AARON HANKS, P.E.

13429 Forestway Dr. • Dallas, Texas 75240 • (214) 477-5524 • AaronKHanks@Gmail.com

PROFESSIONAL SUMMARY

- Licensed chemical engineer with twenty years of experience in the oil and gas industry, the last few years concentrated on dairy RNG projects.
- Noted for creative problem solving abilities.
- Self-starter and fast learner.
- Experience with managing a small technical staff and project management.
- Excellent written communication skills.
- Team player with good organization, people, and communication skills.

EDUCATION

2002 Texas A&M University, College Station – BS, Chemical Engineering

GPA: 3.0 out of 4.0

PROFESSIONAL REGISTRATIONS

- Texas P.E. 132265
- Colorado P.E. 0057217
- Georgia P.E. 045648
- Kansas P.E. 29094
- Arizona P.E. 72969
- South Dakota P.E. 15073

PROFESSIONAL EXPERIENCE

FREESE & NICHOLS, INC (Dallas, TX), Energy Practice January 2012 to Present

Freese & Nichols is a Fort Worth, TX based EPCM with a focus on municipal work. In late 2011 they completed the acquisition of a small EPCM, Nichol and Associates, that focused on projects in the oil and gas market. This was the start of the Freese and Nichols Energy Practice, which I joined shortly after the acquisition.

Most Recent Position Held – Associate and Lead Technical Professional, Energy Practice

<u>Biogas Projects at Freese & Nichols</u>

Greeley, Colorado Project | Vanguard Renewables | Lead Engineer |2020-2021

- Designed raw biogas pretreatment and a gathering system to connect three dairies with CSTR digesters to a centralized upgrading facility utilizing PSA and bulk H2S removal with a patented liquid redox system.
- Designed balance of plant at each dairy
- Designed pipeline injection facilities and metering and regulation to the natural gas utility at the central upgrading site

Americus, Georgia Project | Vanguard Renewables | Lead Engineer |2020-2021

- Balance of plant for a dairy RNG project with a covered lagoon digester and PSA upgrading.
- Designed the pipeline injection compression facility located approximately 2 miles from the dairy along with the pipeline that connects them.

Butterfield Dairy|Avolta| Process Engineer|2021-2022

Butterfield Dairy, Maricopa County, Arizona

- Balance of Plant for a mixed plug flow digester facility.
- Coordinated with boiler packages to select appropriate steam and hydronic boilers.

Milky Way Dairy|Avolta| Process Engineer|2021-2022
Milky Way Dairy, Pinal County, Arizona
- Balance of Plant for a mixed plug flow digester facility.
- Coordinated with boiler packages to select appropriate steam and hydronic boilers.

Athena Project|Brightmark| Senior Advisor|2021-2022
Athena Project, Minehaha County, SD
- Design of pipeline injection station and gathering system to transport RNG from two dairies to the injection station.

Multi-Bay RNG Decant Facility|Confidential Client|Process Engineer|2021-2022
FEED for multi bay RNG trailer decant hub with pipeline injection
- Assisted with major equipment specs and selection, dynamic temperature calculations, and recommendation for maximum moisture specification.

EPCOR – Process Engineer
Tonopah FEED Study, Maricopa County, Arizona – Process Engineer
- FEED for balance of plant around dairy RNG project utilizing a mixed plug flow digester.

Traditional Oil & Gas Projects and Roles at Freese & Nichols

Golf Lake Treating Facility/Baker Expansion | Aethon Energy Operating |Project Manager and Lead Engineer|2018-2020
Balance of plant for a 150 gpm Kinder Morgan Treating Amine plant and dehydration unit in the Cotton Valley Lime for treating 27 MMSCFD of natural gas containing 150 ppm H2S and 5.5% CO2 with subsequent relocation to the Baker Dehy site in the Haynesville. The Golf Lake balance of plant design allowed for addition of a future second 150 gpm amine plant with minimal downtime. The Baker Expansion balance of plant provided for integration with a existing amine treating and dehydration. FNI scope included verification of vendor process simulation, P&IDs, plot plan, piping design, geotechnical services, foundation design, electrical package, instrument loop drawings and cable schedule, control valve and PSV sizing, integration of purchased equipment, major equipment sizing, and procurement assistance for thermal oxidizer, fuel gas package, slug catcher, and instruments.

Low Pressure Amine Plant, Reeves County, TX | Atlantic Resources |Project Manager and Lead Engineer|2017
Low pressure 90 gpm amine plant installation in West Texas. The plant operates at 80 psig to remove up to 750 ppm H2S and associated CO2 from low pressure wellhead gas. Kinder Morgan Treating had piloted one other low pressure amine plant previously, and had operating experience backing up a high probability of success for this installation. Freese & Nichols provided capital cost estimating and balance of plant engineering, including 3 sulfatreat towers with the ability to be used in parallel or in series with the amine plant to ensure success.

Various Compressor Stations | USA Compression |Project Manager and Lead Engineer |2014-2018
Worked with USA Compression to develop a standard modularized compressor station package for them to offer on a lease basis to their clients suitable for 1-6 compressor units. Assisted with the design and installation of a number of these modular stations in West Texas, Oklahoma, New Mexico, and Western Pennsylvania that included inlet separation, compression, dehydration, atmospheric liquid storage and offloading, flare, and PLC-based control system. Also attended client design reviews and PHA's. Header racks were skid-mounted and prefabricated to facilitate quick installation. Stations included:
- Enable Katie (Oklahoma)
- Enable Pioneer (Oklahoma)
- Enable Rush Creek (Oklahoma)
- Williams Buena Vista (New Mexico)
- Williams Cantaral (Western Pennsylvania)
- Energen Jones Holton (West Texas)
- Apache Chaparral (West Texas)

Utah Compressor Station| Brazos Midstream |Project Manager and Lead Engineer|2017
Engineering design for a nominal 50 MMSCFD 3-stage compressor station with dehydration in West Texas. FNI scope included P&IDs, process simulation, piping, structural/foundation design, line sizing, control valve sizing, relief valve sizing, and electrical design. This site also had a Sulfatreat tower for removal of small amounts of H2S. Futures were left for an additional second train of dehydration and Sulfatreat.

Brazos Pecos Compressor Station| Brazos Midstream |Project Manager and Lead Engineer|2017
Engineering design for a nominal 50 MMSCFD 3-stage compressor station with dehydration in West Texas. FNI scope included P&IDs, process simulation, piping, structural/foundation design, line sizing, control valve sizing, relief valve sizing, and electrical design.

St. John's Compressor Station | XTO Energy | Lead Technical | 2018
Provided engineering services for the Texas-based Permian Production Compressor Station. This station was a relocation of the Night Train facility in the Barnett. We reused equipment and piping to construct this facility.

Gates 12.1 & 13.1, Webb County, TX, |Rosetta Resources|Project Manager and Lead Engineer|2017
Engineering design of Eagleford common point site for separation of multiphase production from nearby wells into oil, gas, and stabilized condensate for blending back into the oil. Site included separation, condensate stabilization, compression, and dehydration. FNI project scope included process design and simulation, equipment sizing, P&IDs, plot plan, 3D model, piping isogen drawings, and 3D model shots with line numbers.

Cotton Valley Lime Wellsite Facilities|Aethon Energy Operating|Project Manager and Lead Engineer|2018-2019
Engineering design and procurement assistance for NACE spec high pressure natural gas wellsite facilities in the Cotton Valley Lime in Robertson County, TX. The gas was expected to have 150 ppmv H2S prior to drilling, but actually came on with 2% H2S. FNI scope included P&IDs, piping, materials review and bill of material development, attending PSSR's, electrical design, instrument loop drawings, and evaluating various methods of dealing with H2S in the produced water.

Bison Crude Oil Truck Terminal | Brazos Midstream | Lead Technical | 2016
Provided facility mechanical design services for the Bison Crude Oil Terminal. FNI's scope of services included facility engineering, mechanical design, P&ID's, geotechnical engineering, civil and structural design, electrical design. FNI provided procurement assistance, project management, construction drawing packages, and construction support.

Pecos River Gas Plant | Medallion Midstream |Project Manager and Lead Engineer | 2015
Balance of plant and process evaluation of a 1981 vintage 20 MMSCFD Gulsby RJT gas plant in Loving, County TX with provision for future addition of a 100 MMSCFD plant. Balance of plant included slug catcher, inlet filter coalescer, Thomas Russell amine plant, residue discharge filter coalescer, glycol dehydration package, refrigeration compression, regen gas after scrubber, regen gas cooler, product storage tanks, product surge tank, NGL pipeline pumps, product transfer/charge pumps, product storage tank pumps, air compressor package, gas and liquid meters, slug catcher dump heater, fuel gas scrubber, hot oil system, 3-phase separator, flare package, product surge tank, product storage tanks, 3-phase separator, condensate stabilizer, condensate storage, inlet compression, and residue compression. FNI's scope on the project included process simulation, P&IDs, PFD's, preliminary piping, preliminary plot plan, equipment sizing, equipment quotes/bid tabs, and procurement assistance. BCCK Engineering performed the installation and civil scope for the project.

Silver Gas Plant | Lucid Energy Group |Lead Process Engineer | 2012
Installation of a 1981 vintage 20 MMSCFD CE Randall cryogenic gas plant in Sterling, County, TX including balance of plant. Balance of plant included amine unit, refrigeration compression, product surge tank, product storage tanks, slug catcher, 3-phase separator, condensate stabilizer, condensate storage, inlet compression, and residue compression. FNI's scope on the project included process simulation, P&IDs, PFD's, plot plan, grading plan, foundations, electrical, procurement assistance, and construction management.

State Line Compressor Station | RKI E&P| Project Manager and Lead Engineer|2011-2012
Design and construction management of a 60-MMSCFD compressor station in West Texas. The facility included inlet separation, compression, dehydration, fuel gas conditioning, atmospheric liquid storage and offloading, NGL storage, flare, instrument air system, and a local pneumatic control system with a pneumatic ESD loop.

Hydraulics and Capex Estimating for Various Gathering/Transmission Systems | Confidential Midstream Clients |Project Manager and Lead Engineer|2017-2019
Evaluate proposed gas, oil, and water gathering and transmission systems in Oklahoma and New Mexico with phased buildout. Scope included development of capital cost estimates, gas hydraulic modeling, liquids hydraulic modeling, coordination with corrosion consultant to provide materials recommendations for super sour service.

Gas Hydraulic Model Update | Cardinal Midstream |Lead Engineer|2018
Update Synergi Gas model. Scope included adding new wells and associated production to the system, adding new compressor stations, adjusting production from existing wells, and verifying expected system pressures to determine if any bottlenecks would be likely.

Liquid Holdup and Slug Catcher Sizing | Rosetta Resources |Lead Engineer|2017
Determination of expected gas pipeline liquid holdup volume and recommendation for slug catcher sizing. Scope included building a VMGSim model of the pipeline including the elevation profile and using the Oliemans mechanistic 2-phase flow correlation to predict liquid holdup volumes at a range of flowrates and with seasonal variations in pipeline operating temperature, vessel sizing calculations, and evaluation of using two vessels in parallel.

Surge Analysis | Enbridge |Project Manager and Lead Engineer|2017
Surge analysis for a proposed 71-mile HDPE pipeline, with multiple pump stations and three lateral branch lines, to transport treated brine water to water ponds. Scope included building a transient model in Synergi Pipeline Simulator (SPS), analyzing transient events, making design and controls recommendations to prevent over pressuring the pipeline, running external load and pipe collapse calculations, making a recommendation for entrained gas release and prevention of vapor lock, and writing a report to document the analysis and recommendations.

Surge Analysis | Brazos Midstream |Lead Engineer|2017
Surge analysis for 7 miles of 8" diameter carbon steel oil pipeline transferring oil from one facility to another with vertical can pumps. Scope included building a transient model in Synergi Pipeline Simulator (SPS), analyzing transient events, making design and controls recommendations to prevent over pressuring the pipeline and downstream facility.

TGGT HOLDINGS (Dallas, TX) April 2011 to January 2012

TGGT Holdings, a joint veture between Exco Resrouces and BG, was a pipeline operating company with assets primarily in the Haynesville Shale.

Position – Project Controls Engineer, Midstream

<u>Key Roles</u>

- Acted as project manager for two meter station uprade projects in the Haynesville Shale.
- Worked with engineering, finance, and accounting groups to produce capital projects budget and capital spending forecasts.
- Produced earned value reports for the company's project portfolio.
- Gained proficiency with Microsoft Project.
- Created a library of historical cost data to use for cost estimates.
- Produced cost estimates for several projects.

MUSTANG ENGINEERING (Houston, TX) May 2002 to April 2011

Mustang Engineering is a Houston based EPCM specializing in deepwater offshore oil and gas projects.

Position - Senior Process Engineer

Key Projects

Macedon Development | BHPB | Lead Process Engineer | 2009-2010
Lead process engineer for the FEED stage design of a 200 MMSCFD gas plant in North West Australia.

- Designed inlet slug catcher. Determined sizing and configuration of vessel and finger type designs to determine the optimal arrangement.
- Developed the design of a silica gel dehydration and dewpoint control unit in coordination with vendors and client process engineer.
- Performed a study to determine the optimal compressor configuration, compressor selection, and timing to introduce low pressure compression as required by reservoir pressure depletion.
- Performed HYSYS modeling, and developed heat and material balances.
- Developed the design of mercury guard beds and modified the overall process to prevent condensation in the mercury guard beds.
- Performed equipment sizing and created process datasheets for vessels, pumps, heat exchangers, compressors, and waste heat recovery unit.
- Assisted junior process engineers with development of the flare study including determination of maximum flare load cases, determination of emergency depressurization rates, AspenTech Flarenet modeling, and compressor settle-out calculations.
- Developed the relief, flaring, and emergency depressuring philosophy.
- Assisted civil engineer with development of the drainage philosophy.
- Coordinated with client and pipeline engineer to develop a study determining the optimal selection of the sales gas pipeline with contingency to accommodate additional future production from a third party.
- Participated in HAZOP and provided resolutions to HAZOP action items.
- Performed pipeline depressurization calculations and sized pipeline vent valves.
- Evaluated designs for enclosed ground flare, multipoint ground flare, and elevated flare to achieve the project's visibility and noise emission goals.
- Developed an excel spreadsheet to calculate pipe wall temperature profiles during transient depressuring scenarios.
- Managed a staff of three process engineers.

Situche Complex | Talisman | Lead Process Engineer | 2010
Lead process engineer for conceptual design of a 17,000 bpd oil production complex in northern Peru.

- Developed a power generation study which evaluated options for utilizing fuel gas, crude oil, and diesel as potential fuel sources for internal combustion engine generator packages and turbine generator packages. The study included development of a cost estimate and preliminary design for a fuel gas conditioning unit, crude desalter, diesel production unit, and debutanizer unit.
- Developed a study which evaluated options for removing H2S from produced gas, including a cost estimate and preliminary design for each option.

KG-D6 Development | Reliance Industries Limited |Process Engineer | 2010
Process engineer for a feasibility/pre-feed study for the design of a jack-up compression platform located off the coast of India with compression facilities for 800 MMSCFD of natural gas.

- Developed equipment sizes, cost, weight estimate, and report for the design of inlet slug catchers and liquids handling system.
- Developed a flaring study which determined maximum flare loads, required flare boom length, and thermal radiation analysis.
- Coordinated with piping designers to determine the optimal equipment layout.

Holstein and Mad Dog Follow-On Engineering | BP |Lead Process Engineer | 2005-2009
Lead process engineer supporting ongoing operations and capital projects for BP's Mad Dog and Holstein floating production platforms located in the deepwater Gulf of Mexico.

- Managed a team of 6 process engineers.
- Developed schedules and manhour estimates for capital project studies.
- Assisted clients with operational troubleshooting on an as-needed basis.
- Performed process engineering for the following installed capital upgrades:
    - Addition of gas lift systems on Mad Dog and Holstein.
    - Increased the capacity of produced water treatment systems on Mad Dog and Holstein.
- Performed debottlenecking study to increase the production capacity of the Mad Dog platform from 80,000 bpd to 120,000 bpd. Evaluated capacities of existing separators, heat exchangers, dehydration system, compression system, produced water treatment system, waste heat recovery units. Examined options for retrofitting existing equipment for higher capacity, determined where replacements are required, sized replacement equipment.
- Performed study to determine the capability of the Holstein platform to accommodate production from other nearby reservoirs. Analyzed production profiles, performed flow assurance studies and analyzed OLGA transient flow results, determined ability to accommodate risers on the platform, analyzed equipment capacities, and determined how to accommodate increases in power and heat requirements.
- Performed complete flare system and relief valve sizing audits for Holstein and Mad Dog platforms. Performed audit of flare header sizing only for Nakika, Marlin, and Pompano platforms. Assisted with high level evaluation of flaring scenarios on Atlantis and Thunderhorse platforms.
- Performed study to add seawater injection and produced water injection facilities to the Holstein platform to enhance oil recovery.
- Built hydraulic model of the cooling water system on Mad Dog using Kentucky Pipe 2000 hydraulic network modeling software.
- Assisted client with the complete re-HAZOP of the Holstein and Mad Dog platforms. Provided resolutions to HAZOP parking lot items. Attended and participated in HAZOPs as requested by clients.

MC-72 Tie-Back to Pompano Platform | BP |Lead Process Engineer |2009
Lead process engineer for the MC-72 subsea well tie-back to the Pompano fixed production platform in the Gulf of Mexico. Responsibilities included HYSYS modeling, P&ID Review, 14C Review, HAZOP analysis, flare system design, preparation of instrument data, and report writing.

- Performed HYSYS modeling and created heat and material balances.
- Coordinated with piping designers to determine appropriate equipment layout.
- Performed sizing of heat exchangers, relief valves, choke valves and created instrument process datasheets.
- Participated in HAZOP and provided resolutions to HAZOP action items.
- Updated flare study and AspenTech Flarenet model.

Qua Iboe Terminal Flare Elimination Project | Mobil Producing Nigeria |Lead Process Engineer |2004-2005
Lead process engineer for the FEED engineering phase of a flare elimination project at the Qua Iboe onshore oil terminal in Nigeria. The scope of work was to add compression facilities to send produced gas via pipeline to a nearby LNG plant in order to significantly reduce operational flaring. Responsibilities on the project included P&ID development, flare system analysis, preparation of instrument data, HYSYS modeling, equipment sizing, writing reports, and participating in HAZOP and design review meetings.

Marlin Platform Brownfield Work | BP |Process Engineer |2002-2004
Performed brownfield follow-on work for BP's Marlin platform, a 60,000 BOPD TLP platform in 3,000 feet of water in the Gulf of Mexico which serves as a host platform for several subsea tie-backs. The scope of work included addition of subsea multiphase pumps to enhance recovery from the King subsea wells, a FEED study for the addition of a low pressure compression module, operations support, and performing the engineering for numerous M.O.C. projects. Responsibilities on project included P&ID development, HYSYS modeling, compressor settle-out calculations, equipment sizing, and hydraulic calculations.

Dolphin Deep Tie-back | BG |Process Engineer |2003
FEED and Detailed Design for the Dolphin Deep subsea well tie-back to the Dolphin fixed platform off the coast of Trinidad. Developed process simulations, developed emergency depressurization study, prepared a flare study detailing required modifications to the existing flare system, and analyzed production profiles along with OLGA steady-state and transient flow results to perform flow assurance and hydrate studies.

MMS Permit Packages | Hunt Petroleum and Agip/ENI Petroleum |Process Engineer |2003-2004
Performed API-14C analysis and managed drawing updates for MOC projects on various production facilities in the Gulf of Mexico. Scopes of work included performing analyses to ensure compliance with API-14C, and updating of SAFE Charts/Process Safety Flow Diagrams/P&IDs/equipment layout drawings/electrical area class drawings as required for submittal of MMS permit packages.

Cameron Highway | El Paso |Process Engineer |2003
Worked with a senior facilities engineer to develop the first draft of P&IDs for a pumping station which was part of the Cameron Highway pipeline system delivering oil and gas from deepwater facilities in the Gulf of Mexico to Texas City and Port Arthur.

Pompano 14C Review | BP |Process Engineer |2002
Performed API-14C review for BP's Pompano platform in the Gulf of Mexico.

ABITIBI CONSOLIDATED (Lufkin, TX) Summers 1999 to2001

Position - Summer Intern, Technical Services

Summer intern at a pulp and paper mill. Performed lab tests and equipment audits, updated facility spill plan, assisted in operational troubleshooting and start-ups, and assisted in new chemical trials which included analyzing chemical cost effectiveness using data retrieved from a PI database.

SKILLS

- Process Simulation with BR&E Promax, Aspen HYSYS, and Slumberger Symmetry
- Network Hydraulic Modeling with Synergi Gas and H2O Map
- Surge Analysis with Synergi Pipeline Simulator (SPS)
- Heat exchanger rating programs such as HTRI and HTFS
- Various vendor rating programs for control valves, relief valves, gas turbines, etc.
- Flare system network analysis using AspenTech FlareSim
- Visual basic programming and Development of In-House Calculation Spreadsheets
- Some Basic AutoCad