

### **Alberta Natural Gas - Cutbank**

- Responsible for the optimization, debottlenecking, and reconfiguration of compressors totaling 5000 HP. Compressor types included Ariel, Energy Industries, Knox Western, and Superior. Engine types included Caterpillar, Superior, and Waukesha.

### **Algharim International - Kuwait**

- Equipment inspection, evaluation on process hazards analysis for a 250 MMSCFD gas conditioning facility
- Prepared budgetary cost estimation for fuel gas boosting compressors for a power plant project.

### **AltaGas Ltd. – Suffield South**

- Modeled the pipeline network 103 km and 5 compressor stations by PIPEFLO including matching field and simulation data.
- Evaluated hydraulic analysis data to determine potential maximum backpressures for various capacities. Undertook economic analysis of looping and compressor options.

### **Altana Exploration - Sunchild**

- 500 HP compressor station c/w dehydration and associated pipelines.

### **Amerada Hess Canada Ltd**

#### **Boundary Lake, BC**

- Project management of the design and installation of 1100 HP compression.

#### **Cessford**

- Project management of the design and installation of a 300 HP gas compressor.

### **Amoco Canada Petroleum Company Limited**

#### **Fir**

- Installation of two 1,000 HP gas engine driven sour system compressors to interface with an existing gas treating facility. The scope of work included: the addition of two 10 HP reciprocating liquid pumps, and upgrading of the utility air and the heating systems; and co-ordination of the multi-discipline team.

#### **Wabasca**

- Design, relocation and refurbishment of a 1500 psi compressor air injection train c/w water quench pumps to assist a heavy oil recovery scheme.

## **Anadarko Canada Corporation**

### **Junior, NEBC**

- Design, material and equipment specifications, as well as procurement and project management, for the construction of a new separation/dehydration station with capabilities for future compressor installation. Design capacity: 28 MMSCFD, sour gas.

### **Townsend**

- Compressor station (738 HP) including inlet separator, reciprocating compressor, dehydrator, tank farm, genset, MCC, instrument air, flare knockout and flare stack, gathering system and sales pipeline were also included in the scope of work for this project.
- Designing of a 20.0 MMSCFD gas plant and pipeline including inlet separation, compression piping layout, dehydration, flare system, MCC buildings, utility buildings, gen-sets, tank farm, FKO's, I.A. 5000 HP compressors, metering facilities, line heating, storage containment and gas tie-ins to plant. Large O.D. Mountain pipeline Bores.

## **Anderson Exploration Ltd. (now Devon Canada Corporation)**

### **Beatton River**

- Air dispersion modeling and environmental approval for a 22 MMSCFD sour compressor station.

### **Blue Range – Big Bear – South Clear Hills**

- Design and procure materials for a 1,000 HP sour compression and dehydration facility with state-of-the-art emissions incineration.
- Managed HAZOP study process.

### **Other NEBC**

- Regulatory approvals.
- Drawing development.
- Procurement of a sweet booster compressor.
- Construction bid preparation and evaluation.

### **Paradise**

- Detailed engineering design for the addition of a 250 HP reciprocating booster compressor and tie-ins.
- Submitted applications to the Oil and Gas Commission for four pipeline projects in NE British Columbia.

### **Saddle Hills**

- Design and project management of a 2800 HP compressor installation.

### **Valhalla**

- Project management of a 5600 HP compressor installation.
- Project management of a 400 HP compressor installation.

### **Woking South**

- Project management of a 607 HP compressor installation.

### **APF Energy Trust**

#### **Alberta, Canada**

- Facility instrument air compressor replacement involving design, specification, procurement and delivery.

#### **Sakwatamau**

- Responsible for cost control and reconfiguration of an existing motor driven 500 HP Gardner Denver compressor. The unit was reconfigured from a single to two-stage compressor, with interstage processing. A torsional analysis was included as part of the project, requiring changes to the flywheel.

#### **Two Rivers**

- Co-ordination and field inspection of a 400 hp compressor installation.

### **Artemis Exploration Inc. - Unity**

- Responsible for completing the design of nine (9) sweet shallow gas pipeline tie-ins and one main gathering pipeline to tie in at an existing compressor station. Pipeline sizes vary from 4", 6" and 8" of Poly-ethylene pipe.

### **Atco Midstream Ltd. – Glen Ewen**

- Design, material specs, construction bid documents and construction contract award for the installation of a screw compressor package, inlet separator package, ancillary installation and piping associated at existing sour gas facilities.

### **ATCO Gas Services Ltd. - Golden Spike**

- Project management of a 500 HP compression installation

### **Barrington Petroleum Ltd. - Jumpbush**

- Design and project management of a 740 HP compressor installation.

### **Baytex Energy Ltd. - Westeros**

- Design and project management of a 1200 B/D sour oil battery with 10 MMSCFD solution gas including 2750 HP re-injection compressor.

### **Bear Cub Energy – Texas, USA**

- The AGI process section consisted of 2x100% 5-stage motor driven 600 BHP (447 kW) reciprocating compressors with acid gas feed conditions of 3.0 MMSCFD ( $0.085 \times 10^6 \text{ m}^3/\text{day}$ ) gas containing 55% H<sub>2</sub>S and 43% CO<sub>2</sub> with a discharge pressure of 1280 psig (8825 kPa).

### **Belair Energy Corporation - Turin**

- Optimization study, which saved the cost of a new compressor installation.

### **BHP Petroleum (Canada) Inc.**

#### **Cecil Lake**

- 60 B/D / 0.5 MMSCFD sales gas / 1.5 MMSCFD gas cycling scheme comprised of field satellites test separator & header building, pig catcher and launcher, pop tank, battery and compressor station (group and test separator package c/w pig catcher, compressor, flare stack & K.O. drum, LPG bullet, refrigeration skid, U/G water drain tank, 5 oil storage tanks).
- Gas plant: 98.61 e<sup>3</sup>m<sup>3</sup>/day (3.5 MMSCFD), 444 kW (600 HP) compression, refrigeration, 105 B/D LPG mix. Project Manager for the EPCM execution of NGL liquids recovery and the re-injection of the gas (a recycle scheme). The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and storage vessels. Responsible for operating manuals, commissioning and start-up.

#### **West Pembina**

- Gas plant: 16.9 e<sup>3</sup>m<sup>3</sup>/day (600 MSCFD), 93 kW (125 HP) compression, refrigeration, 2.4 m<sup>3</sup>/day, (15 B/D) LPG mix. Project Manager for this solution gas processing facility (battery off-gas). The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and storage vessels. Responsible for operating manuals, commissioning and start-up.

### **Blue Range Resource Corporation**

#### **Bulrush**

- Responsible for a 20 MMSCFD, 1950 HP compressor station c/w inlet separator modifications and expansion of the wellsites and gathering system.

#### **Delburne**

- Piping arrangement drawings for three 400 HP compressor package installations.

#### **Hillsdown**

- Design and project management of a 740 HP compressor installation.

#### **Pickwell**

- Design and project management of 5 MMSCFD two well gas gathering system and compressor re-commissioning.

### **Bonavista Petroleum**

#### **Alberta**

- Refurbish 25 MMSCFD sour compressor station c/w acid gas VRU.

**Beaton**

- Project management of the installation of compression (400 HP and 800 HP), inlet separator and dehydration facilities.

**Branch**

- Project management of the installation of inlet separator, dehydrator and compressor (400 HP).

**Charlie**

- Design and project management of a 800 HP compressor installation.

**Expanse**

- Design and project management of a 800 HP compressor installation.

**Heathdale**

- Design and project management of a 800 HP compressor installation.

**South Elkton**

- Plant and compressor station revamp

**West Cove**

- Drawing development, design and ABSA application of an 800 hp compressor station.

**Burlington Resources Canada Ltd.(now ConocoPhillips Canada)**

**Dahl**

- 10 MMSCFD Compressor Station c/w inlet separation, dehydration, metering, NGL storage, fuel gas sweetening, electrical generation and scada system.

**Gutah**

- 25 MMSCFD compressor station complete with inlet separation, metering, liquid blowcase facility including electrical generation, scada, system, operator residence and helicopter hanger and fueling facility.
- Locations 9-26-c, 9-98-L and d-100-E field compressor stations. Three remote, winter access field compressor sites from 530 – 1200HP. C/W inlet separation and blowcase facilities, metering, electrical generation, scada systems, and helicopter landing pads.

**Kahntah**

- 16 MMSCFD compressor station complete with inlet separation, metering and liquid blowcase facility including electrical generation and scada system facilities.

**Ring Border**

- Responsible for modifying an existing d-21-L/94-H-9 compression facility involving the installation of an 1100 HP compressor unit and a 1400 HP compressor unit to increase capacity to 27 MMSCFD.

### **Canada Northwest Energy Limited (now Sherritt International Corporation)**

#### **Mikwan**

- EPCM on this gas plant expansion: 169 e<sup>3</sup>m<sup>3</sup>/day (6 MMSCFD), 28.6 m<sup>3</sup>/day (180 B/D) LPG mix, and 518 kW (700 HP) compression. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

#### **Meyer Lake**

- Design and project management of a 1072 HP compressor station with dehydration facilities.

#### **Morinville**

- Design and installation management of a 1.5 MMSCFD compressor station with low noise parameters.

#### **Oldman**

- EPCM on a greenfield gas plant: 507 e<sup>3</sup>m<sup>3</sup>/day (18 MMSCFD), refrigeration sweetening, 48 m<sup>3</sup>/day (300 B/D) LPG mix, 444 kW (600 HP) compression. The equipment included the piping, instrumentation and controls, compressors, contactor tower, amine absorber, heat exchangers (reboilers, condensers), pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

#### **Peter**

- Design and project management of a 814 HP compressor installation.

### **Canadian Hunter Exploration Ltd. - Pedigree**

- Responsible for a 20 MMSCFD compressor station complete with inlet separation, metering, liquid blowcase facility and scada system.

### **Canadian Natural Resources Ltd. - Oldman**

- Design and project management of a 814 HP compressor installation.

### **Caterpillar Inc. – Houston**

- Marketing – project engineer to develop a fuel gas treatment unit (GTU) for recovery of solution gas to fuel a 5MW generator plant for Siberia. The design utilized a 300 KW compressor and multi staged Joules Thomson Choke process.

### **CEPSA/ SONATRACH – Algeria - RKF HMD**

- Monitored and controlled the safe and efficient operations of two High-pressure multi stage separation trains, one train of five gas injection compressors and eighteen (18) oil/gas production / injection wellheads.

### **City of Calgary - Bonnybrook**

- Evaluation of the digester gas system for the sewage treatment plant.
- Design and specification of the storage compressor.

### **Chesapeake Energy Corporation Project, - Oklahoma**

- Prepared data sheets for new compressors, pumps, heat exchangers, air coolers and vessels.
- Involved in technical analyzing and evaluation of acid gas compressor vendor bids.
- Prepared equipment (pumps, compressors, heat exchangers, vessels) datasheets.
- Design of a five stage 450 HP acid gas injection compressor.

### **Chevron (Universal Compression) – Thailand**

- Project engineering 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.

### **City of Medicine Hat - Medicine Hat**

- Project management for the optimization, debottlenecking and reconfiguration of distribution piping and a 1200 HP electric drive-reciprocating compressor. Project scope included rewinding the existing electric motor, restaging the compressor, a pulsation study, construction and installation of custom designed pulsation bottles, and the addition of a flywheel to alter the coupling resonant frequencies.
- Project management for the installation of a 600 HP screw compressor.
- Project management for the installation and repackaging of an 1100 hp reciprocating compressor.

### **Concept Compression Corporation**

#### **High Pine**

- Responsible for the completion of a fugitive emissions study of a compressor building.

#### **Various**

- Fugitive emissions studies on a number of sour service compressor packages.

#### **Wapiti**

- Responsible for the completion of a fugitive emissions study of compressor building.

### **Confidential – Middle East**

- The AGI conceptual design basis consisted of 3x50% 4-stage gas turbines each at 14152 BHP (10409 kW) driving reciprocating compressors. The total acid gas feed conditions are 85 MMSCFD (2.41 x 10<sup>6</sup>m<sup>3</sup>/day) gas containing a range of 34-64% H<sub>2</sub>S with the balance CO<sub>2</sub> and a discharge pressure of 230 bara (23,000 kPa).

### **ConocoPhillips Canada Ltd**

#### **Peco**

- Modifications to the existing gas plant involving upgrading of the liquid processing train, addition of a recycle compressor and the conversion of a turbo-expander plant from demethanized to deethanized liquid production.

#### **Minehead**

- Design and project management for the installation of a new group/test separator and piping associated at an existing compressor/dehydration station.

### **Connacher Oil and Gas Ltd. - Calgary**

- Pipe racks, reciprocating compressor foundation, dynamic design analysis.

### **Crestar Energy Inc.(now ConocoPhillips Canada)**

#### **Bantry**

- Provided project management, equipment specification, and control and electrical systems design for a grass roots oil battery consisting of an inlet test separator, free water knockout, water injection, solution gas compressor (800 HP), and a tank farm. The control system consisted of a PLC 5/30 and Winview MMI. The power system consisted of a 1000 AMP service with a 200 HP gas compressor and a 125 HP water injection pump.

#### **Jenner**

- A major expansion of an oil battery to increase the oil production from 300 to 600 m<sup>3</sup>/d and water injection rate from 3,000 to 9,000 m<sup>3</sup>/d. The expansion included the installation of a 12 ft dia. x 80' S/S FWKO, 1600 HP produced water injection pump, 200 HP solution gas compressor, automated desand system and extensive piping modifications.

#### **Jenner**

- Responsible for the specification, the procurement of mechanical equipment, and the co-ordination of the detailed design for two oil batteries, and the installation of an 800 HP reciprocating compressor and inlet separator/blower package.

#### **Little Bow**

- Compressor package change out from an electric drive unit to an internal combustion.

#### **North Gilby**

- Modification of a gas plant to convert it to a 400 HP compressor station including recylindering of the compressor.

### **Saddle Hills**

- Design and project management of a 2,000 B/D oil battery for treatment of 25 API oil including 4,000 B/D water injection facilities.
- Responsible for permit applications and specification and procurement of mechanical equipment, including a crude oil treater, tankage and VRU, for a 300 m<sup>3</sup>/d crude oil battery.
- Project engineering for expansion to a oil battery to include 800 HP electric driven compression, power generation (1MW), MCC building, flare stack, line heater and an inlet separator/pumping skid.

### **Cube Energy Ltd. - Provost**

- New design for a 360 HP compressor skid, which became the prototype for a rental fleet involving more than 50 units for various firms.

### **Devnic Resources Ltd - Morinville**

- Responsible for a 5 MMSCFD compressor station c/w inlet facilities and metering.

### **Devon Canada Corp (formerly Anderson)**

#### **Birley Creek, BC**

- A sour central oil battery with solution gas recovery and gathering/discharge pipeline system. Provided permitting, engineering including mechanical design, equipment specification, procurement, expediting, instrumentation and controls design.

#### **Cabin Creek**

- Design review and process engineering for sour conversion of a 50 MMSCFD TEG glycol dehydration facility.
- Plant SO<sub>2</sub> modeling.
- Design and project management for the addition of 1480 HP sour gas compressor.
- Design and installation of the addition of two 1480 HP sour compressors to the existing facility. Responsibilities included design review and input for the new compressor package, drawing review and management, regulatory submissions, procurement, construction inspection and start-up supervision.
- Responsible for the set up, distribution and evaluation of a mechanical construction bid for a 1434 HP compressor addition.

#### **East Eagle**

- A sour 6 MMSCFD, 1050 HP compression facility comprised of group separator, compressor, dehydrator, flare system, pipelines and modifications to existing oil battery to recover solution gas. Provided permitting, engineering and project management including mechanical design, equipment specification, procurement, expediting, instrumentation and controls system design.
- Repair and abandonment permits for pipelines.

#### **Edam, Saskatchewan**

- Permitting and relocation of compressor station from Alberta to Saskatchewan.
- Design and project management of a facility including 500 HP compression, inlet separation, dehydration, produced water, gas gathering system and sales line with an alternate fuel gas system for the nearby sand disposal facility.

### **Gunderson**

- Sour gas plant: 1409 e<sup>3</sup>m<sup>3</sup>/day (50 MMSCFD), 15% H<sub>2</sub>S, mole sieve, inlet slug catching, two 400 kW power generators, a 1110 kW (1500 HP) compressor, operations camp, infrastructure, 2 wellsites tie-ins, vapour recovery system. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for operating manuals, commissioning and start-up.
- Design and project management for the addition of one 20 MMSCFD, 1600 HP sour gas compressor.

### **Normandville**

- Sour gas plant; 562.8 e<sup>3</sup>m<sup>3</sup>/day (20 MMSCFD), 2220 kW (3,000 HP) compression (inlet & sales total), 150 kW (200 HP) refrigeration, 4.54 m<sup>3</sup>/hr (20 USGPM) amine-sweetening, 37 kW (50 HP) acid gas (75% H<sub>2</sub>S) re-injection compression. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers (reboilers, condensers), pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

### **North Cecil**

- EPCM execution for a sour gas plant of a 1268 e<sup>3</sup>m<sup>3</sup>/day (45 MMSCFD), 4440 kW (6000 HP) compression, 333 kW (450 HP) refrigeration, 14.76 m<sup>3</sup>/hr (65 USGPM) amine-sweetening, recycle compression and acid gas incineration. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for operating manuals, commissioning and start-up.

### **North Nig Creek, BC**

- Permitting, process design, and project management for the installation of a second compression train at an existing 40 MMSCFD compressor station.
- Modifications included the addition of inlet separator, compression (2215 HP), dehydration with dual sales line flowcontrol, a sales pipeline and power generation.

### **Omega**

- EPCM execution for a gas battery, 112.7 e<sup>3</sup>m<sup>3</sup>/day (4 MMSCFD), 296 kW (400 HP) compression, dehydration. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for operating manuals, commissioning and start-up.

### **Pica**

- EPCM execution for a gas plant: 451 e<sup>3</sup>m<sup>3</sup>/day (16 MMSCFD), 548 kW (740 HP) compression, 111 kW (150 HP) refrigeration, and condensate product. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for operating manuals, commissioning and start-up.

### **Puskwaskau**

- EPCM execution for a sour gas plant: 563.5 e<sup>3</sup>m<sup>3</sup>/day (20 MMSCFD), 1904 kW (1,478 HP) compression, 148 kW (200 HP) refrigeration, 4.54 m<sup>3</sup>/hr (20 USGPM) amine sweetening, 74 kW (100 HP) (58% H<sub>2</sub>S) acid gas re-injection compression, 37 kW (50 HP) water disposal pump, and 30 kW (40 HP) recycle compression. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for operating manuals, commissioning and start-up.
- Upgraded to 111 kW (150 HP) acid gas compression. Installed power generation. Upgraded amine plant to 5.7 m<sup>3</sup>/hr (25 USGPM).

### **Rycroft**

- EPCM execution for a sour gas plant: 676.2 e<sup>3</sup>m<sup>3</sup>/day (24 MMSCFD), 2220 kW (3000 HP) compression, 259 kW (350 HP) refrigeration, 28.4 m<sup>3</sup>/hr (125 USGPM) amine-sweetening, 185 kW (250 HP) acid gas injection, 1200 kW power generation, recycle compressor and VRU. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for commissioning and start-up.

### **South Cecil**

- Design and installation of suction pressure control on existing plant compressors.

### **South Eaglesham**

- EPCM execution for a gas plant: 563.5 e<sup>3</sup>m<sup>3</sup>/day (20 MMSCFD), 2220 kW (300 HP) refrigeration, 33.3 m<sup>3</sup>/day (210 B/D) LPG. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

### **West Culp**

- EPCM execution for a sour gas plant: 563.5 e<sup>3</sup>m<sup>3</sup>/day (20 MMSCFD), 2220 kW (3000 H) compression, 260 kW (350 HP) refrigeration, 28.4 m<sup>3</sup>/hr (125 USGPM) amine sweetening, 185 kW (250 HP) acid gas injection, 1200 kW power generation, oil battery modifications, solution gas compression and VRU. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

### **Wolverine**

- Design and construction support for a 3 MMSCFD sour gas dehydration facility. The equipment included a line heater, hot oil circulation string pump skid, dehydrator unit, meter skid, utility skid c/w air compressor, flare stack and incinerator.

### **Zarembo, BC**

- Permitting, process design and project management for the installation of an oil battery with solution gas compression and gathering system.

### **Dome Petroleum Limited - Vulcan**

- Responsible for a 50 MMSCFD compressor station involving three 1650 HP compressors (EPC Scope).

### **Duke Energy (now Spectra Energy)**

#### **Fourth Creek**

- Process design and project management for the EPCM execution for a gas plant: 1634 e<sup>3</sup>m<sup>3</sup>/day (58 MMSCFD), two 6.8 m<sup>3</sup>/hr & 10.2 m<sup>3</sup>/hr (30 & 45 GPM) mixed amine processes, 148 kW (200 HP & -10°F) and 333 kW (500 HP & -45°F) refrigeration, 1332 kW (1800 HP) Paddy scheme, 2220 kW (3,000 HP) plant sales compression, 111 kW (150 HP) acid gas (30% H<sub>2</sub>S) re-injection

#### **Gadsby**

- Installation of a 630 HP compressor, dehydrator and associated piping.

#### **Gordondale West**

- Audit of compressor performance and recylindering.

#### **Midwinter**

- Installation of a 1100 HP compressor into an existing facility plus expansion of a tank farm and the addition of piping to the inlet header.
- compression. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for regulatory approvals, emergency response procedures, operating manuals, commissioning and start-up.

### **Encal Oil and Gas Ltd - North Oak, BC**

- 1,500 B/D (32° API) oil battery including gathering system and treatment, water handling, 2 MMSCFD sweet solution gas plant (compression, dehydration, provision for future VRU). Provided permitting, engineering and project management for oil and gas production facilities including mechanical design, equipment specification, purchasing, expediting, critical path scheduling, reporting, cost control, instrumentation, and controls system design.
- Design and project management of a 400 HP compressor installation.

### **Encana (formerly PanCanadian) – Deep Panuke, Nova Scotia**

- The study included compressor sizing (approximately 1200 HP, phase equilibrium calculations, water content and knockout and budget cost estimation.

### **ENCO - Windflower**

- Field Inspection for a 600 hp compressor station including dehydration and associated pipelines.

### **Enerflex Systems Ltd.**

- Design and coordinate construction of one reciprocating and three oil flood screw compressor packages.

## **Enermark Inc**

### **Alexis**

- Pipeline tie-in of the gathering system to the inlet header and the addition of a 250 HP compressor and dehy.
- Design, permitting, detailed engineering, procurement, construction management and overall project management of 2 MMSCFD compression facility.

### **Bantry**

- Design, construction and installation of two 1250 HP, four throw three-stage compressors.
- Upgrade of an existing compressor station inlet separator to a 72" diameter, #300 vessel. Responsible for design of vessel and associated process piping.
- Installation of a 600 HP screw booster compressor to an existing compressor station. Scope of work included partial design work and construction management.
- Installation of two small solution gas screw compressors on the casing gas of two oil wells in the Bantry area. Responsibilities included regulatory submissions and design work.

### **Bashaw**

- Design, construction and installation of five rotary screw compressors ranging from 242 - 933 kW (325 – 1250 HP).

### **Chinchaga/Debolt**

- Design, installation and procurement for two 400 HP screw compressors plus associated equipment.

### **Debolt**

- Organized the bidding of transportation for a compressor from Calgary to Chinchaga including bid requests, clarifications, and contractual award and materials requisitions.

### **Firebird**

- Compressor performance audit and optimization.

### **Fox Valley**

- Project coordination for the design, construction and installation of one (1) Ariel JGK/3 frame and a Caterpillar G3512-LE natural gas driver and the removal of two (2) existing compressors from the site. Responsible for:
  - The design layouts and site configuration
  - The completion of project cost estimates
  - Completed equipment bid, evaluations and award
  - The sizing and design of all required equipment
  - Coordination of drawing completion with drafting department
  - Ordering all PV&F
  - Coordination with Tarpon Energy Services for the electrical design and construction
  - Coordination and shipping of all equipment to site
  - Provision of field support during construction

### **Giltedge**

- Project coordination and purchase of a casing gas booster compressor.

### **Glacier**

- Design, construction, and installation of a multi-service compressor, plus tie-in of multiple pipelines and associated equipment; simulation of gathering system

### **Gote**

- Piping modifications, recylindering of a 600 HP compressor, and the addition of a larger genset.

### **Hanna**

- Design and project management of 56 well gathering system with over 25 miles of pipelines. Project was completed under budget and ahead of schedule.
- Detailed engineering, materials specifications, AEUB permits, material procurement and construction management for the installation of a new compressor package at existing Valhalla facilities.
- Optimization of two existing compressors, including addition of side stream piping and controls, plus the addition of another three-stage compressor.

### **Pouce Coupe**

- Addition of a lube oil scrubber on the existing compressor.

### **Princess**

- Removal of the existing screw compressor and subsequent replacement with a reciprocating compressor. The project included the expansion of the gathering system, tie-ins, piping modifications, and the addition of separation and an amine system.

### **Silver Heights**

- Optimization of an existing electric drive compressor, plus foundation and piping changes required to decrease unit vibration.

### **Trochu**

- Gathering system simulation which included booster compressor stations.
- Responsible for the construction of thirteen (13) new pipelines and three (3) compressor stations: pipelines consisting of 3" dia., 4" dia., and 6" dia., 15.35 km. Compressors include two (2)-400 HP screw compressors and one (1) 860 HP screw compressor; completed AEUB application for pipelines and compressor stations; completed AEUB audit packages for pipelines and compressor station; designed compressor layouts and all associated equipment (PSV's, tanks, pipe size, gravel pad design); completed ABSA applications for all three (3) compressors, drawing development, approval and completion, construction bid packages and bid evaluation.
- Responsible for the cost estimation and design of compressors based on gas rates of 3 MMSCFD, 0.714 MMSCFD and 1.43 MMSCFD; awarded construction contract, provided construction field support, purchased all necessary equipment and materials.

### **Valhalla**

- Plant reconfiguration project that involved modifications to the gathering system, inlet header, plant piping, the VRU, and the addition of 1500 HP compression.
- Detailed engineering, material specifications, AEUB permits, material procurement and construction contract award plus full project management to completion for the installation of a new compressor package.

### **Princess**

- Design and project management of a booster compression addition to conserve flare gas. 600 HP, 3-stage compression from 20 psig to 700 psig.
- Design and project management of 5.5 km of 6" emulsion pipeline.
- Add booster compression/conserve flare gas.

### **Entex Petroleum Ltd. - Carbon**

- Responsible for a 2.8 MMSCFD, 550 HP compressor station.

### **ESSO Resources Canada Limited**

#### **Boundary Lake**

- Responsible for the specification and procurement of a fully modularized 75 HP electric two-stage reciprocating vapour recovery compressor package c/w auxiliary equipment.

#### **Judy Creek**

- Specify and evaluate bids for three electric drive, 3,000 HP three-stage natural gas compressors for low-pressure inlet applications, to specify, evaluate bids and procure two 2,500 HP centrifugal York refrigerant compressors and to critique two existing 1,300 HP centrifugal York refrigerant compressors.

### **Exmar (through Universal Compression) – Gulf of Mexico**

- Detailed design and 3D ACAD for two 3550 HP modular three level compressor skids for an offshore platform – designed to marine offshore specifications.

### **Falghanim International LLC**

- Design Engineering and review for six (6) 2250 KW single stage fuel gas booster compressors.

### **Find Energy – Blue Rapids/Pembina**

- Design of a 30 MMSCFD gas plant and subsequent expansion to 57 MMSCFD. This included inlet separation, condensate stabilization, dehexanizer; refrigeration, compression, flare system instrumentation and control logic, plant piping, tank farm, MCC buildings, utility buildings, propane storage, truck loading system, LACT units, metering facilities, flare knockout drum, instrument air compressors, plant heating systems, storage containment, transportation and setting of equipment.
- Design and installation of three 1478 HP (three-stage compressors).
- Process design of a 30 MMSCFD sweet gas plant which included three 1478 HP inlet and sales compressors, refrigeration for LPG recovery, condensate stabilization and frac oil production.

### **FlowPhase Inc.**

- Developed engineering software programs for pipeline pressure drop, compressor horsepower, hydrate and methanol injection and hydrocarbon dew point analysis.

### **Genra Energy Corporation - Gote**

- Design and project management of a 600 HP compressor installation.

### **Glencoe Resources – Joffre**

- CO<sub>2</sub> sales compressor package with a single stage reciprocating compressor driven by electric Motor.

### **Grad & Walker Resources Ltd**

#### **Big Meadow**

- Permitting for booster compressor installation.
- Inspection of compressor revamp.

#### **Bonnyville**

- Design and project management of a 1200 HP compression/dehydration facility including 10 km 4" / 6" gathering system.

### **Grand Banks Energy Corp. – Tower Creek**

- Sour gas plant: 1409 e<sup>3</sup>m<sup>3</sup>/day (50 MMSCFD), 15% H<sub>2</sub>S, mole sieve, inlet slug catching, two 300 kW power generators, infrastructure, sour water stripping, and incineration. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and vessels. Responsible for operating manuals, commissioning and start-up.

### **Grey Wolf Exploration Ltd - Sundre**

- Responsible for the compressor study for revamping of the gas plant compression facility on a 1400 HP natural gas driven compressor and two 700 HP electric drive compressors.

### **Gulf Canada Resources Limited (now ConocoPhillips Canada)**

#### **Ester**

- Ester 01-15 Compressor Station - Project management of the installation of 840 HP Gemini unit.

#### **Jenner**

- Shallow gas program with 100 well site tie-ins.
- Rebuilt and modified Jenner 15-23 51" separator.
- Project manager for the installation of 7840 HP Ariel JGH4 compressor and 5 MMSCFD dehydrator.

### **Westerose**

- Fast-track project to install a 600 HP sour gas compressor. Provision was included for a future 3,200 HP to be added at the site. This project was very sensitive to odour and noise environmental issues.

### **Hanover Russell – Tulsa, OK**

- Design and fine-tuning of an acid gas injection scheme to dispose 0.3 MMSCFD of about 55% H<sub>2</sub>S and 45% CO<sub>2</sub> including injection pressure estimation, compressor sizing, phase equilibrium calculations, and water content and knockout.

### **Hawker Resources - Boundary Lake**

- Installation of a 1500 HP screw booster compressor in front of four 450 HP integral reciprocating compressors.
- Compressor failure investigation.
- Responsible for the installation of a 1500 hp screw compressor and plant modifications.

### **Home Oil - Elkton**

- Have optimized gas well drilling and compressor sizing, field location, and long term budgeting and planning for gas field development using computer economic modeling.

### **Hudson's Bay Oil & Gas – Zama**

- Replaced the low pressure-sweetening tower planned for the gas plant 75 MMSCFD with a recycle loop through the inlet compressor. Low-pressure sweetening towers have foaming problems when sweetening rich deethanizer overhead streams at their dewpoint temperature. Recycling this small rich stream into the plant inlet avoided any sweetening problems and reduced filter disposal problems.

### **Husky Energy**

#### **Fox Creek**

- Addition of a 250 HP, 70 e<sup>3</sup>m<sup>3</sup>/day, 2 stage reciprocating compressor at an existing well site
- Scope included detailed engineering and construction for the compressor addition. The compressor was moved from another Husky site

#### **Rainbow Lake (1)**

- Addition of a 1200 HP, 500 e<sup>3</sup>m<sup>3</sup>/day sour gas compressor
- Scope included detailed engineering, procurement and construction for the compressor addition, flare system update

#### **Rainbow Lake (2)**

- Optimization of existing acid gas compressors and addition of new acid gas compression 1400 HP.
- Engineering and safety audit for acid gas injection system, system revamp, and continued operations support. Specifications for 3<sup>rd</sup> AGI compressor

### **Ram River**

- Fast-track project to procure and install a 1478 HP sweet gas compressor into the existing plant. Sophisticated controls were designed and integrated into the existing plant Delta V system.

### **Sylvan Lake**

- Responsible for the completion of five different flare system compliance reports ranging from 4 compressors and 1 gas producing facility.

### **Husky Oil Operations Ltd. - Blackstone**

- Air dispersion modeling and environmental approval for a 200 MMSCFD acid gas facility.
- VRU and acid gas compression (300 HP) addition.

### **Imperial Oil Ltd - Sarnia, Ontario**

- Refrigeration package for the refinery which included: compressor, oil separator, condenser, and oil recovery skid.

### **Interation Energy Ltd.**

- Umbach compressor station (6 MMSCFD)

### **J.M. Huber Canada Limited**

#### **Sexsmith**

- Cost estimate for a 140 HP wellsite compressor station.

#### **Kaybob South**

- Co-ordinated the detailed engineering design for the installation of a 130 HP booster compressor and tie-ins.

### **James E. Smith & Assoc. – Tyler, Texas**

- Design of a 3 MMSCFD acid gas injection scheme inject (about 50% H<sub>2</sub>S and 50% CO<sub>2</sub>). Including injection pressure estimation, compressor sizing, phase equilibrium calculations, water content and knockout and budget cost estimation. Several scenarios were investigated.

### **K2 Energy - Cutbank, Montana, USA**

- Design, engineering and project management for the tie-in of 7 low pressure gas wells and gathering system including a screw booster compressor (325 HP), 20" dia dehydration, recip sales compressor (250 HP) and 10 km of 4" steel 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.

### **Keyera Energy (formerly Keyspan Energy)**

#### **Caribou**

- Project Engineer for the design, selection and installation of one 1478 hp sweet sales gas compressor and one 800 hp 5-stage acid gas compressor.

#### **Gilby**

- Responsible for completing cost estimates on three (3) different scenarios to deal with acid gas (Option 1: Dehy and AGI compressor with small pipeline to edge of lease), (Option 2: Dehy, compressor and pipeline to another facility), (Option 3: Incinerator).

### **Kharafi National - Kuwait**

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

### **Kinetic Resources (LPG) - Alberta**

- Developed a cost estimate of a “rail in / truck out” propane terminal, consisting of eight-spot rail unloading rack, nine propane storage tanks, truck loading station, loading pumps, propane vapor compressors, and associated utility and safety facilities.

### **Lariat Oil & Gas Ltd. – Three Hills**

- 1 MMSCFD compressor station including inlet separation and metering.

### **Long Petroleum – Shreveport, Louisiana**

- Design of a process for the injection of 1.5 MMSCFD of sour gas (6% H<sub>2</sub>S and 6% CO<sub>2</sub>) with particular focus on injection pressure estimation, phase equilibrium, hydrate formation and prevention, and preliminary compressor sizing.

### **Longview – Arkansas, USA**

- Design calculations for a proposed scheme for the injection of 1.5 MMCFD of sour gas (6% H<sub>2</sub>S, 6% CO<sub>2</sub>) including injection pressure estimation, water content, compressor sizing and hydrate calculations.

### **Ministry of Oil and Gas - British Columbia**

- Completed a project for BC govt. to assist the Ministry in evaluating Producers Cost of Service. Evaluated the capital cost of equipment and total installation cost for pipeline, compressors, amine plants, molecular sieve plant for sweetening and dehydration.
- Scope included developing both equipment and total installed cost curves with an accuracy of  $\pm 25\%$  for the following equipment types:
- Compression for sweet and sour applications using reciprocating, turbine centrifugal, and screw compressors with all drive types ranging from 1,000 to 20,000 hp (0.75 - 15 MW).

### **Mark Resources Inc.**

#### **Eta Lake**

- Project management of a 300 HP compressor installation.

#### **Gadsby**

- 4 MMSCFD, 400 HP booster compressor expansion including an upgrade of the existing dehy, an addition of fire/gas safety detection, an addition of a flare system and a PLC control system. Provided permitting, engineering and project management for gas production and compression facilities including mechanical design, equipment specification, purchasing, expediting, critical path scheduling, reporting, cost control, instrumentation, controls system design.

### **Mazeppa Processing Partners – Mazeppa**

- Design and procurement of two (2) 2000 HP electric driven two-stage sweet gas reciprocating compressors.
- Project Engineering and procurement for one (1) 450 HP three-stage overheads recycle compressor.
- Troubleshooting engineer to assess a compressor after cooler, and to source an overhead vapors cooler.

### **Mobil Oil Canada Ltd.**

#### **Lone Pine**

- Design and project management of a 1000 HP electric drive compressor installation including boiler feed water treatment, reverse osmosis package.

#### **Sierra, BC**

- A fully modularized 4,500 HP Caterpillar/Solar turbine driven, sour gas centrifugal compressor (design pressure 8,600 kPa). Mechanical Engineer responsible for the procurement of special materials, coordinating the shop assembly with Solar and the various trades and supervising the field installation.

### **Murphy Oil – Tupper West, NE BC**

- Rotating equipment specialist for the EPCM scope of work currently underway for a 180 MMSCF/d sour natural gas processing plant. Relevant design features of the plant include:
  - Inlet and sales compression – Four (4) 3-stage Ariel JGZ/6 packages, each with 6500 HP electric drives
  - Acid gas compression – (2) 300 HP electric drive, 5-stage reciprocating compressors
  - Mixing of acid gas and sweet sales gas to produce a sour sales gas stream including sweet mix compressors (250 HP reciprocating compressor)
  - Recycle gas compression – (2) 200 HP electric drive 2-stage reciprocating compressors
  - Power generation – (8) 4400 HP gas driven power generators

### **NCE Petrofund Ltd - McIntyre**

- Detailed design, procurement and construction supervision for the installation of a 200 HP booster compressor.
- Evaluation and improvements to gas gathering system.

### **Newport Petroleum Corporation - Willesden Green**

- Upgrade of a 700 HP compressor and the installation of an additional 500 HP compressor c/w attending inlet separation and dehydration. Facility downtime was only five days.

### **Northridge Exploration Ltd. – McLeod River**

- EPCM execution for a 507 e<sup>3</sup>m<sup>3</sup>/day (18 MMSCFD) gas plant, 518 kW (700 HP) refrigeration, 1702 kW (2300 HP) compression, 40 m<sup>3</sup>/day (250 B/D) condensate, 111 m<sup>3</sup>/day 700 B/D LPG mix. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

### **Numac Energy Inc.(now Devon Canada Corporation)**

#### **Clarke Lake**

- DBM, budget, detailed engineering, material specs, bid documentation, BC government permits, material procurement and construction contract award, as well as project management through to completion, for the installation of a compressor package, inlet separator package, ancillary installations and piping associated at existing facilities. (d-31-K, 94-J-10)

#### **Ferrier**

- Project Engineering from DBM through detailed design, construction and start-up of the fast track conversion of oil battery at 10-36 to include gas and condensate handling facilities. Involved a multidiscipline team to add a three-stage 800 HP compressor, oil boot, 30,000 gallon condensate storage bullet, with blending controls, fuel gas conditioning, choke plant, vapour recovery unit, flare knockout and flare stack and full gas and fire detection instrumentation. Every system at the existing site was modified, and all work completed “hot” with plant running, except for a seven (7) day tie-in period. The vapour recovery system enabled a zero process emission level.

#### **Leo**

- Project Engineering and management for re-cylindering/staging of two 800 HP Superior 8G/MW 64 compressors. Both compressors were changed to two-stage, low-pressure boosters from the existing two-stage high-pressure configuration. Additional plant changes included control systems, piping, pulsation bottles and cooler sections.

#### **Martin Creek, BC**

- Design and project management of a 30 MMSCFD compressor station including inlet separation, glycol dehydration, 3200 HP compression, heat medium, power generation.

#### **Martin/Birley**

- Optimization and restaging of two 750 HP compressors and investigation of maintenance issues.

### **Red Creek**

- Installation of a 200 HP sour (12% H<sub>2</sub>S and 3% CO<sub>2</sub>) compressor package.

### **Tommy Lakes**

- Design, procurement and project management for the addition of a 1478 HP sour compressor, 20" OD dehydrator and sales metering to existing facilities.

## **Pacific Cassiar Limited**

### **Bow Island**

- Five compressor stations varying in size from 3 MMSCFD to 5 MMSCFD c/w dehydration and choke plant for hydrocarbon removal.

### **Magrath**

- Coordination, purchasing and field inspection for a screw compressor installation.

### **McIntyre**

- Design and project management for the installation of a two compressor stations, choke plant and gatehring system.
- 04-28 Compressor station – installed compressor and 3.5 MMSCFD dehydrator.
- Responsible for the detailed engineering design, procurement of mechanical equipment and construction supervision for two compressor stations which included installation of one 200 HP booster compressor, one 400 HP reciprocating compressor and a choke plant.

### **Welling South**

- Coordination and field inspection for a compressor station, including dehydration and associated pipelines.

## **PanCanadian (now Encana)**

### **Monogram**

- Optimization, debottlenecking, re-piping, and restaging of a gas plant totaling 5500 HP. The compressor restaging included a pulsation study in the scope of this project plus management and cost control. The original configuration of the compressors was five (5) two-stage units, all operating in parallel. The final configuration consisted of two (2) low-pressure boosters feeding three (3) of the original units. Controls and automation were added to balance the compressor volumes for numerous flow conditions.

### **Wembley**

- 2 MMSCFD solution gas compressor addition. Provided permitting, engineering and project management for gas compression facility including mechanical design, equipment specification, purchasing, expediting, critical path scheduling, reporting, cost control, instrumentation, and controls system design.

### **Penn West Petroleum Ltd.**

#### **Esther**

- Gathering system design and installation management for the connection of 17 oil wells.
- Project management of the installation of inlet separation, compression (500 HP) and dehydration for solution gas.
- Project management of the twinning of existing water injection facility.

#### **Firebird**

- Install water disposal / condensate re-injection pump package, gas driven.
- Design and project management of 7 km of 6" pipeline and three wellsite meter facilities.
- Design and installation management of a grassroots gas plant. The scope included a five well tie-in, wellsite facilities, 18 km of pipeline (4" and 6"), inlet separation, 750 HP compression, dehydration and water disposal.
- Installed incremental 500 HP inlet compression.
- Satellite plant communications.

### **Petro-Canada Oil and Gas - Wilson Creek**

- Project engineering from DBM through construction, to install gas gathering pipelines and plan for a 1200 HP sour compressor, tie-in the then largest flowing gas well in PCOG Western Canada, and install a 7 km offload pipeline. Specified and procured (2) compressors, and planned their installation and modifications to an existing 35 MMSCFD gas sweetening and HC dewpoint control plant.

### **PetroFund – July Lake**

- 1680 HP compression facility including inlet separator, compressor, sweetening skid, dehydrator, metering skid, tank farm, genset, MCC, air compressor, flare and flare knockout, gathering system and sales pipeline.

### **Petrorep (Canada) Ltd. - Provost**

- EPCM execution for a 704.4 e<sup>3</sup>m<sup>3</sup>/day (25 MMSCFD) gas plant including 1780 kW (2400 HP) compression, refrigeration, desiccant dehydration, 78 m<sup>3</sup>/day (105 B/D) LPG mix. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

### **Phillips Petroleum Ltd. - Progress**

- Design, estimate, project schedule, specifications and procurement for a separator and a 300 HP integral Ajax field gas gathering compressor.

### **Placid Oil & Gas Ltd. – Fort St. John, BC**

- 5 MMSCFD compressor station including inlet separation.

### **Poco Petroleums Ltd. - Viking**

- Compressor station clear air license.

### **Point West Energy - Bounday Lake**

- Project Engineering for the design and installation of four 600 HP integral two-stage reciprocating compressors in sour service. The project also included a detailed foundation study due to the unique nature of the integral compressors.
- Designed and constructed a 25 MMSCFD gas compressor station c/w (4) 1000 HP Ajax Sour Gas Compressors.
- New 30 MMSCFD, 2400 HP compressor station including dehydration.

### **Polish Oil and Gas Company – Poland**

#### **Zielona Góra**

- Compression system design and evaluation for two new gas fields.

#### **Żuchłów and Załęcze**

- Evaluated the compression requirements to maximize the existing pipeline capacity in two (2) gathering systems during future reservoir production decline. Proposed optimized compressor configurations.

### **PrimeWest Energy - Caroline**

- Project Engineering and management for the optimization, debottlenecking and re-cylindering of one (1) 1450 HP electric driven low-pressure booster and two (2) 800 HP electric drive sales compressor. Project included rebuilding/re-cylindering of the sales boosters, plus evaluation of plant process capacity in conjunction with process engineering co-workers. Future changes may include the installation of a recycle compressor, increased piping changes, an additional sales cooler, and additions to the refrigeration system. A new larger flywheel was required for the sales gas compressors as a result of the torsion study.

### **Promax Energy - Cessford**

- Project coordination, permitting and purchasing of a 1600 HP compressor station and choke plant.

### **Propak Systems Ltd. – Rio Blanco, CO**

- Phase II Meeker Gas Plant – Review of pumps, filter, compressors, exchangers and heaters specification sheets.

### **Red Mountain Energy Corporation**

#### **Kazakhstan**

- Design Engineering for two (2) 3000 kW 4 Stage off gas compressors.

#### **Minnibai**

- Two (2) 3000 kW 3 Stage methane compressors, two (2) 600 kW ethane compressors and one (1) 300 kW turbo expander.

### **Rigel Energy Corporation - Gilby**

- Project management of compressor (305 HP) and dehydration facility (2 MMSCFD) installation.

### **Rio Alto Exploration Ltd.**

#### **Ante Creek**

- Refurbishing and restoration of a 20 MMSCFD, 1250 HP compressor station at the gas plant site.

#### **Galloway**

- Design of three 3335 HP compressors for process and sales gas as part of a 75 MMSCFD plant expansion. The facility involved unique compressor configurations required for the differing process and sales gas volumes with multiple services on one frame.
- Re-cylindering of one (1) 1478 HP compressor.

#### **Smoky**

- Design of two 3335 HP compressors for process and sales gas as part of a 50 MMSCFD new gas plant.

### **Rozsa Petroleum Ltd. - Carmangay**

- Engineering and procurement for five (5) test separators and one (1) group separator.
- Engineering and procurement for oil battery, gathering system and compression.

### **Saxon Petroleum Inc. - Bigoray**

- Permitting for an oil battery and compressor station.

### **Shell Canada Ltd. - Fort McMurray**

- Refrigeration package for a froth treatment plant which included: compressor, oil separator, condenser, and chiller.

### **Siemens AG (Universal Compression) – Pakistan**

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

### **Solex Development Corp.(now Altagas) - Harmattan**

- 200-tonnes/day CO<sub>2</sub> recovery plant. The project saved considerable capital by intergrading the new facility into the existing gas plant and reusing certain vessels, compressors and other equipment, which was revamped for the service and infrastructure.
- Project Engineering and procurement for the reapplication of a 1750 HP, five-stage CO<sub>2</sub> compressor to a 1000 HP three-stage CO<sub>2</sub> compressor. The project included a torsional analysis and flywheel design for the new configuration.

### **Suncor Inc.**

#### **Lagarde, BC**

- Oil battery expansion to accommodate additional 485 BOPD, 398 BPD water and 2.45 MMSCFD of associated gas. The new facilities comprised of a treater skid c/w inlet group separator, four oil storage tanks, two water storage tanks, a pop tank, gas compression and dehydration, a flare stack and K.O. drum, office/warehouse/ MCC trailer, pipeline and meter skid.

#### **Rosevear**

- Detailed design of two (2) 800 HP acid gas injection compressors.
- Preliminary and detailed engineering, procurement and construction of a 140.8 e<sup>3</sup>m<sup>3</sup>/day (5 MMSCFD) acid gas (50% H<sub>2</sub>S) injection facility requiring two 600 kW (800 HP) variable speed electric drive compressors, acid gas chilling, associated pipelines and the addition of an auxiliary steam boiler and Sour Water Flash Tank. Responsible for regulatory, project management, construction management, commissioning, and operations support.

### **Swift Energy - New Zealand (via Enerflex)**

- Design, fabrication, and delivery of a five-stage inert gas compressor including process gas simulation, vibration studies, thermal pipe stress analysis, pulsation studies and very restrictive environmental standards.

### **Telesis Oil & Gas - Renwick**

- Design and project management of a gas plant compressor addition, 350 HP.

### **Tetreau & Associates - Patricia/Princess**

- Detailed engineering design of two (2) sweet natural gas compressor stations, each complete with inlet separator and dehydration and designed for 4.0 MMSCFD of sweet natural gas.
- 630 HP compressor station including dehydration and sweet gas gathering system.

### **Thunder Energy Inc. – Big Valley**

- Conducted pipeline & compressor simulations, prepared cost estimates, DBM, PFD and tenders for the compressor station (600 kW) and the well tie-ins at a proposed CBM development.

### **Tom Brown Resources Ltd. (Now Encana) – Carrot Creek**

- Project Engineer responsible from DBM through construction, to expand an existing 20 MMSCFD gas sweet gas process facility with the addition of 450 HP refrigeration package, 1800 HP compressor package, condensate stabilizer and replacement of PLC controls.

### **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.

### **TransAlta - Centralia, Washington (USA) (via Enerflex)**

- Design, fabrication, and delivery of two (2) 1440 HP electric driven single stage four throw reciprocating compressors to be used as fuel gas boosters for turbine power generation. Skid design included 100% bypass cooler, process gas simulation, steam shell/tube heat exchanger, and a process skid. The project also included a noise study, vibration study (API 618 - Level 3), and piping studies for thermal growth.

### **Transwest Gas Systems Ltd.**

#### **Bonnyville South**

- Evaluated the operation of an existing gathering system through pipeline pressure drop surveys and modeling work.
- Recommended the relocation of two (2) compressors and the recylindering of two (2) other units.

#### **Kehiwin**

- Design and project management of a sweet gas compression (1478 HP) and dehydration facility including a mix of 4" and 6" diameter pipe in a 10 km gathering system.

#### **Marianna Lake**

- Changed out a 1400 HP compressor for an 800 HP rental unit.

#### **Provost**

- Design, permitting, procurement, and project management (including mechanical design, instrumentation and controls, equipment specifications, purchasing, expediting, scheduling, cost control, reporting) for a 3000 BPD (23 API), 27,000 BWPD oil battery. The facilities included a gathering system, oil treating, water treating and disposal, as well as solution gas compression. The equipment included an inlet heat exchanger, a free water knock-out, a treater, 6 storage tanks, a water injection package with biocides, descaling, corrosion inhibitors and demulsification, a recycle package and a solution gas compressor for 2 MMSCFD, MCC/air compressor/office skid.

#### **Sage/Fort Kent/Kent/Cold Lake/South Leg**

- Design and installation of 30 compressor packages ranging from 200 HP to 1478 HP, reciprocating and screw types, electric and natural gas drives

#### **Winnefred North**

- Design and installation management of a 1478 HP screw compressor
- Addition of two (2) 1478 HP compressors to the existing plant, upgraded the dehydration facilities, and installed 35 km of gathering system complete with two (2) satellites

#### **Winnefred South**

- Addition of a booster screw compressor (1478 HP).
- A 40 km gathering system involving a mixture of 3", 4", and 6" pipeline c/w two (2) satellites.

### **Ultima Energy Trust – Smiley**

- Optimization of a refrigeration screw compressor and 500 HP reciprocating compression and gathering / sales gas system.

### **Universal Compression Inc. – Petrozuata**

- Project Coordinator responsible for checking over P&ID revisions on a 2450 HP Compressor.

### **Universal Compression – Venezuela**

- Project engineering for the design and drafting for one 237 HP four throw single stage reciprocating compressor.
- Project engineering for the design and drafting for two 4735 HP six throw three stage reciprocating compressors.
- Project engineering for the design and drafting for three 3500 HP three stage compressors.

### **Wascana Energy Inc.(now Nexen) - Balzac**

- Flare system upgrade and compressor addition and the gas plant (formerly CanOxy).

### **Westar Resources Ltd. - Coleville**

- Project, Process Engineer, and Fabrication Supervisor for process modules for a refrigeration plant: 141 e<sup>3</sup>m<sup>3</sup>/day (5 MMSCFD), low temp, 42 m<sup>3</sup>/day (264 B/D) LPG mix. The equipment included the piping, instrumentation and controls, compressors, towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.

### **Westcoast Petroleum Ltd. - Crystal Lake**

- EPC execution of a refrigeration plant: 211.3 e<sup>3</sup>m<sup>3</sup>/day (7.5 MMSCFD), 59 m<sup>3</sup>/day (370 B/D) LPG mix and 22 m<sup>3</sup>/day (140 B/D) C<sub>5+</sub>. The equipment included the piping, instrumentation and controls, compressors, fractionation towers, heat exchangers, pumps and NGL storage vessels. Responsible for operating manuals, commissioning and start-up.