separator; one 10,000 bbl wash tank, one 10,000 bbl surge tank and two 11,000 bbl storage tanks; circulating pumps, storage pumps and booster pumps; a power oil system; utilities and a 32-km, 8-inch diameter crude oil export pipeline with 30,000 BPD capacity. In 1990, BP Development transferred its concession rights to Oryx Ecuador Energy Company which awarded Gulf an EPCM contract for the installation of the facilities.

*contract award—1988*  
*completion—1992*

**Badin Gas Development**

Union Texas Pakistan, Inc.

A 135 MMCFPD gas production facility was installed in the Badin gas field of Pakistan that produced 1,700 BPD condensate from five separate fields. The installation included flow lines, inlet manifolds, production and test separators, glycol dehydrators, condensate stabilizer, fuel gas scrubbers, compressors, condensate storage, loading facilities, evaporation ponds, firewater system, power generators, utility systems, emergency shutdown systems, flares, industrial buildings and sewer system.

*contract award—1987*  
*completion—1988*

**Export Facilities Project**

Yemen Exploration and Production Company

This (grassroots) oil field development project in the Marib region of the Republic of Yemen included: 50+ well gathering system; 200,000 BPD central production facility; pentanes plus recovery plant; 40 MW central power plant with power transmission and distribution system; 420-km, 24-inch and 26-inch diameter crude oil export pipeline with multiple pump and pressure reducing stations; 8-km, 24-inch diameter offshore loading line; turret-type single point mooring buoy and a captive floating storage offshore tanker with 3,000,000 bbls capacity.

*contract award—1985*  
*completion—1988*

**Waterfall Secondary Recovery and Crude Oil Gathering System**

Occidental Peruanco, Inc.

A 68-mile, 10-inch secondary recovery and crude oil gathering system was installed to collect 74,000 BPD from 1,500 oil wells. The system included 23 production batteries, treating/ desalting facilities, gas lift compressors, metering systems, pump stations, power generation and oil field electrification.

*contract award—1978*  
*completion—1984*
major projects–consulting engineering
feasibility studies, cost estimates and pipeline integrity assessments

**Methodology and Technical Requirements for Power Efficiency**

*TNK-BP*

Gulf conducted a study to develop power efficient solutions and procedures for all stages of TNK-BP’s major capital projects. This study involved creating a methodology and technical requirements for the appraisal, selection, definition and execution phases of major capital projects. The study included developing step-by-step algorithms supported by specific power efficiency factors required by TNK-BP and the Russian Federation’s industry standards. Gulf incorporated these standards in the development of step-by-step algorithms. The methodology was approved for implementation, and has been implemented as a Company standard for development of future major capital projects.

**Engineering Support of Yamal Oil Pipeline System Project**

*TNK-BP, ROSPAN International*

Gulf supported ROSPAN International by providing engineering and design services on the Yamal Oil Pipeline System. The Yamal Oil Pipeline System is located in Arctic conditions with permafrost and no existing infrastructure. The pipeline connects four (4) major oil fields to the SGC Transneft Pipeline grid at Zapolyarnoye. The 530-mm and 630-mm, above ground and buried sections of the thermal insulated pipeline traverses 374-km. The project management team coordinated and monitored the engineering survey and detailed design work performed by the Russian Design Institute OJSC Giprotruboprovod for the pipeline and terminals.

**Messoyakha Project**

*Gazpromneft*

Gulf developed project methodology and a comprehensive Design Basis Manual, detailing the most feasible option for utilization of “early oil” from pilot wells. Gulf performed studies and detailed analyses to determine the criteria for economical option selection. Gulf developed a “road map” based on the initial production profile, logistic study and market analyses. Gulf also developed solutions for oil gathering, processing and transportation, re-injection and burning based on thorough technical, economical and risk analyses.

**Kamennoye Field Development - Concept Select Stage**

*TNK-BP*

The Kamennoye Field Development Project consisted of seven oil and gas fields in Russia. Phase one of the project anticipated the recovery of 30 million tons of oil, with an estimated 330 wells being drilled with infrastructure and facilities that are to include up to 14 pads, an export pipeline, and an additional oil processing facility. Pending the successful completion of Phase one, Phase two consisted of the long-term development of the most reliable reserves. Gulf assisted TNK-BP in the early planning stages of this major oil and gas producing field. Specifically, Gulf’s scope of work involved comparing development alternatives to determine the optimum configuration and recommended sequence of field development, provided and contributed to the development of deliverables, providing technical, commercial and a planning basis for subsequent stages, and developed the technical specifications and quality requirements for the long-lead items.

**Texas Access Pipeline**

*Enbridge (U.S.) Inc. & ExxonMobil Pipeline Company*

Gulf provided engineering and design services to complete the necessary studies and develop an overall cost/schedule estimate for the Texas Access Pipeline. The proposed 770-mile, 30-inch diameter pipeline will originate in Patoka, Illinois and extend to Nederland, Texas. Also included is an 84-mile, 24-inch lateral pipeline traversing from Nederland to Channelview, TX. The 30-inch pipeline is designed to transport 468,000 barrels per day of heavy Canadian crude oil, while the 24-inch lateral pipeline is designed to transport 176,000 barrels per day. The project also includes 1.8 million barrels of tankage at Patoka and 360,000 barrels of tankage at Nederland. There will be 13 new pump stations for the 30-inch mainline and 1 pump station for the 24-inch lateral.

**Tuapse LPG Export Terminal**

*Litwin Management Services, LLC*

For this project Gulf performed basic engineering services for the Tuapse Export Terminal Project, including the preparation of drawings, studies, key piping plans, Western design standards, environmental assessment and technical documentation to meet the approval requirements of local and statutory bodies. Gulf also prepared a conceptual 3D model of the proposed LPG terminal facilities that will be suitable for marketing the project.
major projects—consulting engineering

feasibility studies, cost estimates and pipeline integrity assessments

**Oil Pipeline in East Siberia**

*OJSC Surgutneftegaz*

Gulf managed the development of the preliminary economic feasibility study (TEO) for a (grassroots) crude oil pipeline system in eastern Siberia. The proposed route of the 500-km pipeline system traversed areas of permafrost and discontinuous permafrost requiring special ditching and construction methodologies to preserve the integrity of the arctic environment while ensuring a sound pipeline installation. The pipeline system configuration consisted of an initial pump station including operational tankage, booster pump stations, delivery terminal with 3-days storage, and railcar loading facility. The system was designed to be constructed in stages to accommodate a multiphase increase in flow volume. Deliverables included a series of studies addressing route selection, alternate fuel / power sources, options for mainline pump drivers, steady-state hydraulic analysis, SCADA and telecommunications systems options, leak detection methodology, transportation / logistics and O&M organization plan. Other deliverables included PFDs, P&IDs, plot plans, route maps, and risk assessed CAPEX and OPEX estimates and project schedule.

**Burgos-Monterrey LPG Pipeline Project**

*Gasoductos de Chihuahua c/o El Paso Mexico Mgmt.*

Gulf developed a Front End Engineering Design (FEED) and EPC bid package for the Burgos-Monterrey LPG Pipeline Project suitable for bidding purposes to potential EPC contractors and suppliers, a detailed cost estimate and schedule for the project and in conjunction with the client, or one of its subsidiaries, development of an implementation strategy that optimized cost and timing consideration for the project. The project consisted of an NPSI 12-inch pipeline capable of transporting LPG using API-5L line pipe, which was approximately 175-km long with a MAOP of 1200 psi.

**Southwest Product Pipeline System**

*China Petro Chemical International Co. Ltd. (SINOPEC)*

The Southwest Product Oil Pipeline Project consisted of a 1,557-km trunkline including several lateral lines. The pipeline system included 18 pumping stations. The system was designed to transport #0, #95 gasoline, #0 diesel and jet fuel. Gulf provided the basic design and other technical documentation, including construction specifications, start-up and commissioning procedures, O&M manuals, etc. Gulf also provided technical assistance and technical training to SINOPEC.

**Baltic Pipeline System Investment Feasibility Study**

*Joint Stock Company Transneft*

The Investment Feasibility Study of the Baltic Pipeline System was executed in compliance with the most stringent Russian & Western standards and the requirements of the international financial and technical institutions supporting the project. The existing 2,100-km crude oil pipeline system will be expanded to deliver an ultimate future capacity of 30 MTA (650,000 BPD). Approximately 775-km of new pipelines were added to the system to deliver the product to Primorsk, Russia and, if economically justified, to Porvoo, Finland. Existing pump stations were expanded and four new pump stations were installed. Two marine terminals with crude oil storage were constructed to provide facilities to load tankers for exporting the crude oil to world markets. The scope of work also included an on-site audit of the existing facilities, analysis of the historical operation and maintenance records, and preparation of the report on the present condition of the system. A separate analysis of batching operations for new and existing sections of the pipeline (2800-km), including cost estimates, was also provided.

**Langzhou to Chengdu Product Pipeline**

*China Petroleum Pipeline Engineering & Construction*

The 960-km pipeline was the first major products pipeline system developed in China. The pipeline begins at the Beitan tank farm near the Langzhou Refinery and ends at a receiving station at Chengdu. The pipeline system was designed to transport refined products in batches with a flow rate of 5 million tons per year. A pump station was proposed at Linyao and distribution stations along the pipeline are located at Longxi, Tianshui, Chengxian, Guangyuan, Jiangyou, Mianyang and Deyang. A SCADA system was used for supervising and controlling the entire pipeline system. Satellite communication systems was used for pipeline operations and networking both data and voice communications.

**Yuzhny-Brody-Plock Pipeline & Terminal**

*State Committee of Oil and Gas*

This feasibility study included a technical analysis of engineering plans and cost estimates for construction and operation of a proposed new Black Sea oil terminal, a 670-km pipeline from Yuzhny to Brody in Ukraine, and a 430-km extension to Plock in Poland. Expansion of the existing Druzhba oil pipeline system to service markets in Poland, Austria and Germany was also evaluated. The general objective of the study was to: 1) assess the financial and technical feasibility of the construction and operation of the port and pipeline system, 2) provide potential shippers and crude oil marketers with provisional tariff structures which would apply to various destinations and capacity utilization factors and 3) provide potential investors with project reference documents to acquaint them with the anticipated technical features, economic parameters, financial characterizations, legal structures, operating structure and environmental features of the proposed port and pipeline project.
### Major Projects—Consulting Engineering

Feasibility studies, cost estimates and pipeline integrity assessments

<table>
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<tr>
<th>Project Description</th>
<th>Location</th>
<th>Industry</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sakhalin Oil Transport and Export Alternatives Screening Study</strong></td>
<td>Exxon Ventures CIS Incorporated</td>
<td>Sakhalin Island, Russia</td>
<td>Technical audit report on the condition of the existing 1,100-km national pipeline system included the evaluation of both the pipeline system and the operations of ten pump stations. Gulf prepared the audit report and a cost estimate to support loan applications to implement rehabilitation of the field. Gulf also developed a conceptual design and cost estimate for installation of a gas-fired power plant as a solution for reducing flaring of produced gas.</td>
</tr>
<tr>
<td><strong>Offshore Gas Pipeline</strong></td>
<td>PEMEX Refinacions</td>
<td>Northwest Alaskan Gas Pipeline Company</td>
<td>Evaluation and recommendations were provided for the complete rehabilitation and modernization of approximately 640-km of existing 10-inch and 14-inch diameter product pipelines and two associated pump stations. All facilities are located in northern Mexico. The 10-inch pipeline was installed in 1960 and the 14-inch line in 1979. The products transported through the system included various grades of gasoline and diesel fuel.</td>
</tr>
<tr>
<td><strong>Monterrey–Gomez Palacio Products Pipelines</strong></td>
<td>PetroPeru</td>
<td>Gazprom</td>
<td>This project included the design of a 746-mile, 48-inch diameter pipeline designed to transport 2.5 BCFD of natural gas at an operation pressure of 1,260 psig. This project was indefinitely deferred in 1981.</td>
</tr>
<tr>
<td><strong>Technical Audit of National Pipeline System</strong></td>
<td>PetroPeru</td>
<td>Exxon Ventures CIS Incorporated</td>
<td>A technical audit report on the condition of the existing 1,100-km national pipeline system included the evaluation of both the pipeline system and the operations of ten pump stations. Leak histories and cathodic protection logs were reviewed, safety procedures and operation and maintenance practices were also studied to determine system conditions. Environmental impacts identified during the above review were also reported. The report identifying the steps to bring the system into conformance with international standards was an important final product of this project.</td>
</tr>
<tr>
<td><strong>Yamal–Center Pipeline</strong></td>
<td>Gazprom</td>
<td>Exxon Ventures CIS Incorporated</td>
<td>This project included a 415-km, 56-inch diameter natural gas pipeline with three compressor stations and one gas chilling station located in the Yamal Peninsula region of Russia. The gas chilling was required to lower the gas temperature below freezing to prevent thaw of the frozen soil around the pipeline. This section is the northernmost segment of a proposed 2,400-km gas export pipeline system. Gulf’s feasibility study included development of detailed specifications for a compressor station’s major materials and equipment and the preliminary design of buildings, foundations and structures for installation in frozen soils.</td>
</tr>
</tbody>
</table>

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