

Project Name

Edgeboro Gas Collection and Control System

Client

Edgeboro Disposal, Inc.

Services Provided

- Design
- Permitting
- Technical Specifications
- Construction Oversight
- Quarterly Surface Monitoring
- Monthly Wellhead Monitoring
- Air Quality Monitoring



Project Description

SAI provided comprehensive design, oversight and monitoring services for the Gas Collection and Control System (GCCS) at the 320-acre Edgeboro Landfill – a former sanitary landfill located on Edgeboro Road in East Brunswick, NJ. This GCCS is comprised of a series of gas extraction wells, gas collection pipes and trenches, which collect the gas produced by the decomposition of waste. SAI assisted its client in obtaining the required permits and approvals for the design and operation of this system. The landfill generated approximately 7500 cfm of gas flow at peak, and currently generates about 4500 cfm of gas. This gas is collected from the vertical wells by an active vacuum system and transferred through a main header line located at the perimeter of the landfill to a 10-MW power plant for energy generation. SAI provided technical assistance to Edgeboro Disposal Inc. for the modification of this existing GCCS to accommodate Middlesex County Utilities Authority’s waste disposal needs.

Approach

The Middlesex County Utilities Authority (MCUA) has operated an active sanitary landfill over the former Edgeboro Landfill since 1992. As part of the Solid Waste Management Plan in Middlesex County, the MCUA is undertaking an expansion of its landfill, which includes the construction of new cells on an approximately 125-acre area over and around the central and southeast portions of the Edgeboro Landfill. Construction of these new cells required the removal of existing gas risers in the Edgeboro Landfill and modification of the existing GCCS layout. SAI has redesigned the existing GCCS to enable continued collection and beneficial use of gas from the Edgeboro Landfill. SAI has also successfully obtained the required United States Environmental Protection Agency (USEPA) and New Jersey Department of Environmental Protection (NJDEP) permits and approvals for this design modification. The construction is currently underway.

Design

The initial design of the GCCS consisted of approximately 172 vertical gas collection wells constructed of perforated pipes extending to different depths in the waste. An active negative pressure system creates a vacuum with the help of blowers. This is utilized to draw landfill gas from the wells into a 16-inch main header, which then conveys the gas to the power plant. The GCCS is equipped with flares to handle excess gas flow in emergency situations.



SAI's GCCS modification design consists of the conversion of existing vertical risers into horizontal wells, which are connected to lateral headers running in an east-west direction along the new MCUA cells. The primary design features of this new system are:

- The 20 new headers being constructed along the new MCUA cells are spaced approximately 150 feet apart to maximize the LFG collection. New laterals have been constructed to connect the gas wells to these headers, and gas wells that will lie in the vicinity of the new MCUA cells will be extended and connected to the headers;
- To reduce the impact of differential settlement, all horizontal pipes will be placed in oversized beds of crushed stone, resulting in a more uniform settlement along the pipes. This will minimize the potential impact of landfill settlement on the efficiency of the system; and
- To facilitate the movement and collection of the gas from the wells, a twelve-inch-thick and 30-foot-wide area filled with stone along the top portion of the lateral trenches will be constructed. This well compacted/dense high permeability layer of crushed stone will also distribute the stresses imposed by the additional loads from the new MCUA cells more uniformly.

The GCCS modification has been designed for a 4,500 cfm of gas flow and an approximate landfill capacity of 16 Million megagrams. USEPA's Landfill Gas Model Version 2.0 was used to estimate the gas generation rates.

This design approach has been approved by the USEPA.

### **Construction Oversight**

SAI provided its engineering expertise for supervising the construction work of the existing GCCS and the modification project currently underway. SAI also provided technical specifications for construction materials, methods and testing.

### **Monitoring**

SAI conducts the quarterly surface methane monitoring required for compliance with the operating Title V permit for the Edgeboro Landfill. This consists of scanning the entire landfill surface with a flame ionization detector along the pathway specified by the Federal New Source Emission Standards (NSPS) regulations, and performing specific follow-up actions in compliance with NSPS. SAI also performs monthly wellhead monitoring at the Edgeboro Landfill for various gas parameters in compliance with Federal and State Air Regulations.

### **Air Quality Modelling**

SAI performed Air Quality Modeling and Risk Assessment for Landfill Gas at the Edgeboro Landfill in compliance with NJDEP Bureau of Air Quality Engineering and Bureau of Air Quality Evaluation Regulations.

**Permitting**

SAI assisted its client in obtaining the following permits for the existing GCCS as well as the ongoing GCCS modification project:

- Major Disruption of a Solid Waste Facility Approval
- Soil Erosion and Sediment Control Approval
- Treatment Works Approval
- Modification of the Title V Air Permit
- USEPA approval of a Work Task Plan and Alternate Operating Scenario
- Air Permit for two enclosed and two open flares to be utilized for gas control

