



Bermuda Energy Services Company Limited.

## TYNES BAY ELECTRICAL INSTALLATIONS FOR BOILER AND PRECIPITATORS UPGRADES

The Tynes Bay Waste Treatment Facility incinerates Bermuda's domestic waste through two separate waste processing streams. The incineration process reduces the Island's volume of combustible waste and replaces the old land fill facility at Marsh Folly. A secondary function of the Tynes Bay waste incineration process is to extract the energy produced by the combustion gasses to produce steam and then convert to electric power.

Domestic waste from all over the Island is brought into a large storage bunker at the Tynes Bay facility. The domestic waste is mixed together by overhead crane to produce a homogenous waste and then loaded by the cranes through a feed chute into a self-combustible furnace. Incineration is the process by which the organic materials in the waste are burnt and converted to ash and gas. The ash is used as an additive to concrete to make an inert and safe landfill material. The heat from the combustion process is used to create high pressure steam in the boiler which in turn is used to drive the steam turbine generator.

### CHALLENGE:

The plant, which first went into service in 1994, was in need of refurbishments and energy saving measures were required to make the facility as energy efficient as possible. The refurbishment project included the installation of new boiler tubes; an upgrade of the systems process controls and incinerator fire grate; a refurbished combustion air system above and below the fire grate; and replacement and extension of the electrostatic precipitators (ESP) and ash conveying systems.



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## SOLUTION:

Tynes Bay once again looked to BESCO's expertise to help them to perform these upgrades. The BESCO team's long term familiarity with the facility enabled them to work with the systems designers and to perform electrical, instrumentation and controls (EIC) installation works for the new systems. On this project, BESCO worked on the EIC systems as part of the boiler renovations, the furnace grate refurbishment, additions to the new fly ash conveying system, the installation of the new ESP's and the changes to the primary and secondary combustion air systems for the fire grate.

The installation works also required upgrades to general building services.

A significant part of the new works was to install new Variable Frequency Drives (VFD) for the combustion air fans for better control and efficiency of the combustion process; and new control systems and motor control centers for the ESPs. Better control of the combustion process improves overall plant efficiency and reduces emissions from the plant.

Waste gasses from the combustion process pass through a series of electrically charged vertical plates, called an electrostatic precipitator, which removes waste particles.

The precipitator is energised at high voltage to create electrostatically charged plates which removes the dust and particulates by attracting the particles onto the charged plates. The collected particles are removed as fly ash and mixed with the ash from the waste combustion process.

The existing two-zone precipitators were replaced with three-zone ESPs. The addition of a third zone allows for better particulate removal performance and greater efficiency.

BESCO also installed air heating and drying systems for each of the two separate waste incinerator streams to minimize damaging humidity inside the precipitator when one of the boiler/precipitator combinations are not in use.

## CONCLUSION:

The resulting refurbishments and installations increased the overall efficiency of the facility and extended the usable life of the plant for at least another 10 years. BESCO continues a close relationship with Tynes Bay through ongoing maintenance and service contracts.



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