Going remote

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Following a staff reduction that left Sonoma County, California, with one facility specialist for seven landfills, the county turned to SCS Engineers to install a cloud-based SCADA system to fill its monitoring gaps.

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Photo Credit SCS

In April 2015, Sonoma County, California, divested all active disposal operations within its jurisdiction, reducing its staff from over 50 active employees down to three.

Left with only one facility specialist for seven landfill sites located hours apart, the county's Public Works and Integrated Waste Division (https://sonomacounty.ca.gov/TPW/Integrated-Waste/#:~:text=Integrated%20Waste%20is%20a%20division,and%20community%20hazardous%20waste%20disposal.) was left with a dilemma on how to manage its landfill monitoring workload with fewer employees.

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“Federal and state regulations require post-closure maintenance, monitoring and reporting for closed landfill sites in order to safeguard the health and welfare of the public and to protect the environment,” says Glen Morelli, a geologist for Sonoma County’s Department of Transportation and Public Works Integrated Waste Division. “With limited staffing, it was desirable to automate, where applicable, these functions to more efficiently manage these legacy sites.”

With Sonoma still responsible for maintaining the closed landfill sites, the county released a request for proposals in October 2015 to identify a supervisory control and data acquisition (SCADA) system that would capacitate monitoring at five of Sonoma’s sites to mitigate the county’s staffing dearth.

Choosing the right system

Ultimately, SCS Engineers (https://www.scsengineers.com/) was up to the challenge, offering a cloud-based SCADA system. Based on a comprehensive proposal and discussion with SCS’ technical staff, the county chose to partner with the Long Beach, California-based environmental consulting and construction firm on the implementation of a Remote Monitoring Control (RMC) system.

The proposed system would integrate the landfills’ electronic monitoring systems via the internet to help track their data. “The amount of work that 50 people can do is not the same amount of work that two or three people can do. So, [Sonoma County] needed some way to bridge that gap,” says David Hostetter, regional manager for SCS Remote Monitoring and Controls (RMC).

Through a network of sensors and machine-to-machine (M2M) applications, the system provides facility teams with a single secure application for their SCADA, data management and reporting needs.

“An [RMC] system allows you to keep track of the separate sensors and controls all in one packaged control data acquisition and viewing application,” says Hostetter. “These systems are set up so that owners and operators of landfills can monitor the entire facility from their mobile phone or their computer.”

He adds, “The key to the system is the internet connection. There is a series of control panels and sensors that are connected, generally through some sort of wireless network. The data is collected at that location and then sent out over the internet back to a server, where clients can look at their facility remotely.”

Remote monitoring

“The primary goal of our SCADA system was to have information readily available anytime and anywhere [away] from our sites, [so there was] specific data we wanted included,” says Morelli. With this in mind, SCS enabled several functions to support Sonoma’s RMC, including alarms, data recording and review, radio systems, an industrial cellular modem and weather stations.

Sonoma, in particular, requested the monitoring of weather patterns, leachate storage volume, power and backup, and flare operations. In order to obtain this information, SCS installed sensors on each piece of equipment the county wanted to monitor. The sensors were then configured to specified parameters based on the sites’ unique needs and environmental reporting responsibilities.

A dashboard interface allows the facilities to review data from each site individually or collectively. To enable this, SCS records the data on each site and streams it to a cloud database with the MQ Telemetry Transport or Message Queue Telemetry Transport (MQTT) ISO standard.

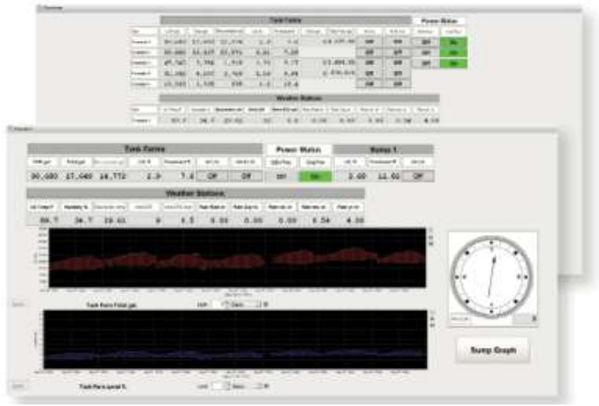
For its leachate storage monitoring, the county utilizes an application provided to its contracted haulers that allows drivers to see on their phone when a facility needs leachate hauled to storage. Similarly, mag meters on pump stations allow the team to see when a waste hauler arrives at a site and how much leachate is removed from the facility.

“By being able to monitor leachate generation and off-haul, we can more effectively manage our hauling contractor, which brings leachate to the wastewater treatment plant from our facilities,” says Morelli.

Noting that leachate generation can be heavily influenced by rainfall, SCS also installed a weather station with an ultrasonic anemometer at each side of the sites. This allows the firm to track rain accumulation, temperature,

humidity, wind speed and wind direction, while also providing the ability to control the pumping systems based on current and predicted rainfall.

When the sites' sensor readings are detected outside an acceptable range, or if an environmental threshold is reaching exceedance, the RMC is designed to send an alert to appropriate staff through a phone, computer or tablet.



The SCADA system allows staff to access detailed landfill site data remotely.

The county's alerts feature a customized combination of email, voice and SMS alarms that are sent to various liquid haulers and end users, which are delivered through a central internet-based cloud gateway that supports all five sites. SCS can also reduce the amount of hardware necessary on-site, and the county can remotely adjust alarms and create new alarms as operations and compliance dictates. These notifications are critical in Sonoma County, where a number of sites are subject to power outages, which can heavily impact remedial facilities on-site, so the system lets personnel know if power is lost, as well as if the backup generator takes over.

"Having the virtual check on system operations allows us to not have to send a technician or facility specialist to the site if we can see the system is functioning property during a power outage," says Morelli. "This has become a more important feature given the planned power outages implemented by power providers in [California] over the last few years."

The benefits

According to Hostetter, the ability to manage a site remotely has been a major benefit to clients, including Sonoma, during the COVID-19 pandemic.

"Sitting here at my desk in Pennsylvania, I could look at a site that's in California," he says. "[Remote monitoring] lowers the operations and maintenance costs because the owners no longer have to pay for somebody to physically go out to the facility, so it's cutting out all the drive time and lowering their health and safety obligations, as well."

For Sonoma County, the biggest economic advantage of the RMC system has been in hauling cost savings. "Before the system, we would send out tanker trucks to a facility to remove leachate from storage, not knowing if there was a need or not," Morelli explains. Many times, he adds, this resulted in half-full or near-empty loads where the county deployed a resource and did not need it. With the RMC in place, Sonoma can now track if the need is there before deploying a resource, whether that is to remove leachate, fix a flare or deal with a power outage.

Currently, SCS has installed RMC systems at roughly 100 sites across the U.S.

"We've found [this system] as an overall organization to be really beneficial for our engineers and our field staff," says Hostetter. "We want to try to leverage technology as much as possible to enable our field staff to be able to get more done, our engineers to understand the systems better, and really we want to try to make everyone's life better."

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