

Agave Energy Company - New Mexico, USA

- Preliminary design calculations for a 0.5 MMSCFD acid gas injection scheme including water content, hydrate formation and phase envelopes.

Alghanim International – Kuwait

- Equipment inspection, evaluation of process hazards analysis (HAZOP) for a 250 MMSCFD gas conditioning facility.

Allen Energy - Como, Texas, USA

- Preliminary design calculations for a 2 MMSCFD (60% H₂S, 40% CO₂) injection scheme including water content and phase envelopes.

Antrim Energy International - Czech Republic

- Dehydrator fabrication inspection and installation supervision. Operator training.

Banagas JGC - Bahrain

- Project management and commissioning of two 55 MMSCFD and one 110 MMSCFD dehydrators.
- Procurement assignments.

Bear Cub Energy – Texas, USA

- Troubleshooting of suspected hydrate formation and high wellhead pressures in a sour AGI process on the tail end of a gas plant.
- The AGI process section consisted of 2 x 100% 5-stage motor driven 600 BHP reciprocating compressors with acid gas feed conditions of 3.0 MMSCFD gas containing 55% H₂S and 43% CO₂ with a discharge pressure of 1280 psig.
- The team conducted an on-site investigation of current operations combined with process simulation to replicate suspected hydrate formation conditions and provided recommendations.

Canada Northwest Energy Limited - Boca de Jaruco, Cuba

- Conceptual design and project logistics for a 4 MMSCFD gas plant involving air blending scheme, 65 USGPM amine plant, 1200 HP compression and a 150 HP refrigeration system.
- Completion, workovers, production and operations management for a 17 well oil field (30° API) including liaison with Cuban regional officials. Responsibilities included co-ordination of office, field and contract services.

Canada Northwest Energy Limited - Gorzyca, Poland

- Conceptual design and project budgeting for a 24 MMSCFD gas plant (57.9 % N₂) involving 1200 B/D oil, 450 B/D LPG and a 15 USGPM amine plant.

Canada Northwest Energy Limited - Indonesia

- Conceptual design of a 15,000 B/D oil battery plus 6600 B/D water handling comprised of two FWKO, a test separator and test tank, two emulsion separators, oil accumulation and 5 storage tanks, oil transfer pumps, flare stack, water accumulation and skim tanks, water injection pumps.

Canada Northwest Energy Limited - Perfericos, Cuba

- Completion, workovers, production and operations management for a 18 well oil field (16° API) including liaison with Cuban regional officials. Responsibilities included co-ordination of office, field and contract services.

Canada Northwest Energy Limited - Rozansko, Poland

- Conceptual design and project budgeting for a 120 MMSCFD gas plant (42% N₂) involving 3800 B/D oil, 2065 B/D LPG, nitrogen removal and 250 MW power generation.

Canada Northwest Energy Limited - Varadero, Cuba

- Waste Heat Recovery System Study: fuel gas used to feed turbine driven electric generator which fed major tourist needs at Veradero beach. The soft water from the battery would be pumped to recover heat from the turbine exhaust and the produced steam would be used at the battery for process needs.
- 10 MMSCFD Gas Plant Study: 300 gpm amine sweetening, refrigeration, compression, 35 T/D sulphur plant.
- Completion, workovers, production and operations management for an 11 well field (10° API) including liaison with Cuban regional officials. Responsibilities included co-ordination of office, field and contract services.
- Responsible for the detailed engineering for a 10,000 B/D facilities upgrade comprising a gathering system, test/metering/pump stations and major treating facility c/w ship loading facilities. Also, a comprehensive feasibility study was done that examined the economic scenarios for phased expansions to 40,000 B/D.
- Operations review and troubleshooting on and amine and IFPEX facility.

Canoro Resources Ltd – Amgri, India

- Conceptual design of a 5 MMSCFD choke plant with expansion options.

Capilano Holdings Inc. (AZGERNEFT) - Azerbaijan

- Preliminary process design and cost estimate for a \$2 million system of flowlining, field satellites, FWKO, desanding, treating, produced water reinjection, and fuel gas scrubbing.

Chesapeake Energy – Grady County, Oklahoma, USA

- Conceptual design, process engineering, basic engineering and equipment specifications for a 80 MMSCFD sour gas facility including liquids recovery and acid gas injection.
- Revamping of Knox Arbuckle Facility including process optimization, replacement of amine towers and addition of dewpoint control unit.

Chevron Research and Technology - Tengiz, Kazakhstan

- Design of a high-volume (250 MMSCFD) high-pressure (9000 psia) sour gas (16% H₂S, 5% CO₂) injection scheme. Generation of methods for estimating physical properties and phase equilibria encountered in the process.

Chevron (Universal Compression) – Thailand

- Project Engineer for the detailed design and 3D ACAD for two-970 kW (1300 HP) compressor skids (duplex) for two offshore platforms – designed to stainless steel specifications to suit the corrosive environment.

CUPET - Cuba

- Fire fighting system design, specifications and procurement for a new oil battery located at Puerto Escondido. The system includes two fire water pumps – cap.: 227 m³/h at 1,000 kPa each (1 electric and 1 diesel), foam proportioning system, 6” OD water distribution system (fiberglass), 4” OD foam distribution system (fiberglass), hydrants, sprinklers system and foam injection chambers.

Dome Expositions – Abu Dhabi, UAE

- Acid Gas Injection training courses.

Dublin International Petroleum – Syria

- Scoping study of the Tishrine Oil Gathering System.

Enar Petroleum Services Pvt. - Karachi, Pakistan

- Design review of a 9 MMSCFD dehydration facility.

Enterprise Training - Doha, Qatar

- Three day course on natural gas dehydration, refrigeration and fractionation.
- One day course on Understanding Natural Gas Hydrates.
- One day course on Acid Gas Injection.

Enterprise Training - Dubai, UAE

- Three day courses on natural gas dehydration, refrigeration and fractionation.

Enterprise Training - Frankfurt, Germany

- One day course on Acid Gas Injection.

Enterprise Training - London, UK

- One day course on Understanding Natural Gas Hydrates presented in Aberdeen.
- Two days of courses on natural gas dehydration and natural gas sweetening presented in London.

Foster Wheeler - London, UK

- One day course on acid gas injection.

Gas Authority of India - Pata, India

- Evaluation of problems at a 400 MMSCFD dehydration facility.

Hanover Russell - Tulsa, Oklahoma, USA

- Design and optimization of an acid gas injection scheme for the disposal of up to 9 MMSCFD of acid gas (55% H₂S, 45% CO₂) including injection pressure calculation, water content optimization and compression design.

Industrie Meccaniche Scardellato s.p.a. - Egypt

- Design of a 10,000 B/D crude oil desalter train involving separation, treating, desalter and skim tank.

Industrie Meccaniche Scardellato s.p.a. - F.P.S.O. "AGIP FIRENZZE"

- Executed the heat and material balances and generated the process flow diagram for the 18,900 B/D crude oil stabilizer unit and the 1 MMSCFD fuel gas sweetening unit.
- Reviewed the pressure vessel fabrication drawings.

Industrie Meccaniche Scardellato s.p.a. - Italy

- Design of a skid-mounted nitrogen rejection unit.
- Process design and data sheets for multiple dehydration units.

Industrie Meccaniche Scardellato s.p.a. - Petrex, Italy

- Design review and equipment sizing for 350 MMSCFD amine plant (two trains - 100 GPH of DEA each); sizing of mole sieve unit including 200 cyclone separator units.
- Amine plant (60 GPM MDEA) and 15 MMSCFD refrigeration plant design.

Industrie Meccaniche Scardellato s.p.a. - Villa Fortuna, Italy

- Process evaluation and equipment design for 10,000 cum/day oil stabilization system.

IPE Bolivia SRL - Santa Cruz, Bolivia

- Multiphase pipeline simulation.
- Pipeline simulations to increase gas production from 2 MMSCFD to 16 MMSCFD including five compressor stations and pipeline looping.

James E. Smith & Associates - Tyler, USA

- Design of an acid gas injection scheme for the disposal of up to 3 MMSCFD of acid gas including injection pressure calculation, water content optimization and compression design.

John Brown Hydrocarbons – London, England

- Conceptual design, preliminary equipment selection and project budget for an 85 MMSCFD acid gas (55% H₂S, 45% CO₂) injection project on Kharg Island.
- Front end engineering and design of 85 MMSCFD acid gas injection facility including acid gas compression (45,000 HP), sour water treatment, acid gas pipeline, wellhead and wellbore completion. Management of core and reservoir studies undertaken by IOOC in Canada.
- Acid gas injection training course.
- Management of core and reservoir studies to support acid gas injection design.

K2 Energy - Cutbank, Montana

- Design, engineering and project management for the tie-in of 7 low pressure gas wells and gathering system including booster compressor (325 HP), dehydration, sales compressor (250 HP) and sales pipeline.
- Permitting including Montana Flood Plain & Floodway Management, Glacier County Planning, Glacier County Sanitation, Glacier County Roads, FAA, Dept. of Environmental Quality, Montana Land Use License, Montana Department of Transportation, ASACoE, Federal Rivers & Harbours, Federal Clean Water.

KCS Resources - Texas, USA

- Preliminary design calculations for a 2.5 MMSCFD acid gas (50% H₂S, 50% CO₂) injection scheme.

Kharafi National – Kuwait

- Conceptual and basic engineering of a 700 MMSCFD gas conditioning facility for a 2500 MW power generation unit.

Kinder Morgan CO₂ Company – Texas, USA

- Kinder Morgan CO₂ Company is the leading U.S. transporter and marketer of carbon dioxide for Enhanced Oil Recovery (EOR). A key asset, the SACROC Unit located in West Texas, is one of the largest oilfields and one of the oldest operating CO₂ capture and injection projects in the U.S.
- The SACROC Unit processes over 620 MMSCFD of gas for CO₂ capture and injection while recovering over 30,000 bpd of oil and 15,000 bpd of NGL liquids. Kinder Morgan desired to maximize production and thus requested Gas Liquids Engineering Ltd. to carryout the following two projects.

Capacity Increase Project

- Identified an additional 90 MMSCFD capacity with minor equipment modifications.
- The primary scope involved process review, simulation, major equipment rating and cost estimation for modifications for inlet separation, dehydration, filtration, chilling/separation, booster compression, gas and liquid amine treating, NGL recovery and condensate stabilization.

Expansion Project

- Generated the FEED for a 240 MMSCFD expansion train for CO₂ capture, injection and liquids recovery.
- The primary scope involved design basis memorandum generation, engineering process design, capital cost estimation and data sheet package development involving inlet separation, dehydration, filtration, refrigeration, liquids separation, heating and water-cooling.
- The secondary scope involved to varying degrees process review, cost estimation and data sheet package generation for modifications of all affected downstream processes such as molecular sieves, amine systems, NGL recovery, condensate stabilization and Puraspec. Process design review of MEA liquid/liquid contactor replacement internals, technical consultation for amine systems change-out.
- Process design review of MEA liquid/liquid contactor replacement internals, technical consultation for amine systems change-out.
- Provided economic consultation for the 240 MMSCFD membrane design including financial perspectives and strategic advice.



Kinder Morgan CO2 Company-Texas, USA

Long Petroleum - Louisiana, USA

- Design calculations for a proposed scheme for the injection of 1.5 MMCFD of sour gas (6% H₂S, 6% CO₂) including injection pressure estimation, water content, compressor sizing and hydrate calculations.

PDVSA/PPC - Caracas, Venezuela

- Evaluation and recommendations to improve the accuracy and reliability of 120 gas metering stations in Maturin District.

PDVSA/Tivenca – Maracaibo, Venezuela

- Conceptual design of multiple processing options for 1200 MMSCFD gas stream including CO₂ removal, ethane recovery, turbo-expander facility, mercury removal and a nitrogen rejection facility.

PetroHunt LLC – North Dakota, USA

- Concept development, preliminary engineering and +/- 30% cost estimation for conversion of a 12 MMSCFD sour gas processing facility from sulphur production to acid gas injection.
- \$6 MM USD capital cost estimate included scope for substantial new electrical facilities, acid gas compression, acid gas injection pipeline, acid gas injection well, process control upgrades and isolation of the obsolete sulphur plant.

Petro Operating Company - Florida, USA

- Acid gas injection data analysis.

Piecobiogaz - Dzieduszyce, Poland

- Process simulation, design and data sheets for a 540 bbl/d sour oil stabilization unit.

Polish Oil and Gas Company - Chobienice, Poland

- Design basis memorandum and project specifications for Chobienice Gas Plant.

Polish Oil and Gas Company - Dębno, Poland

- Design basis memorandum and project specifications for a 55 MMSCFD sour gas plant including fractionation and sulphur plants. Economic evaluation of 200 cum/d fractionation train options.
- Project management of a US \$70 million gas plant development involving 21 wells and the production of 45 MMSCFD gas, 6000 BPD oil, 120 t/d sulphur, 600 BPD LPG and 200 BPD condensate.
- Fabrication and construction inspection.
- Pipeline system design and evaluation.
- HAZOP evaluation. Start-up and operations support.
- Training – plant management and Dębno Plant Operations personnel.



Polish Oil and Gas Company – Dębno, Poland

Polish Oil and Gas Company – Dębno Expansion, Poland

- Evaluation of Dębno Facility operations and expansion options.

Polish Oil and Gas Company – LMG Project, Poland

- Review of the Base Design of the LMG Plant (Lubiatów, Międzychód, Grotów) prepared by a consortium consisted of PBG, Thermo Design Engineering and Technip KTI. The LMG Plant will produce 1300 t/d of stabilized and desalted oil, 16 000 Nm³/h of sweetened gas, 27 t/d of LPG 13 t/d of C5+ and 40 /d of liquid sulphur.

Polish Oil and Gas Company – Żuchłów, Poland

- Compression system design and evaluation for Żuchłów and Załęcze gas fields.

Polish Oil and Gas Company – Sanok, Poland

- Five day customized training course.

Polish Oil and Gas Company - Zielin, Poland

- Project management of Zielin plant expansion.

Polish Oil and Gas Company - Zielona Góra, Poland

- Equipment procurement.

Poltava Petroleum - Poltava, Ukraine

- Scoping, design, procurement and HAZOP for a 5,000 bbl/d condensate fractionation system.

Red Mountain Energy – Kenlyk, Kazakhstan

- Conceptual design of a 14 MMSCFD choke plant

Red Mountain Energy – Minnibai, Russia

- Process design, basic, and FEED engineering for a 45 MMSCFD cryogenic facility to separate nitrogen, sales gas and C2+ products from a mixed stream of these components. The plant embodies a relatively simple two (2) tower design, without the need of external refrigeration, with effective nitrogen rejection, high purity sales gas, and 95-99% recovery of ethane in the C2+ stream.

Red Mountain Energy – Alibekmola, Kazakhstan

- Preliminary design of a 40 MMSCFD gas plant located in Kazakhstan. Simulated process design by VMGsim for compression unit, amine sweetening unit, low temperature separation unit and sulfur recovery unit.

Ryder Scott Company – Texas, USA

- Technical consulting and participation in a multi-company bid evaluation team to evaluate the submitted bids from major oil, gas and energy companies opposite tenders from the Abu Dhabi National Oil Company (ADNOC) for development of two, world-scale, highly sour gas fields. Scope included gas field development, reservoir management, sour gas and condensate processing facilities (500 – 1500 MMSCFD), acid gas injection and/or sulphur production, and pipelines for delivery of gas and liquid products to custody transfer points.

S. E. G. I. - Al Khobar, Saudi Arabia

- Process and mechanical design for an ethylene glycol injection unit for a 320 MMSCFD refrigeration system.

Scimitar Petroleum (Egypt) Ltd - Egypt

- Conceptual design of a commercial heavy oil facility producing 10,000 bbl/d oil and 30,000 bbl/d water.

Sherritt International / CUPET - Yumuri, Cuba

- Design, procurement and construction of an oil battery. The facility is designed for the an inlet flow of 3200 m³/d of oil/water emulsion and 100,000 cum/d of entrained gas, with provision for doubling the inlet flow rate by twinning the major equipment.
- Modified a tank weighing system. This involved the innovative design of a mounting unit to overcome thermal expansion and corrosion problems which had caused failure of the loading facility.

Sherritt International Corporation - Cuba

- Revamping a multi-skid gas plant / power generation unit including: compression, sweetening, refrigeration, steam system and turbine driven electrical power generation.

Sherritt International Corporation - Puerto Escondido, Cuba

- 3,200 cum/d heavy oil and 500,000 cum/d solution gas collection battery with oil treating, water treating and disposal facility.
- Project Management - budget, schedule, packaging, shipping, stevedore, load management/storage, cost controls, inventory management, quality control. Sherritt/CUPET liaison, manuals (equipment, operating, training) and operator training.
- Design & Drafting - process, civil, mechanical, electrical, instrumentation, controls, environmental, safety, specifications (equipment and materials): detailed civil, mechanical and electrical construction drawings.
- Procurement - procure and expedite equipment, mechanical and electrical materials, construction tools and materials.
- Start-up support and on-going technical advice.
- Preliminary design of facility expansion (sales oil and solution gas pipelines, compressor/dehydration station, fuel conditioning). National facility infrastructure study.

Sherritt International Corporation - Varadero, Cuba

- Phase 1 (US 20 million) - Responsible for the re-engineering, 25% of the procurement, 50% of project management, 100% of construction troubleshooting, commissioning and start-up for a 35 MW gas-fired power generation facility involving a 110 kV substation, a GEMS6001 turbine, and two 25 km transmission lines. A 15.5 MMSCFD gas plant - 25% mechanical design, 50% of the procurement, commissioning and start-up by GLE. The design provided recovery of 192 bbl/d of LPG and 133 bbl/d of condensate as well as 40 t/d sulphur.
- Phase II (US 30 million) - Responsible for 75% of the engineering, 75% of the procurement, 75% of the project management and 100% of the commissioning and start-up for a 70 MW gas-fired power generation facility involving two GEMS6001 turbines and a 25 km transmission line. A 27.5 MMSCFD plant - 25% of mechanical design, 50% of procurement, commissioning and start-up by GLE - supplied the gas feed. The design provided recovery of 413 bbl/d of LPG and 286 bbl/d of condensate as well as 70 t/d sulphur.
- Phase III (US 100 million) - Responsible for the detailed engineering of the interfaces between three supplemental fired 400+ MMBTU/hr waste heat recovery boilers and the three GE-MS6001 gas-fired turbine generators. Also primary responsibility for engineering of the reverse osmosis (176 US gpm) water treatment system and its interface with the steam generation system, detailed engineering of the interfaces between the steam turbine generator/condenser/cooling water, and detailed engineering of the sea water intake and water desalination make-up. Field procurement of the equipment.

Sherritt Power Corporation - Boca de Jaruco, Cuba

- Phase IV - Responsible for the engineering, procurement, project management, commissioning and start-up for a US \$15 million, 35 MW gas-fired power generation facility involving a 110 kV substation, a GEMS6001 turbine and a 5 km transmission line. A 15 MMSCFD gas plant designed by GLE supplied the gas feed. The design provided for recovery of 166 bbl/d of LPG (C₃ & C₄) and 115 bbl/d of condensate as well as 15 t/d sulphur.
- Integrated within the Cuba projects were the interconnection of the substations into the UNE National grid and the upgrading of the communications link to microwave. This modification became the backbone of a whole new system in Cuba and involved the MMI remote control interface in Havana, towers and the transmission system.

Siemens AG Universal Compression) – Pakistan

- Project Engineer for the detailed design and 3D ACAD for four-4290 kW (5753 HP) compressor skids for fuel gas booster to large turbines.

Southwest China Petroleum Institute - China

- Three week natural gas processing course.

Technologie Gazowe Piecobiogaz - Przemierowo, Poland

- Design of three wellsite facilities including line heaters and separation units.

Tebodin & Partner Llc - Oman

- Technology screening and conceptual development study of gas treating facilities in support of Petroleum Development Oman's (PDO) Rabab Field Development Project. Substantial literature review and vendor dialog identified key options for mercury removal, gas sweetening, COS, mercaptan, and H₂O removal, prior to NGL recovery and sales gas compression. Sweetening and/or dehydration of inlet separator liquids was also investigated, as was compression and dehydration of separated acid gas streams. Optimization of integrated plant configurations and cost estimation provided the basis for a recommended conceptual plant design for PDO for the gas treating facilities.

Tecna S.A. - El Porton, Argentina

- Basic engineering of acid gas injection compressor facility.

Total Austral S. A. - Aguada Pichana, Argentina

- Design/fabrication co-ordination, commissioning and performance testing for a 280 MMSCFD dew point control plant with refrigeration and 9 MW power generation.

Total Austral S. A. - Ara, Canadon Alfa, Brazil

- Layout of a multi-skid plant extension including the inlet FWKO, exchanger, low temp, economizer, compressor (700 HP, screw type) refrigeration accumulator, glycol dehydration, fuel gas, condensate flash drum, condensate pump, ESD, and quadruple level pipe rack skids.

Universal Compression – Venezuela

- Project Engineer for the design and drafting for one (1) 237 HP four throw single stage reciprocating compressor.
- Project Engineer for the design and drafting for two (2) 4735 HP six throw three stage reciprocating compressors.
- Project Engineer for the design and drafting for three (3) 3500 HP three stage compressors.

Universiti Teknologi Malaysia - Malaysia

- Training – Hydrate Formation
- Training – Dehydration Process Design
- Training – Acid Gas Injection