Heartland

Case Study

Innovative Technology Helps PA Landfill Manage Leachate and Landfill Gas for Beneficial Reuse

Location

Joseph J. Brunner, Inc. Landfill New Sewickley Township, PA

Key Takeaways

- Operational flexibility with variable gas flow, energy flow, and evaporation rates
- Thermal energy from landfill gas used to treat leachate

Background

Joseph J. Brunner, Inc. operates a landfill in New Sewickley Township, PA, and provides disposal services for approximately 70,000 tons per year of municipal solid waste to commercial and residential customers. The landfill generates, on average, approximately 20,000 gallons per day (GPD) of leachate. A submerged combustion evaporator was installed in 2005 to manage leachate treatment. This unit presented numerous reliability challenges over its operational lifetime. By January 2015, the unit had exceeded its useful life due to stress corrosion cracking, and much of the landfill gas destruction equipment required replacement due to intermittent use.

At A Glance



Effective technology with improved savings



Improved operational uptime and efficiency



Upcycling of landfill gases to fuel operations



Flexibility with variable leachate flow rates



Figure 1. Heartland Concentrator in operation at Brunner Landfill.



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Figure 2. Simplified process flow schematic of the Heartland Concentrator at Brunner Landfill.

Challenge

The Brunner landfill faced several important challenges:

- It was very important to the landfill owner to operate a single landfill gas combustion device which would function independent of the Heartland Concentrator[™] for continuous landfill gas management during planned or unplanned Concentrator downtime.
- Due to the observed failure of the previous leachate treatment system, corrosion of wet parts was a major site concern.
- While the landfill typically generates 350 standard cubic feet per minute (scfm) of landfill gas, the Heartland Concentrator needed operational flexibility to work with variable gas flow from seasonal changes as well as future increases.
- The landfill gas combustion and leachate treatment systems must function in automated synergy to ensure safe and efficient operations 100% of the time.

- With only a single operator during normal weekly operations, the treatment system must be fully automated with remote monitoring and alarm notifications.
- Since this is an operating site, interruption had to minimized during removal of existing equipment and installation of new equipment.

Solution

Heartland Water Technology installed a LM-HT® Concentrator with 24.000 GPD capacity to meet Brunner Landfill's leachate management needs. The Heartland Concentrator was designed with a landfill gas flare system to provide the flexibility required for this specific application. With products constructed from robust and corrosion resistant materials, Heartland eliminated corrosion concerns. By incorporating a simple, hotgas, isolation valve equipped with automated control, the flare safely operates independently from the Heartland Concentrator to guarantee continuous landfill gas processing and destruction of non-methane organic content (NMOC) to comply with regulatory standards. The inherent processing flexibility of the Heartland Concentrator's design absorbs the site's fluctuations in landfill gas flow without impacting reliability or performance.





Figure 3. A Brunner Landfill engineering man-ager discusses the operations and controls of the Heartland Concentrator.

Results

The Heartland Concentrator operates continuously for an average of two weeks between required outages for cleaning. One person operates the Concentrator while also responsible for numerous other landfill duties. Downtime for installation was short. Removal of the existing equipment and installation of new equipment was completed in 3 weeks, with full system operation in 4 weeks. Heartland's automation and controls package provided an intuitive, process-flow based HMI equipped with automated monitoring and controls for remote process operation. This control package includes a remote alarm with e-mail notification system that alerts operations personnel of issues during unmanned operation. In addition, equipment operations are monitored through a secure web browser, allowing site personnel to view process conditions and adjust process parameters remotely. An automatically generated daily report monitors this data and provides total gallons processed and uptime data, as well as historical analysis of all critical process parameters. Brunner Landfill personnel have extensive experience with leachate evaporation. They provided key input on optimizing integration of the Heartland Concentrator onto their site, maximizing use of existing equipment and ideas for minimizing downtime for routine maintenance activities.

Since commissioning in December 2015, this combined landfill gas and leachate management system has operated successfully without major issue. The Heartland Concentrator has demonstrated both >95% volume reduction of landfill leachate and >95% availability; Heartland continues to work closely with site personnel to identify cost-effective improvements to achieve even better performance. This close customer relationship is a hallmark of Heartland Water Technology's core company values, as it strives for mutually beneficial continuous improvement.



Figure 4. A hot gas isolation valve provides a simple and effective automated protection of downstream equipment, allowing the landfill gas flare to run continuously and independently from the leachate management process.

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