

### Alberta Energy Company (now Encana) - North Primrose

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- Developed the equipment specifications and procured three 2,000 HP gas engine compressors for the gas gathering system.

### Alberta Hub - Peers

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- Project management of the design and installation of 7 miles of 12 inch gathering system and wellsite facilities at Alberta HUB Gas Storage Facility.
- Additional tie-in of two wells with 16" gathering system.

### Altia Energy Ltd. – TeePee Creek

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- Project coordination for submission of the AEUB applications and audit packages on a 3 MMSCFD gas plant including 3.63 km of 3" pipeline and multi-well gathering system. Responsibilities included:
  - Researching of alternatives to flaring (sulfatreat barrels)
  - Sourcing and ordering equipment, sizing pipelines and various valves for separator

### Amerada Hess Canada Ltd. - Boundary Lake, BC

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- Design and construction of a 50 MMSCFD sour gathering system.

### Amoco Canada Petroleum Company Limited - Kindersley

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- Provided the preliminary scoping and feasibility study for a 6000 BPD (approximate) "super battery" development to optimize an existing oil producing field. The proposed facilities included 60,000 BPD of water handling and treatment as well as provisions for gas gathering.

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

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#### Rycroft

- Detailed engineering design of multiple sour (8.0 % H<sub>2</sub>S) wellsite facilities and the associated sour natural gas gathering system.

### South Eaglesham

- 20 MMSCFD gas plant c/w gas gathering, inlet separation, compression, refrigeration, liquids fractionation, NGL, and LPG storage.

### ANG (Trans Canada Midstream) - Cutbank

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- Gathering System - Install a new compressor facility LSD 09-28 with a Cat 3516 TAW/EI FE 650-43 compressor including inlet separator/blowcase, and upgrade with two other compressor sites LSD 08-13 and 06-27.
- LSD 08-13 was upgraded with an additional Cat 399 TALCR Ariel JGK/2 compressor, re cylinder, new cooler section for a Superior 8 G825 MW62 compressor, and a second inlet separator/blowcase.
- LSD 06-27 was upgraded with an additional Cat 3512 TAW Knox E-4445 compressor, re cylinder, and new cooler section for a Waukesha 3521 GSI Ram 52 compressor.
- Plant performance test and equipment capacity evaluation including plant simulation.

### Altia Energy Ltd.

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#### TeePee Creek

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  - Researching of alternatives to flaring (sulfatreat barrels)
  - Sourcing and ordering equipment, sizing pipelines and various valves for separator

#### West Doe

- Project coordination for the design and construction of two (2) wellsite facilities (40 MMscfd and 9 MMscfd), one custody transfer meter station (40 MMscfd), and four (4) pipelines (2" and 6") totaling 8 km's in length. Responsibilities included:
  - The design of well head piping, layouts and site configuration
  - The completion of project cost estimates
  - Equipment bids, evaluations and award
  - The sizing and design of all required equipment
  - Coordination of drawing completion with drafting department
  - All OGC regulatory applications, notices and approvals

- Ordering of all PV&F
- Coordination with Kilowatts Design for the electrical design and construction
- The coordination and shipping of all equipment to site
- Field support during construction

#### Artemis Exploration Ltd. - Unity

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- Shallow gas gathering system: design and EPCM scope for 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 polyethylene pipe. Responsibilities included:
  - The design of well head piping, layouts and configurations
  - Completion of C.P. railway crossing application forms and package for a pipeline crossing railway tracks
  - Completion of project cost estimates; tracking of construction costs, and forecasting completion costs
  - Purchasing of all necessary equipment; completion of construction bid package and bid evaluation; awarding of construction contract, and provision of construction support during field construction
  - Coordination with field inspections for the delivery of parts and equipment

#### Blue Range Resource Corporation - Bullrush

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- Design and project management of a 20 MMSCFD, 1950 HP compressor station including inlet separator modifications and expansion of the wellsites and gathering system.

#### Blue Range Resource Corporation - Pickwell

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

## ConocoPhillips Canada Resources Limited - Cessford / Teepee Creek

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- Responsible for a 67 shallow gas well tie-in program including construction bids, bid evaluations, and contractual award. Responsibilities included:
  - Complete metering revisions, quotes and coordinated drafting of drawings
  - Sourcing pipe material (fiberglass pipe) and assuring CSA Z662 compliance for a water injection line
  - Requisitioning of equipment and materials for construction
  - Assistance to drafting in the completion of P&ID's to "issue for construction" drawings

## Crestar Energy Inc. - Westeros

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- Project management and engineering for a 15 well gathering system and 3,000 B/D central sour oil battery.

## Devon Canada Corp (formerly Anderson)

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### Falher

- Design and project management for the installation of 30 km of gas gathering system.

### Portreeve

- Design and project management for the installation of a 42 well gathering system.

### 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.

### 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.

### South Eaglesham

- Design and project management of a 20 MMSCFD sweet gas plant including gas gathering, inlet separation, compression, refrigeration, liquids fractionation, NGL, and LPG storage producing 400 BBL/D LPG mix, 465 BBL/D oil.



**Zaremba, BC**

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

**Dublin International Petroleum – Syria**

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- Scoping study of the Tishrine Oil Gathering System.

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

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- 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.

**Enco Gas Ltd.**

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**Helmet, BC**

- Design and project management of gathering and dehydration facilities.

**North Helmet, BC**

- Co-ordinated the detailed engineering and procurement of facilities equipment for two gas gathering systems, including four wellsites, and pipelines, in NE British Columbia.

**Shekilie**

- Design and project management of a 8.5 MMSCFD gas plant and gathering system.

**Windflower, BC**

- Design and project management of a gathering system for 6.5 MMSCFD plant.

**Enermark Inc**

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**Bantry**

- Project coordinator responsible for completing the AEUB applications for new pipeline tie-ins and new construction consisting of 2" dia. lines totaling 3.95 km and 3" dia lines totaling 5.87 km.

#### Giltedge

- Design and field supervision of the installation of 8 oil and casing gas production wellsites with 6 km of gathering system.
- Design and field supervision of the installation of 915 b/d water injection facility.

#### Hanna

- AEUB applications on the phase 8 work involving sixty-eight (68) new pipeline tie-ins and new construction consisting of 2" dia., 3" dia., and 4" dia. lines totaling 47.4 km; responsibilities included:
  - Completing the AEUB audit packages
  - Completion of the AEUB application for a sweet multi-well gas battery
- AEUB applications for the phase 9 scope involving forty-three (43) new pipeline tie-ins and the new construction of 2" dia., 3" dia., and 4" dia. lines totaling 28.8 km.; responsibilities included:
  - Completion of AEUB audit packages
  - Cost estimating and drawing development, completion and approval
  - Acquisition of all materials and equipment
  - Construction bid packages, and bid evaluation, award, field construction support

#### Princess

- Responsible for the design and construction of forty-nine (49) pipeline tie-ins with a total length of 40.3 km. Pipeline sizes range from 3" dia., 4" dia., 6" dia., and 8" dia:
  - Completed Alberta transportation application for pipeline highway crossing
  - Completed AEUB application and audit packages
  - Responsible for drawing development, approval and completion
  - Responsible for acquiring all necessary equipment and materials
  - Construction bid packages, and bid evaluations
  - Awarded construction contracts

#### Trochu

- Completing the AEUB applications for new pipeline tie-ins and new construction consisting of 3" dia. lines totaling 4.78 km and 4" dia. lines totaling 1.75 km in this gas gathering system.
- Responsible for the cost estimating, design, and construction of phase 2 gathering system – thirteen (13) pipelines ranging in size from 3" dia., 4" dia., and 6" dia. Total length of pipelines was approximately 10.6 km. including field construction support.



## Enerplus Resources Corporation

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### **Bantry**

- Project management for a 46 well tie-in gas-gathering program. This shallow gas project involved approximately 25 km of 2" tie-ins. Scope of work included permitting, bids and bid evaluations, cost control, and construction.
- Project engineering for all aspects of a 60 well tie-in shallow gas program, including cost estimating, bidding, regulatory, design, and construction management.

### **Bilbo**

- Conducted gas gathering system simulation and cost estimates for phases 1, 2, and 3.

### **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.
- Project coordination for a 60 well tie-in gas-gathering program. This four month shallow gas program involved approximately 50 km of 2" tie-ins. Scope of work included permitting, bids and bid evaluations, and construction.

## Grad & Walker Resources Ltd. (now ConocoPhillips Canada) - Bonnyville

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

## Gulf Canada Resources Limited (now ConocoPhillips Canada) - Swan Hills

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- Conducted a mechanical reliability study for the 65 km of produced water pipelines, 50 km gas gathering, and oil flowlines (ranging from 4"Ø to 12"Ø). The system flows were 7500 B/D oil, 50 MMSCFD gas and 180,000 B/D water.
- Conducted system improvement studies for the above gas gathering and produced water injection pipelines.
- Carried out the economic evaluations for various production gain scenarios involving reliability improvement for the gathering and produced water injection systems.
- Investigated the reliability effect, environmental risk reduction, and the production improvement associated with the rerouting of the production from seven oil wells. The system flows were 4 MMSCFD gas, 650 B/D oil, and 24000 B/D water.
- Designed flare system modifications at the miscible flood plant in order to avoid utilization of the flare pit. The modifications included a flash drum system to separate the phases — gas to flare, liquids reinjected in the NGL line.
- Prepared equipment specifications for the stated modifications at the miscible flood plant and conducted the bid evaluations and procurement.
- Field facilities involving 300 wells, 7,500 B/D of oil associated with 50 MMSCFD of gas, and 190,000 B/D of water were studied for optimization purposes. Production modes included water flood and miscible flood. A concept of super satellites was developed for energy conservation and gathering system debottlenecking. Weak links in the injection system were identified for prioritized line replacement, thereby avoiding major production interruption costs. Operating cost improvement opportunities were identified through shifting the make-up water source from surface to underground aquifers. The centralization approach yielded significant operating efficiencies with respect to water handling and injection. Simultaneously, serious environmental issues and corresponding revenue implications were addressed. The overall benefit of this work was a net revenue contribution of in excess of \$3M/yr.

## Iranian Offshore Oil Company – Kharg Island, Iran

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- Acid gas injection Front End Engineering and Design study. The study was part of a gas gathering and NGL recovery project. The NGL plant on Kharg Island will process 600 MMSCFD of sour gas, produce 460 MMSCFD of sweet gas, 48,000 bbl/d of hydrocarbon liquids, and inject 85 MMSCFD of acid gas into a reservoir.



### K2 Energy - Cutbank, Montana

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- 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, and Federal Clean Water.

### Lomalta Petroleum Ltd. - Chauvin

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- New oil battery and associated pipelines including casing gas gathering, source water, water injection, vapor recovery, gas compression, and oil treatment.

### Luscar Oil & Gas Ltd. - Sedalia

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- Design and project management of a 5 MMSCFD plant compression and gathering system with plant refurbish.

### Murphy Oil – East of Red Deer

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- A large 2-Phase sour gas gathering system utilizing heaters and a central dehydration station for gas rates up to 35 MMSCFD.

### NCE Petrofund Ltd - McIntyre

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- Detailed design, procurement, and construction supervision for the installation of a 200 HP booster compressor.
- Evaluation and improvements to gas gathering system.
- Responsible for the engineering performance evaluation of a gas gathering system c/w compression facility.

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

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### Forsyth, Manatokan, Leo and Maple Glen

- Responsible for various gas well tie-ins and gathering system pipelines.

### Tommy Lakes

- 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 wellsite installations (4 new wells) and gathering pipeline (4.5 km 6" and 3.5 km 4" ).
- DBM, budget, detailed engineering, material specs, bid documentation, material procurement, and construction contract award, as well as project management through to completion, for wellsite installations (7 new wells) and gathering pipeline (14 km 4").
- DBM, budget, detailed engineering, material specs, bid documentation, material procurement, and construction contract award, as well as project management through to completion, for wellsite installations (6 new wells) and gathering pipeline (8 km 4", 6 km 6").

## Pacific Cassiar Ltd. - McIntyre

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- Responsible for detailed engineering design, procurement, and construction supervision for a sweet natural gas gathering system.

## Paragon Petroleum Corporation - Wildwood

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- Grassroots design and project management of a 17 MMSCFD amine facility involving 1160 HP compression, refrigeration, wellsite facilities, and gathering system.

## Penn West Petroleum Ltd.

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### 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.

#### Hoosier, Saskatchewan

- Conceptual engineering, costing, detailed design, procurement, construction management, commissioning, and start-up services for a grassroots 1,000 B/D heavy oil battery complete with a 6,000 B/D water disposal system.
- 15 well tie-in.
- 35 km of gathering system.

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

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- 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.

#### Petrolia Oil and Gas Ltd. - Antelope

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- Design and project management of a 10 MMSCFD, 750 HP gas compression, and choke plant including H<sub>2</sub>S treating and gathering system.

#### Phillips Petroleum Ltd. - Progress

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

#### Polish Oil and Gas Company - Dębno, Poland

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- Design basis memorandum and project specifications for a 45,000 SCM/Hr 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 gathering system design and evaluation.
- HAZOP evaluation. Start-up and operations support. Training – plant management and Dębno Plant Operations personnel.

- Conceptual design and design review of Barnówko Oil Terminal which had the capacity to load six rail cars simultaneously with crude oil or liquid sulphur.

#### Rozsa Petroleum Ltd. - Carmangay

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

#### (Sinopec) Shengli Oilfield - Shandong Province, China

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- Design of 7 single-well natural gas gathering and handling stations (10,000 m<sup>3</sup>/day each).
- Design of 7 single-well natural gas gathering and handling stations (10,000 m<sup>3</sup>/day each).

#### Slade Energy - Rainbow Lake

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- Design and project management of 12 miles of 4, 6, 8, 10 inch gathering system and wellsite facilities.

#### Southwest Petroleum Institute - Sichuan Province, China

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- Developed technical software products including Pipeline Network Simulation (PNS), Pipeline Leak Detection (PIPELEAK), and Project Keys and Tools for Oil/Gas Gathering, Handling, Transportation, and Distribution System.

#### Tetreau & Associates Ltd. - Patricia

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- 630 hp compressor station including dehydration and sweet gas gathering system.

## Transwest Gas Systems Ltd.

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### Bonnyville South

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

### Chandler

- Design and project management of a 15 MMSCFD sweet gas compression (1478 HP) and dehydration facility including a mix of 3", 4", and 6" diameter pipe in a 56 km gathering system.

### 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.

### 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.

### 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.
- Piping design of gathering system expansion.
- Designed multi-well satellite skid.

### 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.



Trigas Exploration Inc. - Irricana

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- Prove the integrity of discontinued 4 NPS, 9 mile sour gas pipeline, then design and procure equipment for gas gathering with 500 HP compression.

Triton Canada Resources - Fort McMurray

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- Design and project management of a 20 MMSCFD, 1500 HP gas plant including dehydration and gathering system.