

Application Highlight: 2500 Series™ System in Natural Gas Transmission

The CTI 2500 Series™ System is widely used in Natural Gas Transmission applications due to its process capability, reliability, and its ability to operate in Class 1 Division 2 hazardous environments.

Basics of Natural Gas Transmission

The U.S. interstate natural gas pipeline network relies on more than 1,200 natural gas compressor stations to maintain the continuous flow of natural gas between supply areas and consumers. Compressor stations are “pumping” facilities that advance the flow of natural gas. They are usually situated between 50 and 100 miles apart along the length of a natural gas pipeline system and are designed to operate on a nonstop basis. As of 2006, there were 1,200 mainline compressor stations, with about 4,700 individual compressor units.

Although mainline natural gas compressor stations vary widely in size and layout, the basic components of such a station include compressor units, scrubber/filters, cooling facilities, emergency shutdown systems, and an on-site computerized flow control and dispatch system that maintains the operational integrity of the station. Most compressor stations are unmanned and monitored by an off-site Supervisory Control and Data Acquisition (SCADA) system that manages and coordinates the operations of the several compressor stations that tie together a natural gas pipeline system.



Figure 1 Natural Gas Pipeline

The purpose of a compressor station is to boost the pressure in a natural gas pipeline and move the natural gas further downstream. A simplified station schematic is shown in Figure 2.

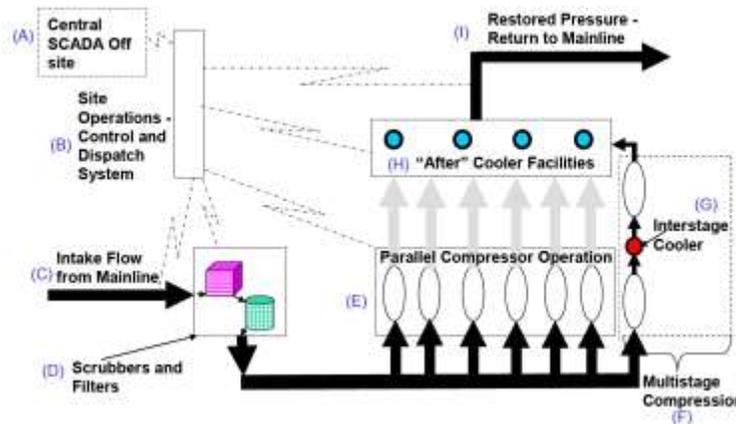


Figure 2 Compressor Station Schematic

The natural gas stream entering the station (C) is passed through scrubbers and filters (D) to extract any liquids that may have condensed out of the natural gas stream as line pressure decreased and to remove any particulate matter that may have formed during contact with the materials that coat the inside of the natural gas pipeline. Once the natural



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gas stream has been cleaned, it is directed through smaller piping segments assigned to individual compressor engines of varying horsepower and capacity (E). Computers regulate the flow and number of units that are needed to handle the scheduled system flow requirements. (Source: Energy Information Administration, Office of Oil and Gas, November 2007)

Panhandle Energy

Panhandle Energy is one of the largest 2500 Series™ users in the natural gas transmission industry. Panhandle Energy Companies operate more than 15,000 miles of pipelines that transport natural gas from the Anadarko and San Juan basins, Rocky Mountains, Gulf of Mexico, South Texas and Mobile Bay to major markets in the Southeast, Midwest and Great Lakes region. At a typical compressor station, Panhandle employs CTI 2500 Series™ products to provide reciprocating engine control, turbine/compressor control, combustible gas and flame detection, and overall compressor station control. The specific processes include lubrication and cooling system controls, sequential start/stop operations, pressure and flow control, unit speed control, air/fuel ratio control, alarm and shutdown systems. The systems include a wide range of 24VDC and 120VAC I/O, RTD and thermocouple inputs, and analog I/O. The systems also support communications using Ethernet, Modbus for communications with equipment within the station and externally to the SCADA system.



Figure 3 Natural Gas Compressor Station



According to Dennis Thompson, Senior Technical Specialist, Panhandle Eastern, “Reliability and predictable service are the most critical considerations for our control systems, which is why we have remained TI, Siemens and CTI loyal since 1980.”