

Process Engineering

Services

Auto CAD
Plant 3D

Process Engineering

Groundwater Recovery and
Treatment

System Start-up

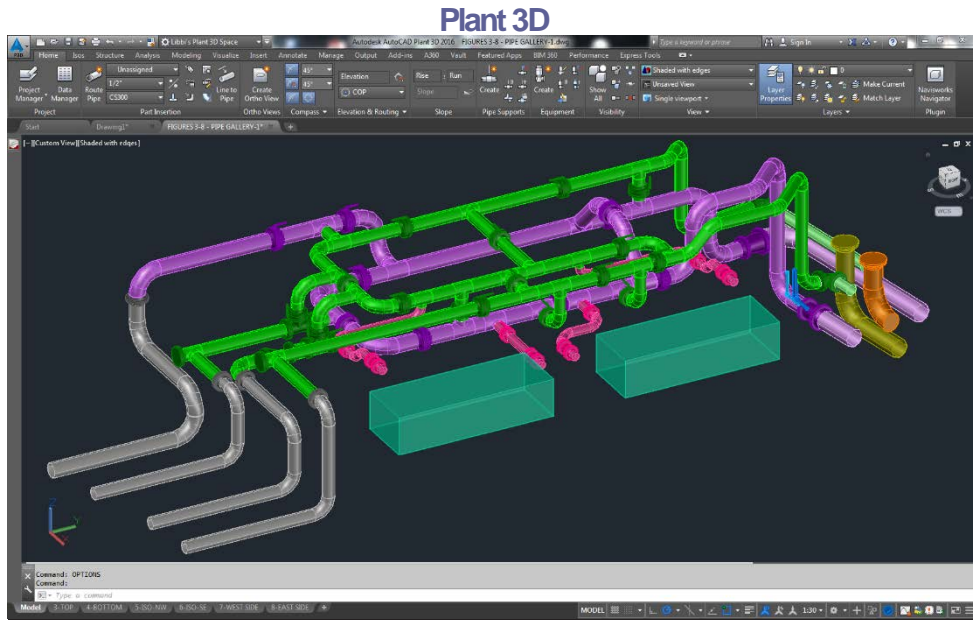
Project Management

Operation Oversight

Cost Estimates

Value Engineering

Services



KEY offers process engineering services as stand-alone tasks or as part of environmental and remediation services. Typical process engineering projects include conceptual design, equipment sizing and selection, piping layout and design, drawing preparation including Process and Instrumentation Diagrams, permit applications, system construction oversight, system start-up and oversight of operations and maintenance.

KEY's process engineering staff has performed a variety of design and analysis projects nationwide, including:

- Wastewater and groundwater treatment process design
- Groundwater recovery system design
- Potable water system design
- Sewerage system design
- Production well pumping design
- Construction Quality Assurance
- Engineering evaluation of existing systems
- System start-up
- Operations oversight

KEY's senior engineering staff design and operations experience

enables KEY to offer implementable – strategic design plans and specifications with less need for field changes and less opportunity for change orders.

KEY's project teams are assigned to ensure that mid-level and junior level staff can work under the close supervision of our Project Managers, maximizing communication of our clients' needs and goals to all team members. We are careful to ensure that our projects are adequately staffed yet not overstaffed, to provide the optimum balance of productivity and cost. Our firm holds weekly staffing meetings to maximize our project manpower loading, such that all project milestones can be met while concurrently optimizing the utilization of our technical resources.

Process Engineering Projects

Representative projects include:

Groundwater Treatment Plant Design

KEY designed a groundwater hydraulic control recovery and treatment system to attenuate the anticipated rise of the water table within a 64-acre barrier wall enclosure. The system is comprised of a Hydraulic Control Treatment System (HCTS) and a series of 42 groundwater/DNAPL recovery wells that provide for the extraction of groundwater to reduce the water table elevations within the barrier wall system. Water extracted from the recovery wells are being treated through the HCTS, which employs chromium reduction, sulfide based metals precipitation, clarification, solids management, pH adjustment, oil/ water separation, filtration and carbon adsorption. KEY designed the HCTS, provided support for construction quality assurance, prepared as-built drawings and operation and maintenance plan and continues to oversee operation of the system.

Portable Pumping System Design and Construction

KEY designed and oversaw the construction of truck and trailer mounted pumping systems used in the Oil and Gas Industry to transfer produced water from well pad locations to centralized storage facilities via permanent and temporary pipeline systems. The pump systems were designed to transfer up to 400 gpm and incorporate RFID tag location-specific pumping limitations, integrated engine controls, LEL interlocks, diaphragm clean-up pump, and PLC



data logging capabilities. Pumping volumes average 6 to 8 BBL/min depending on the topography of the related line.

The pumpers have safely transferred in excess of 1.2 million barrels of water in the last 12 months with zero releases.

Treatment System Optimization

KEY prepared preliminary design and assisted the client in securing Maryland regulatory approval to replace a 30,000 square foot treatment system with one 30 times smaller. Upon agency approval of the system modification proposal, KEY completed all aspects of the design and construction of the new facility, on a fast-track schedule. The treatment system included: groundwater recovery wells and pump system; NAPL recovery skimmers; hydrogen sulfide oxidation; flash mixing and flocculation; dissolved air flotation; and activated carbon adsorption. The project was successfully completed ahead of schedule and within budget. KEY then coordinated transition from the original treatment system to the new one, and served as the system operator with zero exceedances and significant cost savings.

Pump Station Design

Provided pump station design assistance for a company in the Oil and Gas Industry. This project included performing a pump upgrade design, pump sizing and selection, piping material recommendations and quantities, evaluation of existing force main pressure losses, vendor selection and contracting assistance. Evaluation of the existing lift pump system included review of proposed intake modifications and providing recommendations.



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