

KEN HOLTGRIEVE

Mr. Holtgrieve is an engineer and project manager for onshore oil, gas, and energy related surface facilities. Ken has over 42 years of experience holding both senior engineering and project management positions with Shell E&P Company, Denbury Resources, and Kinder Morgan CO₂ Company. Ken is now using this experience as an independent consultant to energy companies.

HIS PRIMARY AREAS OF EXPERTISE INCLUDE:

- Working with Asset Acquisition and Divestiture Teams
- Project Development and FEED (Budget, Schedule, AFE Justification, Project Economics, Stakeholder Engagement)
- Project Management (Detailed Design, Procurement, Construction, Start-up, Operation)
- Gas Compression, Gas Dehydration, and Gas Treating Facilities
- Enhanced Oil Recovery and CO₂ Production/Injection/Sequestration
- New Technology Development and R&D
- Equipment Maintenance Program Development
- Process Safety (HAZOP's, HAZID's, BowTie's, PSSR's, Risk Ranking, Facilities Safety Reviews, Relief & Vent Studies, HSE Risk Assessment for Urban Operations)
- Wellhead Hook-ups, Flowlines, Test Facilities, and Gathering Systems
- Oil/Water/Gas Separation and Metering
- Operations Reviews and Debottlenecking/Optimization Projects
- Coaching and Mentoring of Younger or Less Experienced Staff

REPRESENTATIVE PROJECTS AND ACTIVITIES INCLUDE:

- Coordinated vendor engagement and prepared report for concept selection process for large CO₂ capture compressors and pumps for two Shell carbon capture projects in N. America.
- Supported Kinder Morgan's new business development group working on potential property acquisitions and new ventures. Obtained approval to proceed with Kinder Morgan's first CO₂ capture project with more capture projects identified but on hold due to low oil price.
- Assisted with successful start-up and commissioning of four large centrifugal compressors at Kinder Morgan's Yellow Jacket CO₂ facility in SW Colorado.
- Obtained approval and coordinated successful testing of DexpTM dehydration process at Kinder Morgan's Doe Canyon facility in SW Colorado.
- Identified list of potential deficiencies and suggested improvements for the Goldsmith San Andres Unit CO₂ EOR Field in West Texas.
- Obtained approval for testing of multi-phase flow meter at Goldsmith Field which if works, could replace far more expensive and less accurate well test separators.
- Completed assignment as interim Project Manager for Kinder Morgan's St. Johns CO₂ Source Field surface facilities primarily focused on FEL, FEED study and initial permitting/environmental work. Obtained approval to utilize integrally geared centrifugal compressors and participated in the initial kick-off meetings with MAN Turbo & Diesel in Berlin, Germany. Project postponed due to low oil prices.

REPRESENTATIVE PROJECTS (Cont.)

- Coordinated preparation of field development plans, cost estimates, front-end engineering design, and project execution for several Denbury EOR (CO₂) projects. Provided troubleshooting and facilities upgrades for the Lockhart and Delhi EOR (CO₂) Projects.
- Managed a multi-disciplinary team to complete Shell's \$200MM+ Freeze Wall Test Project in NW Colorado from design stage through construction to handover through start-up and commissioning. Resulted in successful test of deep (2,000') freeze wall technology to prove underground aquifers can be protected from oil shale producing activities. Largest and deepest freeze wall known to exist at the time.
- Managed the design/procurement/installation of surface facilities for the three separate projects in NW Colorado all for development of Shell's proprietary in-situ heating technology for Shell's oil shale in NW Colorado and heavy oil in Canada and other countries.
- Lead a multi-disciplinary team responsible for development of natural gas fired subsurface heating technology. Successfully developed two separate patented burner ignition systems that would work reliably downhole.
- Managed the design/procurement/installation of surface facilities for the three separate projects at Shell's Weeks Island Field including:
 - Highly successful Gas Cap Blowdown Project that received Shell's President's Award for Team Excellence" with rates peaking near 100 MMscfd.
 - A new compressor station with three engine driven compressors primarily utilizing surplus/used reconditioned equipment.
 - CO₂ Membrane Project that enabled recovery of approximately 8 Bcf of hydrocarbon gas reserves that would otherwise go unrecovered.
- Lead Shell's Compressor/Critical Equipment Network that primarily focused on compression in Shell's Michigan, S. Louisiana, S. Texas, and Cortez, Colorado operations. Implemented lessons learned program, vibration monitoring, standard maintenance procedures, and proactive maintenance vs. calendar or breakdown maintenance. Resulted in increased equipment reliability/availability and reduced maintenance cost.
- Managed design/procurement/installation of Shell's Fred 2 Acid Gas (H₂S) Disposal Project in Michigan that allowed large reserves of oil and gas to be recovered that would otherwise be left in the ground. Utilized novel Sulfinol (amine) sour gas treating plant.
- Coordinated revamp and design/installation of a 4500 HP electric motor driven CO₂ compressor at Shell's Jackson Dome facility in Mississippi.
- Managed design/procurement/installation of surface production facilities, including very high pressure "kill lines", that safely produced sour gas wells (29% H₂S) in Mississippi.

- Managed design/procurement/installation of surface production facilities for enhanced oil recovery (CO₂ injection) at Shell's Olive and West Mallalieu Fields in Mississippi.

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- Received a Service Recognition Award for role in preventing lost production at the Goodhope Field following explosion at the Norco Refinery in 1988.
- Acted as Project Engineer responsible for well testing facilities, office and warehouse project, and well cluster facilities at Shell's McElmo Dome CO₂ Project (CO₂ Source Field) near Cortez, Colorado, one of largest known CO₂ reserves in the world.
- Completed assignment as Well Evaluation Engineer that included scheduling and witnessing logging operations of drilling wells in West Texas, New Mexico, and Oklahoma. Evaluated logs, received and evaluated reports, examined drill samples, witnessed coring and drill stem testing operations.

Mr. Holtgrieve obtained a BSCE degree from the University of Missouri-Rolla in 1978. He is a member of the ASME and a registered professional engineer in the State of Texas (inactive).