GAS LIQUIDS ENGINEERING LTD.
#300, 2749 – 39th Avenue NE
Calgary, Alberta, Canada T1Y 4T8
Phone: (403)250-2950 Fax: (403)291-9730
www.gasliquids.com

Air Products Canada – Estevan, Sask and Other Canada/US Location

- Evaluated and recommend site-specific product transfer procedures with cryogenic pumps into containment tanks, onsite FRAC – jobs and plant turnarounds.
- Facilitated the training of employees and contractors for safe handling of cryogenic products and tractor/trailer transportation.

Apache Canada Ltd. - Leafland

- Study the potential for increasing the flowrate from the current 20 MMSCFD gas plant.
- Debottlenecking study of the cryogenic section of the plant.
- Resolved problems with brazed aluminum heat ex-changer.
- Rectifier column optimization study.
- Coldbox performance evaluation.

ATCO Gas Services Ltd. - Villeneuve

- Troubleshooting of expander and cold box freezing problems which resulted in operating parameter adjustments and mechanical modifications to the mole sieve driers.

ATCO Midstream - Golden Spike

- Engineering and technical auditing of the detailed design for a 40 MMSCFD sour gas plant involving 450 HP acid gas (50% H_2S) injection, turbo expansion and coldbox, ethane extraction, mole sieve, and mercaptan removal. Project management and engineering management, EPC contract development and administration, start-up services.
- AENV permit application. EUB permit applications and audit manuals.
- Study of third party gas processing options.
- Process design, permitting and project management for a 12 MMSCFD sacrificial sweetening system. Project included Solar compressor upgrades, replacement of trays with structured packing and construction management.
- Acid gas volume: 212 m^3/d. Acid gas compression: 450 HP.

B.P. Resources Canada Ltd. - Chetwynd, BC

- Optimization and costing of modification scenarios for a 70 MMSCFD gas plant.

Border Midstream Services - Alberta

- Acquisition evaluation of multiple gas plants processing 1,000 MMSCFD of primarily sour gas including amine plants, sulphur plants, acid gas injection and turbo-expanders.

Canada Northwest Energy Limited - Różańsko, Poland

- Conceptual design and project budgeting for a 120 MMSCFD gas plant (42 % N_2) involving 3800 B/D oil, 2065 B/D LPG, nitrogen removal and 250 MW power generation.

Canadian Hunter (now ConocoPhillips Canada) - Elmworth

- Process study regarding reduction of CO_2 in ethane product by optimizing 575 MMSCFD expander pressure ratios and demethanizer temperatures. Resulted in recommendation to add a CO_2 rectification column to the demethanizer center feed liquid.

Dow Chemical Canada Limited – Sarnia, Ontario

- Debottlenecking of a de-ethanization tower.
- Hydrate study.

Find Energy Ltd. – Pembina

- Simulated lean oil absorption process and cryogenic process (VMG Sim and Promax) and conducted economic evaluations to realize the potential 95% C3 Recovery in the gas plant.

Gas Liquids Engineering Ltd. - Various

- Simulation studies with the Bryan Research and Development Company's software including: Improving the C_{3+} and C_{2+} recovery performance of existing natural gas processing plants based on turbo expander refrigeration and/or absorption. Nitrogen removal from natural gas by cryogenics or absorption. Helium separation by cryogenics. Modeling and simulation of natural gas dehydration with molecular sieves. Modeling and simulation of hydrocarbon separation on activated carbon.

Industrie Meccaniche Scardellato s.p.a. - Italy

- Design of a skid-mounted nitrogen rejection unit.

Kinder Morgan CO_2 Company L.P. – USA – Additional Projects

- Front end engineering design for treatment of a feed gas stream to specification for delivery to the cryogenics system.

Kinder Morgan – Snyder, Texas, USA

- Preliminary design of a 45 MMSCFD expander plant to strip C_{2+} liquids from a 700 MMSCFD 90% CO_2 feed stream.

Maloney Industries – Calgary

- Utilized a cryogenic process for Qiu Ling Propane Recovery Plant 45 MMSCFD. The design required 25% less energy than the best competing technology and had $US 4 MM less capital cost. The compressors had engine drives. When these drives were fully loaded, the calculated propane recovery increased from 88% to 96%; competing recoveries were 85%. Maloney's bid was chosen by the Technical Committee but was later dropped by the Commercial Committee.

PDVSA/Tivenca – Maracaibo, Venezuela

- Conceptual design of multiple processing options for 1200 MMSCFD gas stream including CO_2 removal, ethane recovery, turbo-expander facility, mercury removal and a nitrogen rejection facility.

Pembina Resources Limited - Diamond Valley

- 400 B/D debutanizer performance upgrade and 20 MMSCFD turbo-expander performance review.
- Sulphur plant facility review and appraisal.

Port Maitland Management - Ontario

- Straddle Plant, 15 MMSCFD mixed refrigerant LPG extraction plant; ethane recovery for heat value trimming was a unique feature of this plant.

Red Mountain Energy – Minnibai, Russia

- Conceptual design and basic engineering at a 45 MMSCFD cryogenic facility
- Provided basic engineering support for process design of a 45 MMSCFD cryogenic facility to separate Nitrogen, sales gas and C_{2+} products from a mixed stream of these components. The plant embodies a relatively simple two tower design without the need for external refrigeration, and with effective nitrogen rejection, high purity sales gas and 95 – 99% recovery of ethane in the C_{2+} stream.
- Further tasks performed included the preparation of equipment data sheets and researching materials appropriate for use in cryogenic facilities.
- Performed preliminary cost estimate for 24 hp cryogenic pumps for nitrogen/methane and ethane/propane services.
- Process design and basic 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.

Solex Gas Processing Corp.(now Altagas) – Harmattan

- 200 MMSCFD gas plant expansion study involving C_{2+} recovery with Ortloff's GSP process.

Taylor Gas Liquids (now Altagas) - Younger

- Modification of cryogenic subcooler and regeneration gas exchangers.

Western Decalta Petroleum (1977) Limited - Diamond Valley

- Coldbox performance review and troubleshooting.
- Expander wheel modification recommendations for alternate plant flowrates.
- Performance of numerous operating parameter reviews over several years as gas composition and flow rates changed.
- Consulting, supervision, and project management of several plant modification projects resulting from changes in plant feed composition over several years, including mercaptan removal, excess CO_2 in feed gas, and feed precooler heat exchanger installation
- Gas chilling (4000 BBL/D debutanizing) and Turbo Expander Study (20 MMSCFD).