

## Industrial Gas Improvements

A set of industrial gas clients required ASUs, CO<sub>2</sub> plants and HyCO units, utilizing a broad spectrum of DCS and PLC / HMI platforms. The projects required changes in electrical design, instrument design, control systems, Point / Logic configuration and site support, as well as improved automation capabilities.

### Main Objective

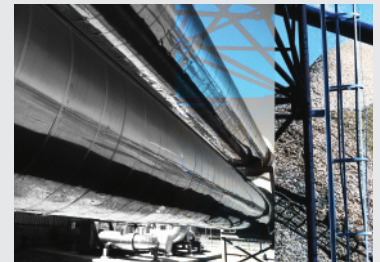
Many of the projects involved medical-grade gas production, which requires a strict quality standard to meet FDA requirements for computer-validated control systems. Achieving this standard typically requires alterations in wiring, power distribution, instrumentation and control system architecture.

### Customer Results

With our third-party audited engineering quality system, MAVERICK satisfied all requirements and achieved GAMP (Good Automated Manufacturing Practice) for all projects. Components were completed on time and within the original scope and estimate, achieving the required FDA approvals and meeting all production demands. By optimizing platform configuration through project tools development, project startups sustained minimum operational disruptions.

### Application Description

- Project managers directed the organization of individual projects, providing coordination of personnel and engineering services, scheduling, budgeting, weekly status reports and quality control documentation.
- All work performed adhered to an audited cGMP (current Good Manufacturing Practice)-compliant quality assurance system.
- Services included detailed electrical, instrument and control system design engineering, full systems configuration with both factory and site acceptance testing (FAT and SAT) and commissioning support.
- Retrofits of existing pneumatic plants were made, as well as the conversion of legacy DCS or PLC / HMI platforms.
- The scope of services and objectives involved electric design, instrument design, control systems, configuration and site support.
- Base conversions were enhanced through additional automation features at the facility to allow for unmanned operation, electrical load shedding, MVC (multi-variable control) and truck auto-loading.
- Local compressor / refrigeration panels were converted to full DCS automation, and provided access to remotely monitor and control facilities, including automated start up and shutdown.
- Equipment automation included main air compressors, N<sub>2</sub> feed and recycling compressors, expander / booster compressors, molecular sieves, argon skids, N<sub>2</sub> / O<sub>2</sub> / Ar storage, truck auto-loading and analyzers.



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