

Altia Energy Ltd - Tee Pee Creek

- Design and project management of a 3 MMSCFD sour facility.

Amerada Hess Canada Ltd. - Olds

- 84 MMSCFD amine sweetening facility performance study and plant relief system analysis.

Anderson Exploration Ltd.(now Devon Canada Corporation)

Kenzie/Donnelly

- Managed upgrade to the Kenzie Satellite with the installation of inlet separation, compression, dehydration, VRU unit and additional flare stack. Associated with the upgrade was upsizing of the amine contactor and associated equipment at the Donnelly Gas Plant.

Pickell North, Nig Creek North, Pickell, Nig Creek, Wargen

- Design and project management of sweet and sour gas well tie ins.
- Railway and river crossings.
- Regulatory approvals.

APF Energy - Sakwatamau

- Rated the performance of an amine plant to determine process capabilities under a wide range of flow conditions.

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% H₂S) 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 m³/d. Acid gas compression: 450 HP.

Bearspaw Petroleum Ltd - Lessard

- Regulatory audit of a sour gas facility.

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.

Calpine Canada Ltd - Calgary

- Acquisition review of a sour gas facility including sulphur plant.

Canada Northwest Energy Limited (now Sherritt International Corporation)

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.

Campbell/Namao

- Plant modifications for changeout of DEA and MDEA sweetening chemicals and addition of incinerator stack to double plant capacity (20 MMSCFD).

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.

Oldman

- Design and project management of a new sweet gas plant: 18 MMSCFD, refrigeration, sweetening, 300 B/D LPG Mix, 600 HP compression.

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.

Canadian Natural Resources Ltd. - Meyer Lake

- Design and project management of a 8 MMSCFD amine plant capacity upgrade.

Cymric Resources Ltd. - Steelman

- 0.75 MMSCFD gas plant troubleshooting and feasibility study evaluating various sweetening processes for process improvement.

Devon Canada Corp (formerly Anderson)

Birley Creek, BC

- Process design for 8 MMSCFD gas separation, 740 HP compression and 8 MMSCFD dehydration. Provided permitting, engineering, project management and commissioning including mechanical design, equipment specification, procurement, expediting, instrumentation and controls design.
- Permitting, process design and project management for the installation of compressor station.
- Process design for dehydration and amine sweetening of fuel gas (300 MSCFD).

Coleman

- Engineering review of 60 MMSCFD sour dehydration facility. (27% H₂S).
- Installation of molesieve regeneration cooler.

Gunderson

- Design, procurement and project management of a 50 MMSCFD sour gas plant at 15% H₂S. Units included mole sieve, inlet slug catcher, power generation and vapour recovery unit.
- Design and project management for the addition of one 20 MMSCFD, 1600 HP sour gas compressor.
- Design, permitting, engineering, procurement and construction management for a two well sour gas tie in mountainous terrain. Facilities included 5 miles of 8" pipeline, line heater, wet gas metering, heat medium skid, 28kW generator and TEG, flare knock out and flare stack.
- Design, engineering, procurement, operator training, commissioning and project management for a 50 MMSCFD sour gas (15% H₂S) facility including inlet separation and molecular sieve dehydration.

Leland

- Engineering review of a 60 MMSCFD sour dehydration facility (31% H₂S).
- Installation of replacement salt bath heater, sulphur meltout system.
- Operations support and plant performance studies.

Normandville

- Permitting, engineering, drafting and project management of a sour gas plant: 20 MMSCFD, 3000 HP compression (inlet and sales), 200 HP refrigeration, 20 USGPM amine sweetening, 50 HP acid gas re-injection compression.
- 2002 Expansion: Stabilizer, LPG bullet and pump skid.
- Acid gas composition: 10% H₂S and 90% CO₂. Acid gas compressor: 50 HP @ 2000 psig discharge. Acid gas pipeline: 1.5 km with wellhead pressure of 1750 psig. Acid gas rate: 135 kg/hr.
- 2004 Expansion: Installation of condensate flash tank.

North Cecil

- Permitting, engineering, drafting and project management of a sour gas plant: 45 MMSCFD, 6000 HP compression, 450 HP refrigeration, 65 USGPM amine sweetening, recycle compression, acid gas incineration.

Puskwaskau

- Design and project management of a sour gas plant: 20 MMSCFD, 1,478 HP compression, 200 HP refrigeration, 20 USGPM amine sweetening, 125 HP (57% H₂S, 43% CO₂) acid gas re-injection compression, 50 HP water disposal pump, and 40 HP recycle compression.
- Permitting and public consultation.
- Plant modifications including incinerator installation and replacement of heat exchangers.

Rycroft

- Design and project management of a 24 MMSCFD sour gas plant including 125 USGPM amine sweetening, 350 HP refrigeration, C₅₊ production, 3000 HP primary gas compression, 250 HP acid gas injection and 1200 KW power generation.
- Acid gas composition: 70% H₂S, 29% CO₂. Acid gas compression: 250 HP at 1220 psia discharge. Acid gas pipeline: 500m with 1218 psia wellhead pressure.

West Culp

- Design and project management of a 20 MMSCFD sour gas plant including 125 USGPM amine sweetening, 350 HP refrigeration, LPG production, oil battery modifications, solution gas compression, 3000 HP primary gas compression, 250 HP acid gas injection and power generation.
- AENV permit application.
- AEUB permit application and audit manual.
- Acid gas rate: 2190 lb/hr. Acid gas composition: 53% H₂S, 45% CO₂. Acid gas compression: 250 HP at 1220 psig. Wellhead pressure 800 psi.

Wolverine

- Design and construction support for a 3 MMSCFD sour gas dehydration facility. Equipment included: line heater, hot oil circulation string pump skid, dehydrator unit, meter skid and utilities.

Duke Midstream (now Spectra Energy) - Alberta

- Development of methodology to accurately measure H₂S balance to meet AEUB requirements.

Duke Midstream (now Spectra Energy, formerly Canrock) - Fourth Creek

- Project management of the design, procurement and construction of a sour gas plant, 69 MMSCFD, 10 t/d sulphur inlet, two 30 and 45 GPM mixed amine processes, 200 HP (-10° F) and 500 HP (-45° F) refrigeration units, 1800 HP Paddy compression scheme, 3,000 HP plant sales compression, 150 HP acid gas (30% H₂S) re-injection compression. Acid gas pipeline: 3830 m.
- Equipment and piping layout for a refrigeration skid addition.
- Design and project management of a 2145 HP installation.
- Design and project management of a pipeline installation.
- MOC approvals.

Elk Point Resources Inc. - Saddle Hills

- Detailed design, procurement and construction management for an 8 MMSCFD MDEA amine gas sweetening plant with 2 stage 700 HP inlet / sales compression, CO₂ removal and glycol dehydration.
- Equipment and piping layout for the addition of inlet compression, amine sweetening and dehydration facilities.

Enerplus Resources Corp - Sunchild

- Design and project management of a sour natural gas battery including dual HP/LP flare system and tank blanket gas system.

Gascome Oils Ltd. - Turin

- Design and project management of a 25 MMSCFD gas plant, 430 gpm DEA amine plant, 200 B/D LPG mix.

Genra Resources - Ferrier

- Simulations for sweetening of stabilizer overheads gas.

Grand Banks Energy Corp. – Tower Creek

- Project Manager for a sour gas plant: 1409 e³m³/day (50 MMSCFD), 15% H₂S, 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.
- Single well tie in for 705 e³m³/day of 15% H₂S sour natural gas, 35 MPa piping design, choke line heater, heat string, 1400 m insulated pipeline and pigging facilities.

Granisko Inc. - Rainbow Lake

- Complete design checking of the amine, refrigeration, heat medium, and stabilizer skids (including the checking of all vessel, steel details and spools).

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.

Rainbow Lake

- Engineering and process evaluation/audit of existing acid gas injection facility which includes 2 x 1000 HP four-stage compressors. Acid gas composition: 76% H₂S, 23% CO₂. Acid gas rate: 2.7-4 MMSCFD. Acid gas compressor discharge at 1490 psig into a 200 m pipeline.
- Project management including engineering, procurement, construction management, operation training and commissioning for a third acid gas compressor unit.
- Process review for sales oil tank odour issues.
- Interstage cooler hydrate formation prediction and estimation of methanol injection requirements.

Industrie Meccaniche Scardellato SpA - 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.

Inuvialuit Energy Inc. - Rainbow Lake

- Rated the existing plant and determined the modifications necessary to process 15 MMSCFD additional gas.
- Prepared and evaluated equipment specifications and bid packages.
- Prepared the bid documentation for the construction of 48 km of 8" Ø sour gas pipeline and 16 km of 6" Ø sweet gas pipeline.
- 40 MMSCFD sour gas plant: Supervised complete turnaround activities including the rebuild of the sulphur plant and the installation of a new inlet separation package and deethanizer package.

Keyera Income Fund – Caribou, B.C.

- Engineering, design and project management of a 40 MMSCFD sour gas plant expansion to 105 MMSCFD c/w 250 gpm amine system, 300 Hp refrigeration train, 800 Hp acid gas injection, 1500 Hp sales compression, inlet system conversion, flare system replacement, heat medium, 550 KW power generation, LPG production and new H-P DCS system .

Luscar Oil & Gas Ltd.

Bow Island

- Commissioning and start-up of amine system.

Granlea

- Design and project management of a 2 MMSCFD sour amine plant.

Murphy Oil Corp. – Tupper West, N.E.B.C.

- Engineering, procurement and construction management (EPCM) currently underway for a 180 MMSCF/d sour natural gas processing plant near Dawson Creek, British Columbia. Design features of the plant include:
 - Inlet slug catching and separation on three separate inlet gathering systems
 - Inlet and sales compression – Four (4) 3-stage Ariel JGZ/6 packages, each with 6500 HP electric drives
 - Amine sweetening – 215 USGPM of MDEA circulation
 - Dewpoint control utilizing mechanical refrigeration (300 USTR and 700 HP refrigeration compressors) and glycol injection (17.5 USGPM of 80/20 ethylene glycol)
 - Condensate stabilization and condensate storage (800 BBL of storage)
 - Sour water stripping and produced water storage (10000 BBL of storage)
 - Acid gas compression – 300 HP electric drive, 5-stage reciprocating compressors
 - Acid gas dehydration – 0.5 USGPM of TEG circulation, stainless steel construction
 - Mixing of acid gas and sweet sales gas to produce a sour sales gas stream including sweet mix compressors (250 HP reciprocating compressors)
 - Vapor recovery (tank and dehydrator still vents) and recycle compression (200 HP electric drive)
 - High pressure, low pressure and acid gas flare systems

- Full plant utilities including:
 - High and low pressure fuel gas
 - Process heat medium – 1125 USGPM of 60/40 TEG, heater duty of 22 MMBtu/hr
 - Utility heat medium – 265 USGPM of 50/50 EG, heater duty of 6 MMBtu/hr
 - Instrument air and nitrogen purge systems
 - Underground drain and storage systems for closed hydrocarbon drains, floor drains, amine drains and glycol drains
 - Integrated plant control system, including plant DCS, unit control systems and ESD system
 - Plant 13800 V, 6900 V, 600 V, 208 V, 24 V electrical systems including switchgear, MCCs, VFDs and distribution
 - Site civil design and work including grading plans, retention pond design, office/warehouse buildings, site roads, foundations and structural steel

North Canadian Oils Limited - Whitecourt

- 7.5 MMSCFD amine plant process design and evaluation, specification and bid review.

Northridge Exploration Ltd. - Hattonford

- Design and installation of a scavenger sweetening system (refurbished used equipment).

Paragon Petroleum Corporation - Wildwood

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

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.

Pembina Resources Limited

Morpeth, Ontario

- Study and system design to reduce mercaptans by 40 ppm for a 15 MMSCFD gas plant facility.

Slave / Seal

- Process simulations for the amine plant.

Petrolia Oil and Gas Ltd. - Antelope

- Design and project management of a 10 MMSCFD, 750 HP gas compression and choke plant including H₂S treating and gathering system.

Piecobiogaz - Dzieduszyce, Poland

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

Polish Oil and Gas Company - Debno, 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 Debno Plant Operations personnel.

Rio Alto Exploration Ltd. - Ferrier

- 1.5 MMSCFD coalescing filter added to amine plant.

Rozsa Petroleum Ltd. - Keho

- Design and project management of an 8 MMSCFD sweetening, refrigeration and LPG recovery facility.
- ERCB hearing preparation and owner representative on hearing panel.

Samson Canada Ltd. - Innisfail

- Optimization of a 1,200 BOPD, 8,800 BWPD, 2.5 MMSCFD oil battery (14% H₂S, high paraffin content, saturated brine). The shell/tube exchangers were removed and the inlet separator was modified. The result of the work was improved water retention time, reduced fuel consumption, reduced facility maintenance requirements, and improved recycle treating flexibility.
- Conceptual simulation of proposed pipeline looping and compression expansion.
- EUB regulatory application and technical support for a 10 MMSCFD sour gas plant. Compression, amine sweetening, refrigeration, liquids recovery and acid gas injection.
- Filter/separator design.

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 - 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.

Solex Energy Inc.(now Altagas) - Edmonton

- Conceptual process design for purification (COS and mercaptans) and fractionation of a 30,000 B/D condensate stream to yield propane, butane and heavier fractions.

Suncor Inc.

Adsett

- Preliminary scoping and process design for an amine plant.

Rosevear

- Preliminary and detailed engineering, procurement and construction of a 140.8 e3m3/day (5 MMSCFD) acid gas (50% H₂S) 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.
- Installation of 2nd stabilizer and associated equipment from the North Rosevear facility.