Linden Cogeneration Plant Gas Pipeline and Metering Station Project

Detailed Engineering and Design, Procurement, Construction Management, Startup/Commissioning

Client: Linden Cogeneration Plant

Project: Gas Pipeline and Metering Station for Cogeneration Facility at Bayway Refinery

Location: New Jersey

Project Highlights

Natural Gas End-User: Cogeneration facility located within operating refinery

Gas Usage:

- Block 5 (current): 172,000 Dth/day
- Block 6 (current): 45,000 Dth/day
- Block 7 (future, additional): up to 62,000 Dth/day
- Refinery usage (current): 10,200 Dth/day
- Refinery usage (future, additional): up to 21,000 Dth/day

Supply Pressures:

- Gas supplier 1: 425 psig (min), 650 psig (op), 860 psig (MAOP)
- Gas supplier 2: 470 psig (min), 975 psig (op), 1200 psig (MAOP)

Pipeline Details: 14-inch, 12-inch, and 8-inch supply headers

Cogeneration Plant Configuration: 6x3 combustion turbine based cogeneration facility

Schedule Milestones

Project Award	Engineering Complete	GWC/Award Construction Start	BOP/GWC Work Complete	First Gas Supplier Operational	Second Gas Supplier Operational
2016	2017	January 2017	May 2017	June 2017	December 2017

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Description

The project required the installation of two new natural gas supply pipelines to the Linden Cogeneration Plant, located within an operating refinery in Linden, New Jersey. The cogeneration plant is a 6x3 combustion-turbine-based cogeneration facility fueled primarily with natural gas. The cogeneration plant exports steam and supplies power to the refinery. It also supplies power to the NYISO and PJM electric power regions. Operationally, the plant is divided into two operating Blocks, each requiring a separately regulated flow.

In mid-2016, Sargent & Lundy was awarded the contract to provide Owner's Engineer services and construction oversight services for an engineering, procurement, and construction (EPC) contract to complete the natural gas pipeline and metering station project. However, due to tight schedule requirements, the Owner changed contracting strategy in fall 2016 from an EPC arrangement to a multiple lump-sum contacting approach. Sargent & Lundy was then awarded the contract for detailed engineering and construction management.

The project required replacing the plant's existing, single natural gas supply pipeline with two new independent gas supply lines. The new configuration provides fuel supply flexibility for the plant. The pending expiration of the plant's existing gas contract required critical focus on the timely completion and commissioning of the first new gas supply line interconnection. The design of the balance-of-plant systems (BOP) accounted for the inherent differences in the supply pressures between the two new suppliers. Interconnection with the respective gas suppliers was phased, to accommodate construction concerns and contracting requirements with each supplier.

The project utilized two separate isolation skids to manage and control the selected gas source for each Block. The isolation skids permitted either gas source to be lined up with either or both Blocks. The automated valves now in place allow switching between the two gas suppliers without interrupting service. The project also installed two separate pressure regulating skids—one dedicated to each Block. The individual pressure regulating skids included inline pressure regulators in a worker/monitor arrangement, with slam-shut overpressure protection valves. Each pressure regulation skid included 2x100% redundant main flow paths and 2x100% redundant startup flow paths to permit maintenance and inspection of an offline valve train without interrupting gas service to the respective Block. The team also designed the system to handle additional capacity to support a future CT/HRSG installation, along with current and future ancillary gas supply capacity to the refinery for process usage.

Sargent & Lundy's scope included the detailed engineering, physical design, construction management, and startup/commissioning management. Our engineering and field work complied with the refinery's engineering standards and construction requirements, drawing on our ability to meet each client's specific needs.

Due to the aggressive schedule, the construction scope was divided into multiple work packages by engineering discipline, as well as separated into above- and below-grade work. Sargent & Lundy's construction management scope included oversight and coordination of the various construction contractors. The work also required coordination of the interface and communication with the natural gas suppliers' installation teams, as well as the refinery staff who controlled various work permit activities. Our Construction Management personnel acted as liaison between the plant, the refinery, the pipelines, and the contractors, ensuring that work could be completed efficiently and in compliance with the onsite refinery rules and regulations.

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