

Pipeline Technologies Inc.
Principal - JEFF HOLLOWAY, P.Eng.

1.0 EDUCATION:

Bachelor of Applied Science, Mechanical Engineering, University of Waterloo **1981.**

2.0 PROFESSIONAL AFFILIATIONS

Association of Professional Engineers, Geologists and Geophysicists of Alberta.
Association of Professional Engineers, Geologists and Geophysicists of B. C. (expired).
Association of Professional Engineers of the Province of Ontario (expired).
Association of Professional Engineers of the Province of Saskatchewan (expired).
ASME – Pipeline Division

3.0 EXPERIENCE

Approximately twenty-five years of experience in engineering management, project management, project engineering, cost control, compression and pump application, discipline co-ordination, design, commissioning and start-up of oil and gas transmission facilities, injection facilities, gas processing facilities, oil collection facilities and power generation facilities. This experience includes system hydraulics, application of compression and pumps to pipelines, feasibility studies, dense phase gas pipeline studies, compressor station design, pump station design, meter station design, electric drive options, magnetic bearings, dry seals, micro turbine utility power and all other aspects of oil and gas facility design and construction with an emphasis on gas transmission.

Notable works include:

- Project Engineer and Design Manager, FEED and FERC assistance on the Tuscarora Gas Pipeline System 2005 and Gold Rush Expansion Project. Responsible for DBM, PEP, turbine purchase, budget, WBS system, purchasing system and EPC review and supervision.
- Project Manager / Project Engineer, FEED and FERC assistance on the Tuscarora Gas Pipeline System 2002 Expansion. Responsible for all hydraulics, DBM, PEP, turbine purchase, purchasing system and EPC review and supervision.
- Preliminary facility design, turbine specification and purchasing, compression application studies on the Terasen Southern Crossing Pipeline Project.
- Preliminary facility design and feasibility studies on the Alliance Pipeline in Canada and the USA. This pipeline is a high-pressure pipeline designed to transport high liquid content gas at 1740 psi through a 36” pipeline across North America.
- Design and Safety Audit for Stagecoach Gas Storage Project in upstate New York. Reviewed design and all safety aspects of MOPICO powered gas storage project.

- Design verification, construction quality control and start-up of the USSR/Turkey Natural Gas Pipeline system. This system included over 700 km of 36 and 24-inch pipeline, 11 large meter stations and one 30 MW compressor station.
- Experience also in hydraulic analysis of pipeline systems; gas handling equipment selection and the design of mechanical piping systems including piping stress analysis.
- Co-ordination of all engineering related to the repackaging of seven Allison 501 gas turbine generator sets for Ecuador.
- Project Manager and Design Co-ordinator of condensate pumping station located in Southern Alberta.

4.0 SPECIFIC EXPERIENCE:

PIPELINE TECHNOLOGIES INC. (PTI)

1990 - Present

Principal, Project Manager and Facilities Specialist

- PTI has been consulting for fifteen years to an assortment of Canadian and American oil and gas and pipeline transmission companies.
- PTI performed the **FEED** portion of both the **2005 and 2002 Tuscarora Gas Transmission System Expansions**. These projects consists of the addition of grass root compressor stations (single unit Taurus 60's) onto a free flowing Tuscarora system. PTI generated the hydraulics, generated the electric versus gas study, and prepared the PEP, DBM, plot plans, site selections, WBS, cost control system, turbine specification and recommendations as well as all of the FERC supporting documentation. We set up and maintained a project web site, which was extremely successful at pulling the project together. We incorporated many new innovative ideas into the design of the stations and supervised the EPC company performing the detailed design and construction.
- PTI carried out the safety and design audit for the Stagecoach NY gas storage project designed by Pipeline Power Partners and SNC. This project has withdrawal capacity of 500,000 Mcf per day and injection capacity of 250,000 Mcf per day on the last day of injection as reservoir pressure approaches the maximum operating pressure of 3250 psi.
- PTI generated the feasibility study for the **Alliance Pipeline** and performed the FEED engineering portion of the project. PTI analyzed the hydraulic simulations of the Alliance System, selected the station size and spacing along the mainline, generated the recommendations for size, number, type and spacing of compression, performed the site selection of all of the mainline stations, generated the DBM, schedule, cost estimate and PEP as well as assisted in the generation of the FERC and NEB submissions. We also analyzed the options for electric drivers on the project.
- PTI analyzed the hydraulics and generated the recommendations for size, number, type and spacing of compression on the **BC Gas Southern Crossing Pipeline**. We also generated the cost estimates and schedules for the SCP and carried out the same function for **SCP Phase Two**. PTI generated the turbine and electric motor bid documents for the project as well as generated the unit purchase recommendations.

- Provided Design Audit and Construction Management services to **Husky – Lloydminster Saskatchewan Gathering System** Pipeline Expansion.
- Acted as Project Manager and/or Project Engineer for multiple sour and sweet gas plant and pipeline transmission expansion projects.
- Project managed the expansion of the **Fletcher Challenge Brownfield and Kirkpatrick Gas Plants**.
- Assisted BC Gas Limited in the specification and purchase of gas compression equipment on the Southern Crossing Pipeline. Also assisted in the application of power to the Southern Crossing Phase 2 pipeline extension.
- Worked with ABB to develop modular 40,000 VFD driven compressor station designs.

**GAS TRANSMISSION CORPORATION / PTI
Compression Selection and Application Specialist**

1996

- Provided technical input for preliminary design and turbine specification and selection to Gas Transmission Corporation of Melbourne, Australia. Project included generation of entire preliminary engineering package for two multi-unit Solar Centaur/Taurus compressor stations.
- Provided design audit on AlintaGas Nuovo Pignone PGT-10 station designs in Perth W.A.
- Generated study for AlintaGas of Perth, Australia comparing compressor selection options and application of various vendor equipment to the short-term expansion and long term growth of AlintaGas's 1600 km, nine station, 26" pipeline system.
- Reviewed and confirmed Monte Carlo reliability report to determine the outage scenarios, which would affect the system reliability and assess the best path of growth.

**WESTCOAST TRANSMISSION / PTI
Mech./Process Lead Engineer**

1995 - 1994

- Lead Engineer of 8000 hp Sour Gas Compressor Station for Westcoast Transmission.
- Station included inlet slugging facilities, condensate stabilisation, fuel gas sweetening, sonic flare system design, large tankage, truck loading, and centrifugal compressors with dry seals running in sour gas.

**QUEST - AN ALLIANCE CORPORATION / PTI
Project Manager**

1994

- Project Manager / Designer of 4000 hp electrically driven Ariel reciprocating gas compressor station for Amoco Kirby Lake.
- Project Manager / Mechanical Designer of 2500 psig, 12" gas injection pipeline system for Amoco Crossfield.

FOOTHILLS PIPE LINES LTD. / PTI

1992 - 1993

Lead Mechanical Design Co-ordinator

- Responsible for the mechanical design and layout of station gas piping and mechanical systems, material specification and requisitioning for a mainline, single unit Cooper RB-211 37,500 hp compressor station located at Monchy, Saskatchewan.
- Included design and layouts of all systems at the compressor station and how the station would perform in conjunction with other facilities on the 36" pipeline system.

ALBERTA NATURAL GAS. / PTI

1992

Project Engineer/Sr. Mechanical Designer

- Hired by ANG and inserted into a small engineering firm to get project back on track after small setbacks in design process.
- Co-ordination of client requirements and overall engineering design with an emphasis on the operational requirements relating to the design of three mainline gas compression station additions for Alberta Natural Gas. Units added were EGT RLM1600's (18,000 hp).

PIPELINE TECHNOLOGIES INC.

1991

Mechanical Design Audit

- Reviewed and performed Engineering audit on design and layout of four Northern Border compressor Stations.

PIPELINE TECHNOLOGIES INC.

1990 - 1992

Design Co-ordinator /Mechanical Designer

- Responsible for layout and piping design co-ordination for five multi-unit compressor stations utilising Dresser-Rand TCV-10 and TLAD-8 large integral reciprocating gas compression.
- Project Manager and Design Co-ordinator of condensate pumping station located in Southern Alberta.

BOTAS - ISTANBUL, TURKEY

1986 - 1988

Mechanical Design/Construction Specialist

- Responsible for mechanical design verification of USSR/Turkey Gas Pipeline system as well as construction inspection and start-up of over 700 km of 36 and 24 inch pipeline, one international receipt point meter station, ten large scale sales stations and a 3 unit, 30 MW gas compression station.

NOVA CORPORATION OF ALBERTA

1981 - 1986

Design Engineer, Facilities Engineering Department

- Responsible for mechanical co-ordination and design for gas transmission compression facilities. This incorporated layout, equipment selection, process design, stress analysis, specifications and inspection of mechanical systems.

Major Projects include:

HUSSAR COMPRESSOR STATION

Mechanical Co-ordinator

- Responsible for mechanical design for major gas piping modifications at 44 MW compressor station consisting of six turbine driven compressor units. Finland Raikkola Compressor Station (for Novacorp).

Mechanical Co-ordinator / Designer

- Responsible for complete mechanical design of 8.0 MW pipeline compressor station consisting of three heavy industrial Nuovo Pignone units arranged in a Series/Parallel configuration.

SMOKY LAKE “C” COMPRESSOR STATION

Mechanical Co-ordinator / Designer

- Responsible for mechanical design of a 6.1 MW variable speed electric drive gas compression facility.

ASME PAPERS

“*Results from Demonstration and Application of Ammonia Cycles*”. American Society of Mechanical Engineers Conference. Anaheim, California - 1986 co-authored with J.A. Bartz, EPRI, C. Bellot and J. Fleury, Electricite de France, Chatou, France

Personal Information

- Married, three children
- Partial comprehension of Spanish, French and Turkish.
- Board of Directors – Aventa Woman Addiction Treatment Centre
- Board of Managers – Grace Church
- Board of Directors – Mount Royal Community Association

Contact Information:

jeff.holloway@pipelinetech.com

Telephone: 403-543-8851