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# Dealing With the Public's Nose

Few things will guarantee irate phone calls quicker than a whiff of waste.

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By Carol Brzozowski

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Deserved or not, odor is one of the most serious challenges you face every day in every facet of your waste operation, and once offended, the public's nose is hard to put back into joint.

Odors can be quantified in five ways, according to St. Croix Sensory: threshold (concentration), intensity, persistency, characterization, and hedonic tone (measure of pleasantness or unpleasantness).

"Odors are measurable and quantifiable through chemical analysis and a human odor panel," says Charles McGinley, St. Croix Sensory's technical director.

There are not necessarily particular systems that work best with certain odors, but rather, "how can the odor's generation be minimized," says McGinley.

"In the case of a landfill, you can limit, restrict, or exclude special waste even though special waste will pay you a higher revenue stream. You can eliminate the sewage sludge that comes from the local treatment plant," he says.

"But what does that local treatment plant do in the meantime? There has to be something worked out in the community for those biosolids for beneficial use for fertilizer or whatever."

Odor control is a matter of the prevention of its generation, then containment and then treatment of the odorous compounds, says McGinley.

"Putting on perimeter spray without doing anything else is jumping right to treatment without doing prevention and containment," he says. "Also, there are many issues of affordability."

Many municipal solid waste operations turn to St. Croix Sensory—a sensory testing and training company—either to ascertain whether they have a problem or to obtain training on how to evaluate odors on their own.

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**Photo: NCM Odor Control**  
**An NCM truck-wash system in action**

St. Croix Sensory tests odor strengths in air samples submitted to its laboratory and trains people to evaluate or investigate odors, including solid waste odors.

Air samples often come from landfills, landfill surfaces, air venting, venting from a holding tank containing leachate, exhaust from a building that serves as the tipping or transfer station for the landfill, or a landfill operation such as composting, says Charles McGinley, the company's technical director.

Testing utilizes human odor panels with trained assessors who follow American Society of Testing and Materials (ASTM) odor testing standards, as well as the international standard practices of the European

Committee for Standardization.

St. Croix also trains people "how to smell in a very particular way," says McGinley, adding that the company has trained everyone from government agency employees to landfill and wastewater treatment employees.

St. Croix also tests products used at landfills for odor control.

"We receive samples from companies that make odor counteractants," says McGinley. "They are graciously called 'snake oils' in the industry, but in marketing literature are called odor counteractants or sometimes masking agents."

Recently, McGinley was in Hempstead, Long Island, NY, where he visited a shut-down landfill operation that at one time incinerated sewage sludge and municipal solid waste.

"They used the facility as a transfer station for greenwaste, so the city was concerned for being called upon for having some odors emanating in the community that was believed to be from the greenwaste transfer station," McGinley says.

McGinley trained employees of an engineering firm that had been retained as well as town officials to do an odor study in fall 2009 and spring 2010.

"I trained them on how to observe odors, describe them, and how to measure the odor's strength in the community with a device we sell called a Nasal Ranger Field Olfactometer, used to measure dilution-to-threshold values of ambient odors," he says.



St. Croix stresses three factors in human training, says McGinley.

"One is how their nose works in understanding their sense of smell," he says. "Two is how to describe odors, which is extremely important because describing odors is the very direct way to link what is smelled to where it might be emerging from, tracking back that smell to the source. The third part is how to quantify the odor's strength."

After training, inspectors decide on how they want to set up a monitoring program, says McGinley, adding that his company advises them on how to do so.

"It's simply looking for the hot spots in the community from the complaints they have received over the years and also their knowledge of the community and where they may have smelled smells," he says.

In the New York case, the engineering firm had planned to set up 15 locations throughout the community to visit

daily over several weeks during fall 2009, then report the collected data, McGinley says.

"Then they're going to do it again in the spring to get at least two season's worth of odor," he adds. "That's it in a nutshell in how they go about learning how to use their senses well in investigating, quantifying and documenting. They want the community to smell better next year."



**Photo: NCM Odor Control**  
This portable system features nozzles at 5-foot intervals.



**Photo: Benzaco Scientific**  
Composting in California

In looking for the sources of odors, McGinley says trained inspectors consider whether a door is left open too long, a truck is not being washed enough, or if the odor may be emanating from another unrelated facility.

"Fortunately, when the community tackles something like this, at least it has in a sense an independent approach to investigating odors in the community and figuring out what they are going to do about it," he adds.

Solid waste facilities have a few choices in working with the community at keeping odors at bay, says McGinley.

"If it is a facility that has been a good neighbor, has limited odor in the community, and is recognized as a necessary contributor to society, it can continue to work hard at limiting the amount of odor potential by proper management practices," says McGinley.

That would include a number of Best Management Practices, such as instituting smaller working places in a landfill, using temporary covers, and keeping current with technology, he says, adding that in California one of the newer types of temporary covers is created from the fibrous material of ground-up cars.

"There are a number of novel approaches that are only available in some areas and not others, but it's

the prevention of the release of the odor which must be looked at first," says McGinley.

"The use of odor counteractants has met with general acceptance; however, we've seen they are used more than necessary, and community members, when quizzed, say they used to smell garbage, but now all they smell is a bubblegum smell and it's driving them crazy. One of the reasons why we're asked to train people is that a landfill wants to verify what it is doing is sufficient."

On the other hand, facility managers cannot assume "no complaints mean no odors in the community," says McGinley.

"It means you're within the community's acceptance range," he says. "Is the community willing to maintain a buffer zone around the facility? Through land use, will there be development that encroaches? Those people new to the area are going to say they didn't know there was a landfill there or no one told them it smelled. Now they're closer than anyone else who has lived there and are bringing to the community their 'less tolerant' nose."

Solid waste facilities that are doing "okay" in odor control can always do better, "but private property issues, developers and broadening the tax base by building more homes—all of those issues are very complex land-use issues," McGinley says.

Another scenario is a facility that “has been a ‘stinker’ for quite a while for whatever reason,” says McGinley. “Maybe it is because land use has encroached or the landfill is now into its third cell of development.

“That’s the toughest issue because there may not be any winners in that situation in the long run,” he adds. “The facility’s growth may somehow in the future be blocked.”

Solid waste odor has a positive side in terms of community perception, which can be viewed as opportunity, McGinley says.

“Can we turn this odorous gas into energy through upgrading our gas system and incorporating electric production?”

he says. 

The larger or older a solid waste operation, the more difficult it is to introduce new technologies, McGinley says.

“For example, they may have candlestick flares for their landfill gas, and they’re not yet ready to incorporate gas collection for putting into the energy grid, so they’re not yet ready to build an enclosed flare or a power plant that uses the gas. There are economic questions there,” he says.

“There’s no way to minimize in the short term the smelly landfill gas seeping up cells number one and two while they’re still building number three now. For the community, it may become the political issue of the next year, but the worst nightmare of everyone might be a lawsuit.”

Transfer station design can go a long way in odor mitigation, says McGinley.



**Photo: Benzaco Scientific**  
A transfer station with its odor-control system in place

“Many transfer stations are just open walls or one wall with a push wall and a roof over the top and no walls at all,” he says. “What is certain is when you dump a pail of garbage and stir it around, it is going to smell throughout the neighborhood.”

A case for an optimal design is that of the waste-to-energy facility adjacent to the new Twins ballpark in Minneapolis, MN, McGinley says.

“It has a tipping floor, and they’re changing which doors the trucks are driving into, but they’re also putting on fast doors, so the door opens and closes quickly,” says McGinley. “There are some technologies that may not sound high-tech, but simply a door that closes the tipping floor of the transfer

station doesn’t have to be super expensive.”

Odor-control technologies abound throughout the industry. A vast array of technologies are provided by NCM Odor Control, a company that bills itself as a one-stop shop that manufactures neutralizers and odor-control products that treat typical solid waste odors at landfills and transfer stations, as well as compost odor control and accelerator products, among others. The company has ISO 9001 certification as a chemical manufacturing plant and also services its units.

NCM Odor Control also custom-designs site-specific odor control systems, such as a perimeter linear system for landfills.

Jesse Levin, who heads up the company’s West Coast operations, points out that some landfills mix biosolids with alternative daily cover to cover the landfill’s working face, resulting in a highly odorous material being introduced into an open-air area.

NCM Odor Control's systems are high-pressure and low-output, says Levin, and, as such, keep odors at bay and keep operating costs down.


"What comes out of our nozzles are small droplets because you're trying to treat the air flow and you don't want moisture hitting the floor, because you're adding weight to the material," says Levin. "You're also creating a hazardous work area by making the floor slippery. We try to have a small moisture particle that floats in the air, so when the wind comes through and takes the air flow out of the facility, it's being neutralized."

The company treats the airflow leaving the facility by positioning the odor-control system between the odorous area and the areas of complaint.

The company also manufactures portable odor-control systems. Levin explains that such systems are useful at landfills where, when they were first developed, were far away from people and thus not near readily available electricity and water to utilize the working components of an odor-control system.

The portable system can be hauled around on a trailer up to 17 feet in width and has a 1,000-gallon water tank, a gas engine with a pull-start motor, and a retractable boom arms.

"Ideally, one person, such as the site operator at a landfill, can hitch up their pickup truck to the portable unit, take it to the working face where the neighbors are complaining, and in less than five minutes they can open up the arms,

which give 80 feet of wingspan coverage of line and nozzle, and pull-start the motor," says Levin. 

Coverage can be expanded up to 500 feet. The portable unit can be connected to lines and nozzles that NCM Odor Control strings up at a facility.

"Even if a transfer station doesn't want to do a stationary system, they can use the portable unit—they have the power and water right there," says Levin. "Additionally, the facility can add one of our 55-gallon drums of odor-control neutralizer to the trailer and inject it in there."

NCM Odor Control has another portable system—the Terra Foam system—a highly concentrated aqueous foam resembling shaving cream.

"You can spray down your material using very little neutralizer because you are injecting air into it as well as water," says Levin. "It keeps the cost down, but yet it's highly effective. Because it has a liquid form that permeates through the material, it's neutralizing more of the material as it's going through."

Another system NCM Odor Control has created is for landfills that take in biosolids. It is a spray system used to treat empty or full truck containers.

According to the measurements of the truck container, NCM Odor Control creates a fabricated-steel spray bar that acts as a doorframe. A high-volume spray nozzle is attached to the top of the frame.

"The truck driver pulls through this bar, leans out of his window, pushes a button, and, based upon the site and how long it takes the truck to pull through these nozzles, the push button automatically turns the system on and off, taking the responsibility out of the truck driver's hands," Levin says.

The nozzles spray directly into the truck container.

"If you have an empty truck, you're neutralizing the container itself as it leaves the facility and drives through the community," says Levin. "If it has material in it, then you're adding a topical layer of neutralizer. As the truck is coming into the facility, the neutralizer permeates through the material and adds some sort of neutralization to the offloading process of the biosolids at the landfill."



NCM Odor Control products can be used in water trucks, says Levin.

"Our products are 100% biodegradable, water-based, and created to have a neutral pH, so coastal states that are more concerned with water levels, especially in California, can use our products in water trucks," he says.

"A lot of landfills don't have the capital funds to afford a delivery system right off the bat," he says, adding that his company works with those facilities to enable them to use equipment they already have.

"We developed a transfer-type system where they get a neutralizer in a 55-gallon drum or whatever they want it in," says Levin. "We have a timer set to how much dilution they want. Let's say they have a 4,000-gallon water truck—we can achieve a 1,000:1 dilution ratio out of the landfill.

"We can get a higher dilution ratio in a transfer station because it's enclosed, but landfills are open air and anything could cause the odor composition that comes through the landfill to change."

Thus, water trucks can be used as a delivery system to treat the entrance and exits, the access roads to the working face, direct application onto the working face or any piles of compost, sludge, or trash.

At transfer stations where power is more readily available, systems are developed that take into account four factors: the tipping floor, entrance and exit doors, load-off areas, and the source of complaints.

The odor-control system has a pump and motor, and the chemical-injection feed can be set up to increase or decrease the dilution ratios as needed.

"If it's cool in the wintertime and odors are normal and you still are required to do some type of odor control, you can turn the dilution ratio way up, which will add more water to the system and cut down operating costs," explains Levin.

"Or you can turn down the dilution ratio, which injects more neutralizers in there in case of really bad loads, such as hotter temperatures that may cause more odors."

At transfer stations, nozzles and hoses are focused over the tipping floor.



"We use a higher-flow nozzle there because obviously the odors are focused in that area," says Levin. "We put line and nozzles over the entrance and exit to the doorways of the facility, because air comes in one way and exits out the other. We treat the doors as our last line of defense in an enclosed transfer station where we have nozzles that frame the doors so it knocks down odor or dust before it leaves the facility. Then we also focus nozzles over load pits."

At compost facilities, NCM Odor Control uses portable odor control systems such as the linear systems used at landfills, as well as a compost accelerator to increase decomposition time, which helps with odors, says Levin.

"We're working on tests right now to transfer that technology to landfills to help with the working faces," he adds.

Levin points out that for transfer stations and landfills, his company can break up the odor-control system into multiple zones, conserving water and product use.

"At transfer stations, having the doors as one zone and the tipping floor lines and the load-out areas as their own zone allows the site to have total control over the misting system," he says. "They can turn on or off each zone as needed throughout the working day. This allows sites to conserve on water consumption by not spraying in areas that do not need it at that time, and it also allows the customer to conserve on product consumption."

Levin says the linear stationary systems at landfills can be zoned based on weather considerations, such as wind

direction and temperature, and odors.

The system also can be tied into a weather station that NCM Odor Control provides, offering hard data on wind speed and direction.

"Sites can use this technology to help confirm valid or invalid odor complaints," Levin says.

NCM Odor Control also offers remote control capabilities, allowing the system to be activated or deactivated as needed, zone by zone.

Benzaco Scientific's Odor-Armor is a concentrated liquid that neutralizes odors when sprayed downwind into the air through a series of pumps, hoses and nozzles. For waste professionals, it's typically used at landfills, transfer stations, compost facilities, and recycling centers, says Rick O'Sadnick, senior scientist for Benzaco.

O'Sadnick says the system consists of consists of two components: the liquid neutralizer and the water-based, high-pressure fogging units that disperse the liquid into the air.

The neutralizer—100% food-grade and biodegradable—is fed with a pharmaceutical-grade chemical pump into a high-pressure water stream with nozzles lined up along the site perimeter on poles, usually spaced every 15 feet.

O'Sadnick says Odor-Armor is used as a final measure to take care of odors after other aspects of the landfill, transfer or recycling site have been properly cleaned.

"Since various environmental and atmospheric factors affect the time of day that the odors are more prevalent, each site is assessed and the system is timed accordingly," says O'Sadnick, adding that the typical times are from 6 a.m. to 2 p.m., then again from 4 p.m. to 8 p.m.

"Odors are more concentrated in the morning and the evening," he says. "Heat from the sun and the winds tend to disperse the odors in the afternoon hours. Also, people who are affected by the odors are at home more in the morning and evenings. But it all depends—some sites run 24 hours."

Most units have seven-day, 24-hour timers to turn them on and off. Benzaco can program a variable speed drive into the computer so when half of the nozzles are turned off, it slows the motor down to maintain the same water pressure.

Nozzle placement, numbers and height as well as how many units are needed are customized for each site, says O'Sadnick. The company also makes portable units powered by diesel or gasoline engines where needed.

For some odor control companies, the focus is on products that are environmentally friendly.

HLS Ecolo is a B2B business that sells odor-control equipment and products through its dealers, such as airSolution reactants and neutralizers. The company strives to meet the cost versus benefit concerns of municipalities faced with complaints about local solid waste facilities.

"We want to make sure our odor-control products are able to be in contact with the environment in releasing the odor, so we have air treatment for fugitive emissions, which is essential oil-based technology that neutralizes those odors but is released from the sites," notes Thea Saarimaki, a microbiologist who works in product development for HLS Ecolo.

The company offers a topical application for getting at the source of the odor with equipment custom-designed to work with the products.

It's important that odor-control systems be safe for use around people, notes Saarimaki.

"Our systems have been tested for safety in terms of irritation and inhalation," she says. "Often, many treatments offered in the marketplace are chemical in nature. They might be caustic or not appropriate for use around the staff.

"Our products are very useful for perimeter treatment around landfills or other types of services like a transfer station, where you might have a network of nozzles through which you could spray the odor-control reactant at the point of contact," she adds. "That can be an effective way to capture the odor as it's leaving to prevent it from causing

problems and to give relief to the workers on site. "

Saarimaki says another benefit to HLS Ecolo's system and products is that they can be used hands-free.

"It is set up by a technician, but can be programmed on a timer to be released as required," she says.

How to treat an odor depends on the situation, says Bill Ormsby, the company's technical director.

"If it's at a landfill, we might try to treat it both ways," he says. "We might try a surface application and an airSolution approach—try to hit it both ways to greatly reduce the odor," he says. "We look at it based on what's causing the odor, how to treat it, and what chemicals we have to treat it."

At the landfill itself, a perimeter system captures large amounts of fugitive emissions that emanate from the landfill where the waste sits and releases gas, notes Saarimaki.

For the trucks that travel in and out daily, a foaming agent can be used as a different approach that neutralizes the freshly released, but smaller odor, she adds.

HLS Ecolo's marketing director, Steve Ambeau, calls solid waste odor control a "reactionary" business. More scenarios are emerging, such as the emissions that ethanol gives off from the growing number of ethanol plants.

"When you talk about measuring devices, we just use the human sense—the biggest measuring device of success or non-success at transfer stations," Ambeau says.

Saarimaki agrees.

"The reduction of complaints about odors is probably the most effective way of monitoring the success of treatment," she says. "You can measure specific emissions from any given site, but that's not going to give you the whole picture of the problem that might be there. If you can make the emissions from a plant invisible to the neighbors, then they're not going to be thinking about it all of the time."

Saarimaki says the odor-control industry is moving toward a more "natural" and "green" direction and away from chemistry.

But there's a "strong science and an R&D side to HLS Ecolo's business, notes Ambeau.

"We don't like to get locked into those other 'snake oil' companies out there," he says. "That is probably our biggest hurdle—it's only as good as we're able to communicate that science to the end user. It's an ongoing battle and we're doing our best."

SciCorp International in Canada has developed a product that is a plant-based micronutrient for bacteria that stimulates good bacteria to break down organic material in solid waste systems—among other applications—and at the same time slows down the bacteria that creates the rotten-egg odor common to solid waste facilities.

The product is diluted into a spray system 500:1 and applied to solid waste materials.



Derk Maat, the company's chief executive officer, is quick to point out it is not a masking agent. He adds that the product can be also sprayed on the interior of waste trucks.

Stopping odors is not the only benefit, says Maat: "It also stops fly problems."

Maat points out that the community perception about solid waste facilities is that they generate odors is correct, but if a product is used, "odor is cut by 90% to 95% and the neighborhood impact is significantly reduced."

A solid waste facility may have its bricks and mortar odor problems under control, but still receive complaints.

In that case, check the tires.

"Odors mutate and get worse as they stay in the atmosphere," points out Dennis Stanton, owner of Stanton Tire Wash Systems, which manufactures tire wash systems and wheel-wash systems that remove biological bacteria, sanitizing wheels and tires.

A truck driver moves the vehicle through the system, activates an electric eye, and water comes on to wash debris off of vehicles, the undercarriage, tires, and wheels. If desired, a second phase of disinfection is set up through another spray system.

OMI Industries company information points out that different types of solid waste generate diverse odors. Landfills contain large amounts of methane, which is odorless, but mercaptans—sulfur-containing compounds—produce nuisance odors. Wastewater sludge generates sulfide compounds and composting and co-composting facilities produce nitrogenous compound odors. The odors are intensified through agitation, when solid waste is offloaded or



compost rows are turned.

Ecosorb Products, manufactured by OMI Industries, comes in a spray gel form designed for topical applications. The product is applied from a 55-gallon barrel through a pole-mounted control panel with a pump and a top-mounted swing arm with nozzle heads.

Ecosorb Products contained no toxins, and can be delivered by atomization, vaporization, or as a product additive.

The Ecosorb system is activated via a wireless remote control as a refuse truck slowly pulls through the treatment area beneath the swing arm. The activated nozzles apply the product over the entire exposed surface of the payload, encapsulating odor and preventing it from escaping into the air.

At transfer stations, Ecosorb atomization nozzles can be placed beneath the ceiling of the station over load-out and tipping areas, providing dust control as well as odor control.

In sludge composting, Ecosorb is atomized in concentrate form with nozzles or humidifying fans. Ecosorb also is applied through oscillating fan systems in landfills.

Kuma Corp. manufactures Odex, an odor neutralizer made of food-grade products, and a line of misting equipment for hazardous and solid waste, additives, and capping agents.

Odex is delivered through a misting system—the pressure of which is adjusted according to the circumstance—and neutralizes odors by attaching itself to the odorous molecules, converting them into non-odorous compounds.

Jim Ippolito, the director of engineering for the Kuma Corp., says solid waste managers need to exercise caution in choosing odor control products and systems.

"Air currents are too complex, and neutralizing an odor is a health and safety issue," he says. "A lot of companies put things in the air that shouldn't be breathed by people."

He also says solid waste managers need to follow through on the effectiveness of any approach, rather than treating odor control products as a commodity.

"We have documentation that the air coming through the system is 99% cleaner before going into the process," he says. "That takes time, money and equipment."

**Author's Bio:**

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