



KENT A. PENNYBAKER, President

SUMMARY OF QUALIFICATIONS

River City Engineering, Inc., Lawrence, Kansas USA 1994-Present

Process Engineering Consultant for the Oil & Gas Industry providing design and technical support for gas and liquids processing/handling projects.

- Conceptual study comparing capital and operating costs for ethylene recovery processes from steam crackers and from a new ethylene technology.
- Flare radiation measurement and testing. Conducted flare tests to measure the actual emissivity from a plant flare. Developed a testing plan and coordinated with operations to perform flaring at constant composition and rates. Performed calculations to compare to vendor information and reported findings.
- Conceptual engineering and client representation for an offshore development in South Africa. Offshore facilities included separation, hydrate management, and compression on a TLP. Onshore receiving terminal included slug catcher, dew point control facilities, condensate stabilization and storage, and sales gas compression.
- FEED engineering for an offshore deepwater tie-back to an existing floating facility. Facilities included a slug catcher, hydrate management, separation, and tie-ins to existing facilities.
- Process evaluation and selection for converting an existing propane recovery plant to ethane recovery. Performed simulations incorporating existing plant equipment and new equipment. Recommended final process configuration to the client based on cost estimate, minimal downtime, and ease of operations.
- Offshore facility consolidation study. Evaluated different options of consolidating offshore gas facilities operated by two different major oil companies. Evaluated spare capacity and determined different pipeline options for consolidation.
- Gas Processing Training. Prepared and presented different training sessions focused on process engineering and gas processing.
- Process consulting/development support for a Gas-to-Liquids (Synthesis Gas and Fischer-Tropsch) facility with full product separation and treating. Support included development of fully integrated HYSYS process models for material and energy balances for economic evaluations of various processing schemes.
 - Conceptual Engineering Studies – Performed various conceptual studies for potential site locations. This included upstream development as well as GTL facilities.
- Engineering support for a 500 MMSCFD/100,000 BPD offshore FPSO in Indonesia. Facilities included oil separation, compression, H₂S removal, dehydration, LPG recovery, and fractionation.
 - Conceptual Engineering – Performed early evaluations to justify LPG recovery. Performed detailed study comparing LPG recovery processes from which the final process was selected. Assisted with preparation of bid document for EPC bid.
 - Detailed Engineering – Worked as client representative with engineering contractor during all aspects of detailed engineering. Areas of input included layout, PFD's, P&ID's, vendor bid review and selection, equipment inspection and testing, control system narratives, participation in HAZOP, operating guides, and start-up planning. Additionally was responsible for continual simulation modeling updates and evaluation of off-design conditions.
- Process evaluation and selection for a gas plant expansion. Evaluated and compared many available propane recovery processes. Recommended final process for client to specify for contractor.

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SUMMARY OF QUALIFICATIONS – (continued)

River City Engineering, Inc.

- Preliminary engineering for relocating an existing plant to a new site. Determined cost effectiveness of modifications and developed an engineering task list for detailed engineering. Developed PFD's, "as-built" PID's, demo P&ID's , and new relocated plant P&ID's.
- Preliminary and detailed engineering for a propane/butane pipeline export and truck loading facility at an existing plant. Specified tie-ins required, equipment, valves, etc. to allow the plant to export batches of propane and butane via pipeline. Also, added capabilities to export via truck loading.
- Conceptual and preliminary engineering for a major gas transportation system in Indonesia. Evaluated and determined most cost effective way to deliver gas from nine fields to Singapore. Compared different pipeline operation modes such as dry gas, wet gas, and deuse phase. Determined most cost effective routing and operating pressures. Provided key support to contract specifications.
- Preliminary engineering support for a mobile offshore gas production unit. Support included subsea flowline sizing and interface, compression requirements, and facilities. Worked closely with engineering contractor and client.
- Start-up support for a 120 MMSCFD offshore gas processing plant in Venezuela. Troubleshooting and performance evaluation in preparation of performance testing.
- Conceptual engineering for a subsea LPG offloading system utilizing a tarret. Investigated and compared on-shore fractionation and storage to offshore fractionation and storage on an LPG tanker.
- Preliminary engineering for upgrading an existing plant in Kentucky. Determined that plant could achieve higher recoveries with same horsepower while delivering at a higher residue pressure.
- Preliminary and detailed engineering support for a gas plant expansion from 650 MMSCFD to 750 MMSCFD.
- Preliminary and detailed engineering design for a grass roots 40 MMSCFD compressor station.
- Preliminary engineering, startup support, and performance testing for a 100,000 BPD Gulf coast fractionator.
- Process Hazards Analysis (PHA) for numerous gas processing, liquids handling and fractionation, and compression facilities.
- Expansion, performance, troubleshooting, and optimization studies for numerous gas plants.
- Numerous relief and flare studies.

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PREVIOUS EXPERIENCE

CONOCO, Inc., Ponca City, Oklahoma, USA 1987-1994

Senior Engineer providing process design and technical support for the Conoco upstream operating groups. This included oil production and gas processing facilities, both onshore and offshore, domestic and international.

Major Projects:

- District Process Engineering Coordinator for West Texas District, which includes seven gas processing plants and associated gathering systems with approximately 50 compressor stations. Support included troubleshooting, project identification, and major projects. Simultaneously handled several projects ranging from \$10M to \$5MM. Also, coordinated PSM efforts and conducted PHA's.
- Lead Process Engineer on the process design and detailed engineering of a 100,000 BPD (\$127MM) offshore drilling and production platform for Indonesia (Belida DPP'A'). This facility started up ahead of schedule and under budget.
- Performed feasibility and conceptual engineering studies for a 40,000 BPD NGL Fractionation Expansion (Gulf Coast).
- Application and interpretation of Conoco's dynamic multiphase flow simulator (ConOLGA). Bridged the transition from a research project to value adding applications throughout the company.
- Designed and developed a computer program (GASNET) that models gas gathering and distribution networks.

Woodward-Clyde Consultants, 1986-1987

Overland Park, Kansas

Staff Engineer responsible for the development and application of groundwater and contaminant flow models. Work included EPA Superfund sites. Developed and published a method to analyze relief well performance behind levees.

University of Kansas, 1986-1987

Lawrence, Kansas

Teaching Assistant responsible for the classroom instruction of approximately 100 students for "An Introduction to Computers in Engineering".

EDCON, 1983-1986

Lakewood, Colorado

Borehole Gravity Engineer responsible for the collection, processing, and interpretation of field data. The collected data was combined with other geophysical data to develop a reservoir or structural model.

KENT A. PENNYBAKER

EDUCATION

University of Kansas

Lawrence, Kansas

M.S. (Honors) Chemical Engineering, 1986-1987

- Named "Outstanding Graduate Student", 1987
- Thesis title, "Development of the Computer Based Laboratory Test Facility and its Use in the Investigation of Discrete-Time Proportional-Integral Control Algorithms"

B.S. Chemical Engineering, 1979-1983

PROFESSIONAL MEMBERSHIPS

Professional Engineer, Kansas and Oklahoma

American Institute of Chemical Engineers

Society of Petroleum Engineers, Director at Large (1990-1992)

Society of Exploration Geophysics

Tau Beta Pi

Theta Tau

PUBLICATIONS/PATENTS

A Comparative Study of Ethane Recovery Processes, Pennybaker, K.A., et. al., 79th GPA Convention, Atlanta, Georgia, March, 2000.

A Comparative Study of Propane Recovery Processes, Pennybaker, K.A., et. al., 78th GPA Convention, Nashville, Tennessee, March, 1999.

Optimizing Field Compressor Station Designs, Pennybaker, K.A., SPE Gas Technology Symposium, Calgary, Alberta, Canada, 1998.

Layer Density Determination Using Surface and Deviated Borehole Gravity Values, Pennybaker, K.A., US PATENT 5,218,864, June 15, 1993.

Borehole Gravity Drift Correction: A New Approach, Pennybaker, K.A., Geophysics, Vol 53, No. 10, October, 1988, p.1343-1346, 7 Figs.

Groundwater Flow Modeling Pressure Relief Wells, Ritchey, J.D., Studer, J.E., and Pennybaker, K.A., Conference on Solving Ground Water Problems with Models, National Water Well Assoc., 1987.