



Commissioning Case Study

Dynamics on the pipeline infrastructure necessitated... *Flexibility.*

SITUATION

Like virtually everyone in the distribution and transmission sector, this North American leader in the gathering, transportation, processing and storage of natural gas, was very busy in 2016-17 with significant system modifications and project development to effectively monetize the rapidly changing production basins (Marcellus and Utica) as well as the somewhat lagging emerging markets or demand centers (industrial buildout & LNG exports). The dynamics on the pipeline infrastructure necessitated that the existing network become more accommodating with gas flows and/or customer needs throughout various times of the year.

As a result, many pipeline companies in the long-haul natural gas business, undertook several projects focusing on developing a backhaul capability. This pipeline company will be able to move 2 bcf/d to the Gulf Coast and Midwest markets via bidirectional flows in 2017, while retaining full capacity to deliver to Northeast markets when needed.

Achieving these bi-directional flows requires that the existing compressor stations along the pipeline to be modified with valves and piping that will enable the option of compressing gas north or south of the existing compressor units. Once pipelines become fully bi-directional, market arbitrage forces will command the guidance of flows at these flexible locations.



The natural gas compressor station featured in this case study is in South Central Kentucky and one of the many compression stations that underwent the flow direction upgrade. After the valves, pumps and piping has been modified, an engineering firm needs to be engaged to commission the drive units and coordinate bringing the facility back online.

Turbine Technology Services (TTS) has a great deal of experience and expertise in this area and received the contract to manage and execute the commissioning. The following case study details TTS' responsibilities and scope of work.

COMPRESSOR STATION EQUIPMENT

The station has two GE Frame 3 turbines and one GE Frame 5 turbine. The station also has ten Dresser Rand-Clark© reciprocating engines (seven HBA-8's and three HBA-8T's). This project focused on the three turbines and the three HBA-8T's and ancillary equipment that was both new and existing.

TTS RESPONSIBILITIES

- Create the commissioning manual to include checklist for all new equipment, devices and I/O
- Provide leadership to resolve issues
- Lead daily morning meetings with the key vendors, Construction and Operations once commissioning at site begins
- Issue daily progress reports
- Create an ongoing punch list and verify the items are resolved
- Commission all the new equipment except that which is within another vendor's scope
- Coordinate training and verify equipment manuals are supplied
- Coordinate with Operations and the Contractor LOTO efforts for energizing and de-energizing equipment
- Work with all Contractors and their Subs and with Operations to keep the project on schedule and to coordinate all disciplines with each other
- Schedule on site start up needs with the major vendors / suppliers so they can commission and start up their equipment and insure schedule is maintained
- Calibrate and verify range on all transmitters with your certified calibration equipment
- Verify PLC, HMI and SCADA data is correctly ranged and reading properly
- Power up and verify operation of all PLC's, panels and associated communications including fiber optics and Ethernet and that new equipment is communicating with existing equipment
- Energize all 480vac/129vdc and less equipment
- Preform / verify all 480v motor rotation
- Assist as required with any new I/O panels and/or existing panels
- Check / verify all electrical systems for continuity / grounds prior to energizing

SCOPE OF WORK DETAIL

Turbine Frame 3 upgrades included:

- New dry gas seal system (Kaydon supplied by Dresser Rand) and new seal gas booster pumps.
- Selective catalytic reduction using ammonia (SCR, supplied by AeriNOx with H&H controls).
- New covered ammonia storage tank and AFCU.
- New emission monitoring that is part of the SCR system and CO catalyst.

Turbine Frame 5 upgrades included:

- New regenerator.
- New suction throttling valve.
- Updated PLC software for the valve control.
- New equipment enclosure for SCR control panel and for power distribution panels.



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Reciprocating engine upgrades included:

- New high-pressure fuel injection clean burn system installed and commissioned by Dresser Engineuity.
- New PLC unit panel.
- New RTU enclosure for the three recip fuel meter runs.
- New dryer for the compressors in the pump room.
- New JW boiler system with a small electric fuel gas heater.
- New 5kva UPS system.

SUMMARY

Example: "TTS did a masterful job handling all of the details and various contractors. I now understand why they came so highly recommended by management and our associates who went through this exercise in 2016." Plant Manager.

