



News ► Magazine Articles

SEM at Penetrations: The 10-Day Compliance Race

January 29, 2022

Ten days is not a lot of time, especially with current global supply chain issues and worker shortages.

By Shrawan Singh, Ph.D., PE and Stephen Descher

The promulgation of 40 CFR 62 Subpart 000 (EG plan), effective since June 21, 2021, impacted all MSW landfills operated under New Source Performance Standards (NSPS) subpart WWW. One of the major changes of this rule is the requirement to monitor all cover penetrations during quarterly methane surface emission monitoring (SEM). All components that are part of the landfill gas collection system and any other object that completely passes through the landfill cover are considered cover penetrations.

As landfill and landfill gas practitioners, we suggest that advanced planning can save you time and effort. As landfills face short 10-day

correction periods, coupled with supply chain and labor shortages, planning can make operations and compliance more efficient. In the following article, we present a few scenarios and suggestions.



Variety of penetrations.

Monitoring the Numbers

You will need to record any reading greater than 500 ppm above background as an exceedance location during monitoring. These require taking corrective actions such as cover maintenance or landfill gas wellfield adjustments, along with monitoring the exceedant locations again within 10-days of your initial monitoring. If 10-day monitoring still shows methane concentrations greater than 500 ppm, you will need additional corrective actions and to monitor the location once more within 10-days of the second exceedance.

Once the location(s) shows methane concentrations less than 500 ppm, it is mandatory to monitor these locations again one month from the very first reading showing the exceedance. If a location shows methane concentration greater than 500 ppm for three occasions in one quarter, the addition of a collection device other improvements to

the collection system, or a request for an alternative remedy and timeline is required. Therefore, implementing appropriate corrective action within the specified timeframe is critical to avoid expensive gas collection and control system (GCCS) expansions or NOVs.



Penetration corrective action using bentonite.

Corrective Actions

Gas well, well boots, leachate risers, below and above-grade pipe transition, condensate sumps and valve vaults are some of the common exceedant penetration locations. Implementing corrective action at these penetrations within the given timeframe is a challenging ordeal for landfill operators. Corrective action can vary depending upon several factors: the methane concentration observed during initial monitoring, the location of the penetration, cover type (geomembrane capped versus soil capped), material availability and

Corrective actions have varying material and effort requirements; one solution cannot fit all challenges. The most common corrective actions include applying expanding foam, soil mounding, excavation, clean dirt fill or bentonite fill, well boot repairs, installing a prefabricated well boot seal and installing a vacuum line for emission control. We recommend before starting your monitoring operators to consider the following factors:

- Develop an educated estimate for the number of expected exceedant penetrations from the landfill sections that historically show cover exceedances or are in areas with problematic operating conditions. Using the readings and data collected over time makes identifying these areas much easier.
- Decide the type of corrective action to implement based on your cover type in those expected exceedance locations.
- Procure corrective action materials such as bentonite, geomembrane for boot fabrication matching permitted cap material, or prefabricated seals before you need them.
- Check the availability of contractors for liner or well boot repairs, and their response time, before you need them.

Bringing Exceedant Locations to Compliance

Surface emissions vary based on the operating conditions; therefore, it is common to see a variable number of exceedances from one quarterly monitoring event to the next. At one of our sites that had no surface exceedances observed during the previous quarterly SEM event, multiple penetrations observed methane concentration greater than 500 ppm during the following quarterly event. One section of the

concentrations of up to 8,000 ppm methane. We implemented various corrective actions to bring these exceedant locations to compliance.

In the soil-capped section, we implemented bentonite plugs, prefabricated seals, and site fabricated geomembrane seals depending upon the observed methane concentration, exceedant location and material availability. Pre-planning and procuring material ahead of time proved to be very helpful.

For each of these corrective actions, we opened an area about 2-ft. deep and 10-ft. x 10-ft. For bentonite corrective action, about a 9-in. thick bentonite slurry was filled, extending about 5 ft. on each side of penetration and then filled with clean dirt.

Prefabricated seals that come in standard sizes as a slip-on for penetrations and site-fabricated geomembrane seals also covered at least a 5-ft. x 5-ft. area around each penetration. The sleeves at each penetration were left at least 6 in. over the ground surface after filling the excavated section with clean dirt.

In the geomembrane-capped section, we choose to use well boot repairs using geomembrane. Our task was to identify the type of geomembrane used in the cap, procure the geomembrane, identify and schedule the contractor, and install well boots in each exceeding penetration location within the 10-day timeframe. After the well boot fabrication and installation, we needed to reconnect the existing drainage layer carefully.



Above and right: Penetration corrective action using prefabricated seal.

Planning Ahead

Implementing these corrective actions can get expensive; prefabricated seals can cost up to \$300 per penetration, excluding installation. Material and contractor's availabilities are also a significant challenge. While implementing these corrective actions, additional unforeseen challenges can arise as well. Planning ahead and having the material onsite is very important for landfill operators to keep the landfill under compliance. | WA

Shrawan Singh, Ph.D., PE, is a Senior Project Professional at SCS Engineers. He is experienced in landfill design, permitting, and operation, including bottom liner, gas collection and control systems, leachate recirculation system, and stormwater management.

Stephen Descher is a Senior Project Professional at SCS Engineers with 14 years of solid waste experience, mostly in environmental compliance, including Title V permitting, monitoring and reporting, data management, groundwater, NPDES and other environmental monitoring, environmental compliance auditing of solid waste system construction, as well as some experience with ash pond management and closure. They can be reached at www.scsengineers.com/about-scs/staff.