

Up to speed

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Web-based software from SCS Engineers helps simplify the monitoring and analysis of landfill gas and surface emissions.

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For landfill owners across the United States, monitoring landfill gas (LFG) is a critical component of their daily operations.

As a major contributor to the nation's greenhouse gas emissions, LFG contains roughly 50 percent methane—making municipal solid waste (MSW) landfills the third-largest source of human-related methane emissions in the nation.

Given the large role LFG plays in annual emissions, regulations at both the state and federal level require monitoring to determine if the gas is migrating beyond the permitted facility boundary. However, with recent emissions guidelines proposed by the U.S. Environmental Protection Agency (EPA) (<https://www.epa.gov/>) going into effect June 21, the efficient monitoring of LFG has become even more important.

The new rule, called the Emission Guidelines and Compliance Times for Existing Municipal Solid Waste Landfills, was originally published in 2016 during the Obama administration and requires any MSW landfill that reaches an annual LFG emissions threshold of 34 metric tons or more of nonmethane organic compounds (NMOC) to install a system to collect and control LFG.

According to the guidelines, any existing landfills operated by a state, tribe or locale that have not submitted a satisfactory plan to reduce emissions will have 30 months to install or update control systems to meet EPA standards.

The EPA estimates that about 1,600 landfills could be covered by the plan. These landfills are in 41 states and the U.S. territories of Puerto Rico and the Virgin Islands. Additionally, one tribal entity, the Salt River Pima Maricopa Indian Community, would be covered by this federal plan.

ADVANCED MONITORING

To meet these new requirements, which include compliance schedules, testing, monitoring and reporting, many operators will be seeking new or recoded monitoring systems. Meanwhile, other landfills have been ahead of the curve in implementing advanced reporting technology.

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An example of this can be found in Kern County, California, where the county's waste management department installed a web-based application platform developed by Long Beach, California-based SCS Engineers (SCS) (<https://www.scsengineers.com/>) on eight of its 14 landfills last year.

SCS DataServices, a module of SCSeTools, facilitates the capture and utilization of LFG and other solid waste monitoring and management data. According to SCS, this information can be used for environmental compliance reporting, document management and operational analyses.

"When you monitor a landfill gas system, each monitoring point takes [roughly] 30 pieces of data. So, there's a lot of data to keep track of and that's where we came up with [the concept] to take the information that the meters gather and [put that into a] database where everyone can access it," says Tom Shuput, vice president of business development for corporate and SCSeTools.

In December 2020, SCS expanded upon the DataServices platform by introducing SCS MobileTools—a mobile interface to observe groundwater, LFG and surface emission data remotely and in real time.

Kern County was an early adopter of the technology.

"We're a fairly large county, about the size of Delaware, so we have a lot of traveling. [With the MobileTools app], we're able to get a lot done with a small amount of [work]. Any time we can have a tool that will make us more efficient, we're very interested in that," says Tim Reed with the Kern County Waste Management Department.

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"Before, we had just been using spreadsheets for taking our data and manually transferring things over, which worked OK. But it was really hard to analyze the data using just spreadsheets, and it was also a lot more manual work," Reed continues. "That's why we were interested in a database tool, such as the one SCS put together."

The MobileTools app allows users to interact with facility or site data, including site-specific monitoring and exceedance metrics for LFG, liquid levels and surface emissions, according to SCS.

Responsive, touch-enabled flow data charting is also available, illustrating flow targets, reading dates, flow rates and historical flow data analysis.

“If the wellfield to see what type of gas quality they’re getting, as well as the surface emission monitoring,” says Shuput. “This is a requirement of some landfills of a certain size, so it gives you the ability to look at many different factors that could affect the landfill gas system specifically.”

DATA-DRIVEN APPROACH

For Reed, he says this type of technology can be beneficial when identifying problem wells or other issues at the landfill.

“When diagnosing issues with LFG wells, we can use the big picture mapping that shows us how the whole wellfield is operating,” says Reed. “It can show us concentrations on individual wells and which ones might have problems, such as with high oxygen or other issues like that.”

Additionally, Reed says he has been impressed by the application’s historical analysis capability.

“If I want to look and see how a particular well is doing over time, with one click I can look at time series charts that show how it’s doing [over] a year or 6 months and see if concentrations are decreasing or increasing,” he says. “This may affect how we need to operate things in that particular well, so it does add kind of a shortcut in how we analyze the data.”

This kind of technology is also being used at the Yolo County Central Landfill in Woodland, California, which is currently using LFG from decomposing organics placed in its landfill cells to product electricity sold to the Sacramento Municipal Utility District (<https://www.smud.org/>).

According to Ramin Yazdani, director of the county’s integrated waste division, landfill staff predominately use the MobileTools application for running quarterly reports.

“I think having the data all in one place then having multiple people have access to it [is important for our operations] because you don’t have to rely on one person who puts it on a spreadsheet and transfers it to graphs,” Yazdani says. “It makes it easy to access the data and look at it [in] different ways if you’re trying to find a problem for historical data, as well.”

Diane Samuels, SCS’s director of communications, adds, “All of this [historical data] can be turned into any kind of regulatory report that has to be done. And then our users can set up the system to create a report however they want it to look. Regulatory policy often demands they look a certain way.”

In Kern County, which is beginning to implement DataServices technology on its closed landfill sites, this historical data can be helpful when addressing post-closure care.

“However, we still have to operate the gas systems for groundwater protection. So, we have to be very careful in how we operate the system so that we maintain enough methane to keep a flare able to burn and use that as our fuel to destroy the POCs, which are the real problem for groundwater.”

As Kern County’s landfills age, staff must continue to monitor wellheads at some sites to see if there are certain wells that need to be turned off. This is because as the landfill ages, some wellheads will begin to dilute the gas stream, making it harder to effectively capture methane.

“Those are the kinds of things we have to look at over time to balance our wellfield to make sure that we continue to operate our flares for environmental protection,” Reed says.



FUTURE DEVELOPMENTS

Currently, MobileTools is being used at one-third of all landfills in the U.S. While the technology is still in its early stages, SCS has already been expanding features and modules on the mobile application.

“We’re looking at different modules; we’re pushing more on the mobile aspect of it and getting more information in the hands of the users when they’re in the field,” says Shuput. “One example is we’ve added a groundwater module which would allow users to put in all the information on their groundwater wells.”

SCS has also been working on a form application called MobileForms, which is designed to enhance in-field operations. Shuput describes the application as an “electronic clipboard” of various data landfill operators have to take around flare stations, such as the pressure of gauges and how open flare movers are.

“Our development team is going in the direction of mobile devices because for us at least, and with the feedback we’ve gotten from most of our clients, the time between the technician collecting data and getting it back into the system is where labor-savings can be found and where human error may happen,” says Samuels.

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