Landfill Gas Collection and Conveyance System Upgrades

Coventry, Vermont

Owners  Washington Electric Cooperative (WEC)
Client  WEC and New England Waste Services of Vermont, Inc. (NEWSVT)

OVERVIEW

• Upgrade of existing landfill gas-to-energy facility to increase energy production and efficiency.
• Modified existing condensate knockout pot, installed above ground insulated landfill gas conveyance piping, and installed automated actuated valves and controls, while limiting Facility down time.
• Collaborative effort with both WEC and NEWSVT.
• The Project will save the client millions of dollars in maintenance and operational costs over the life of the Facility.

MEETING CLIENT NEEDS

• Designed and implemented an economical solution that met client needs.
• Increased energy production and reduced Facility operation and maintenance costs by implementing improvements to reduce friction losses in the pipeline.
• Used existing infrastructure to reduce construction costs.
• Limited downtime for Facility.
• Cost savings is about $280,000 per year. The payback period will be under 1.5 years and the infrastructure is expected to be in place for at least another 25 years, resulting in millions of dollars in reduced operations and maintenance costs over the life of the Facility.

NEW APPLICATIONS/INNOVATION

• Design decreased construction cost by keeping much of the existing infrastructure in place, which is located up to 12 feet below ground surface.
• Design allows for seamless future upgrades and expansion of the Facility and the landfill's gas collection system.
• Project incorporated controls and logic to more efficiently allow the simultaneous operation of the LFGTE facility and utility flares.

COMPLEXITY

• Task included modifying the existing gas collection and condensate management system while limiting downtime of the Facility. Construction was completed in stages so about four hours of Facility downtime was required over two days.
• Solution allowed gas to be conveyed more freely to the Facility while providing adequate condensate removal.
• Prior to the improvements, a vacuum drop of over 25-inches of water column was measured across the gas condensate management infrastructure located immediately upgradient of the inlet to the Facility. After completing the Project, the vacuum drop was reduced to about 9-inches of water column.

SOCIAL ECONOMIC CONSIDERATIONS

• The Facility is a vital component to Vermont’s renewable energy portfolio, reducing dependence on outside sources of energy.
• Increased efficiencies resulting from the Project enhances the public health through the continued reduction in greenhouse gases.
• The Facility supplies almost two-thirds of WEC’s power demand and reduces greenhouse gas emissions by about 340,000 metric tons of carbon dioxide (CO₂), which is about the annual emissions from over 62,000 cars.

VALUE TO PROFESSION

• Increased energy production and efficiencies to Vermont’s renewable energy portfolio.
• Required a combination of civil engineering, mechanical engineering, science, and unique instrumentation and controls to operate the flare and LFGTE facility simultaneously.
• The Project has been used to provide public awareness on the environmental and economic value of using landfill gas to produce electricity and reduce greenhouse gas emissions.