Newport Substation Design Rebuild

Newport, New Jersey

Black & Veatch replaced the existing 69/12kV substation located on a newly acquired property for Atlantic City Electric. The 69kV portion consists of a six breaker ring bus with two-line terminals, one capacitor bank, one mobile connection and two 69/12kV power transformers. The 12kV switchgear section consists of two breaker and a half lineups and two main breakers. The switchgear is housed in the control building which provides additional space for AC/DC panels, relay/control panels, station auxiliaries, and a separate battery storage room. The old substation will be decommissioned and demolished (to be used as a stormwater management site) when the new substation is completed.

Black & Veatch Role on Project

Black & Veatch’s role includes design of the new substation as well as demolition of the existing substation. During the design phase, Black & Veatch and sub-contractor PS&S Integrated Services will complete site development including studies and analysis calculations. Black & Veatch will further work with diverse sub-contractor ExecuPOWER to complete electrical primary and secondary designs. Upon design completion, Black & Veatch will also provide field support during the rebuild.
Terrace Substation Design

Turnerville, New Jersey

Black & Veatch provided engineering for Atlanta City Electric to replace an existing substation in the same location and incorporate a newly acquired parcel of land for substation expansion. The site consists of a six breaker 69kV ring bus, three step down transformers, three indoor switchgear assemblies, a new control enclosure, two transmission take off structures as well as lightning masts and all other equipment for a functional substation.

**Black & Veatch Role on Project**

Black & Veatch’s role includes all site development and electrical design. The first phase of this project consists of all applicable studies and analysis calculations and preliminary foundation and structure designs. This project is a ‘greenfield’ site and new grounding grids and control buildings will be included. The second phase of this effort includes primary and secondary electrical design as well as finalized structural and foundation plans. The last phase includes all finalized designs with client comments incorporated and necessary information pertinent to construction, testing, and operations.

**Challenges**

A key challenge associated with this project involved the emergency transformer replacement. Terrace was originally considered a greenfield site, and the emergency transformer replacement resulted in the rebuild being implemented around the new transformer.
Design of Silver Run Remote Ends
Delaware, USA

Black & Veatch provided engineering to replace and upgrade 230kV line relaying schemes at the Cartanza, Red Lion and Red Lion West Substations. This work supports integration with the new line relaying schemes at the new Silver Run Substation. In addition to relay upgrades at each location, two new circuit breakers will be added to the Red Lion station.

Black & Veatch Role on Project

Black & Veatch is working with sub-contractor J.D. Hynes to complete ground grid analysis work as well as soil resistivity tests at each site. Black & Veatch is also engaging diverse sub-contractor ExecuPOWER to complete primary and secondary electrical design. Black & Veatch professionals are proactively communicating with Delmarva to effectively address any potential hurdles. Black & Veatch engineers are also preparing construction outage packages and will be available for field support.

Challenges

A key challenge includes coordinating between the different stations. The Red Lion and Red Lion West stations are both in Delmarva’s New Castle region, and the Cartanza Station is in the Bay region. Each region has its own set of regulations and permitting concerns that Black & Veatch is addressing for compliance.
Zoar Substation Design
Georgetown, Delaware

Black & Veatch provided engineering services for a greenfield design project located in Sussex County, Delaware. The project features a four breaker 69kV ring bus, overhead, and underground interconnections to a Delaware Electric Cooperative (DEC) tap. Design also included new takeoff structures and four new 69kV PT stands. A new control building houses protection panels, AC/DC panels, and a separate battery room.

The interconnection from Zoar station to DEC includes both overhead and underground connections. The below grade connection includes a riser structure on both ends while the overhead connection will be rigid bus.

Black & Veatch Role on Project

Black & Veatch’s role includes design for the new tap. Delaware Electric Cooperative is assisting in getting technical specifications. With the help of Century Engineering, Black & Veatch will revise site plans to match Delmarva site standards. Early phases include the completion of multiple studies and analysis calculations. The electrical primary and secondary design phase will be completed with the help of diverse sub-contractor ExecuPOWER. Black & Veatch will be present during construction outages for engineering support.

Challenges

A key challenge included a high-water table and the logistics of the tap. The high-water table severely impacts ground grid design as well as foundations. Designing the tap for Delaware Electric Cooperative entailed joining two established units and working with multiple utilities and contractors.
Black & Veatch provided engineering to upgrade six distribution feeder circuits at two stations for fast trip/no reclose capabilities. This entails adding relays and a latching switch to enable ‘fast tripping’ and ‘no reclose’ capabilities.

Black & Veatch Role on Project

PECO selected Black & Veatch to take the lead on primary and secondary electrical design. Black & Veatch was further assisted by ExecuPOWER, a diverse sub-contractor. Black & Veatch engineers attended multiple site walkdowns to confirm accuracy of designs before construction start. Proximity of Black & Veatch’s New Castle, Delaware office enabled the company’s engineers to assist in the outage as field support.

Black & Veatch Role
- Engineering
- Field Support

Technology
- Power Delivery

Project Elements
- Utility-Scale
- 33 kV
- Electricity

Location
Philadelphia, Pennsylvania, USA
Woodlyn, Pennsylvania, USA

Black & Veatch Contact
Bill Pegram, Project Manager
Tie Block Automation Design
Pennsylvania, USA

Black & Veatch provided engineering to upgrade tie block schemes for ten-unit substations located throughout PECO’s service territory in southeastern Pennsylvania. The stations include a tie block between two 33-4kV units where relays, latching switches, and control switching relays and remote terminal units were installed.

Black & Veatch Role on Project
Black & Veatch’s role included primary and secondary electrical design. In later phases, field comments were incorporated into each design to accurately portray each station. Black & Veatch coordinated the design effort across three offices and provided field support to each station using the company’s New Castle, Delaware office.

Challenges
Key challenges included designs for a large number of stations. For example, aligning different labeling between the field and designs was addressed in one of the stations.

Black & Veatch Contact
Bill Pegram, Project Manager