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FEATURE



Staying beneath the neighborhood's radar is a sound tactic

By Chace Anderson

A lady living near a sewage treatment facility at the base of the Blue Ridge Mountains in Virginia normally had no problem with her processing neighbor except during those unusual times when the prevailing wind shifted direction and blew the plant's fragrance toward her home. On such occasions, the odor would waft into her living area where the scent instantly reminded her to call the director of the sewage treatment facility and complain bitterly to him about the putrid intrusion. She refused, as they say, to suffer alone. During one of these unpleasant phone calls, the director had enough and asked, in not so polite a tone, what the caller's contribution, shall we say, to the plant had smelled like before she flushed it his way. Satisfied by the abrupt ending of the conversation, he returned the phone to its receiver and took a long walk into the office of his executive director to whom he confessed to needing retraining on customer relations.

This story illustrates several factors that managers of waste transfer stations and, to a lesser extent, material recovery facilities (MRFs) should keep in mind. First, the operation of these facilities can affect the lives of its neighbors. Noise, odor, dust, and smoke (NODS) can reach outside the boundaries of a transfer facility and be detected by others. Second, climate conditions are not static and can create environments that push NODS offsite. Sometimes these climate changes result in odors moving farther and wider than they normally do. Third, people will complain about these nuisances the instant that they occur. Fourth, even though there may be logical reasons for a temporary inconvenience, the person making the complaint will undoubtedly be one step away from reserving a room in a psychiatric ward. And fifth, being on the receiving end of these complaints takes patience, restraint, and a faith in a higher order of justice or, at least, a commitment to a steady paycheck.

Table 1. States Using Dilution to Threshold Maintenance

Colorado	Connecticut	Delaware	Illinois	Kentucky
Massachusetts	Missouri	Nevada	North Carolina	North Dakota
Oregon	Pennsylvania	Washington	West Virginia	Wyoming

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Managers understand the profession is becoming more quantifiable. State and local health departments utilize tools such as quartz filters by placing them on or near a questionable site for at least 24 hours to capture the dust particles in a given area to quantify the type and level of exposure. The technology is getting better and less expensive, hence being used more to recognize and quantify fugitive dust. Met One Instruments Inc., for instance, builds small air-quality monitors that are EPA approved for providing valid data. The E-Sampler and BAM-1020 are models that can be transported, set up, and automatically send their findings on emissions and particulate matter back to the fugitive dust investigator. The machines cost approximately \$5,000 and up per unit.

Odor is also becoming more quantifiable. Table 1 lists fifteen states already measuring odor by mixing a specific volume of carbon-filtered air (clean air) with a specific volume of odorous ambient air. These dilutions to threshold measurements can produce odor "speed" limits that state regulatory agencies can test for or apply to odor agreements in conditional use permits for waste facilities. Today's courts and regulatory agencies increasingly allow data on odor and dust collected by grassroots organizations and private industries as evidence as long as it is tethered to a growing body of objective norms.

Given this growing accountability, managers have to be proactive with regard to NODS before they find themselves on the defensive end of a regulatory hearing.

Dust and smoke can affect the health of workers to the extent they distract attention, decrease visibility, and create an environment where a person's predisposition to allergies may be activated. Risk assessors do not consider NODS for transfer stations to be any special or higher risk.

Experts in dust agree. David Emmitt, president and senior scientist for Simpson Weather Associates Inc. in Charlottesville, VA, and research associate professor with the Department of Environmental Sciences at the University of Virginia, works with NASA to use lasers to measure water vapor, clouds/aerosols, and winds. He utilizes EPA's air quality models and monitors fugitive dust emissions from products bulked together and transported. Emmitt concurs with the assessment that waste transfer dust is not a special health risk.

In Emmitt's professional world there are small dust particles and then there are really small dust particles. The really small dust particles—particulate matter with a diameter of 2.5 micrometers or less—can cause serious health risks to humans. How small is 2.5 micrometers? An EPA publication describes it as "approximately 1/30 the size of a human hair; so small that several thousand of them could fit on the period at the end of this sentence."

Studies of dust are done by setting up filtering boxes to measure the type and size of fines. These studies have shown that dust from such operations as a waste transfer station emit the larger type of dust—particulate matter with a diameter larger than 2.5 micrometers—so the dust is not a health threat with respect to causing respiratory problems. Dust, rather, is a nuisance that can ignite allergies and impede the vision, for instance, of truck drivers while maneuvering their vehicles inside transfer stations, thereby raising the chance of accidents.

Dave Hildreth's 28 years of experience support this opinion. Hildreth has been the group manager of landfill support for Allied Waste since the early 1990s. He oversees 162 waste transfer stations and 57 recycling facilities. It is his experience that dust is a visibility and housekeeping problem that flares up depending on loads, location, and climate.

"The type of climate," he says, "and material dictates the amount of dust a facility may experience." In dry climes where dust swirls up out of seemingly nowhere or where there is a high degree of construction debris in the wastestream, dust is more of a problem. "Allied Waste," he says, "is proactive in building new or retrofitting older waste transfer stations so that they can ventilate and process the dust."

These buildings have ventilation systems drawing the air out and sometimes, depending on how large the problem is, into bag houses.

Dust in MRFs, especially ones that shred, fluff, and bale a large amount of paper, can be a fire hazard. Emmitt points out that finely minced dust can be almost explosive. "It burns almost instantaneously," he said. Fine paper dust, if not kept under control, could, with an ignition source, engulf a facility in flames.

"Fire suppression systems are necessary for MRFs," says Hildreth. These facilities have to maintain "constant housecleaning" routines.

Enclosed rather than open waste transfer facilities are preferred by managers to help contain NODS. The Sanitation Districts of Los Angeles County opened a 215,000-square-foot facility in Puente Hills to handle over 4,400 tons of waste and a MRF designed to process 500 tons a day. The facility has been open approximately a year and is totally enclosed. Phil Ackman, supervisor operations engineer, has 25 years in the waste processing field (10 years of it in wastewater) and wanted an enclosed facility to

contain NODS.

"This facility," Ackman says, "has high-speed automatic doors that raise and lower within 40 seconds each. The dust and odor stay in," he says, because of the limited time the doors are open. The facility's ingress and egress are as opposite as possible from the prevailing winds, thereby diminishing the chances that drafts of air may push dust and odor outside the walls of the transfer station.

The Puente Hills facility has a rooftop ventilation system with louvers that automatically close when the lights are turned off at the end of the workday. This seals the facility so no odors can escape. It also conserves energy.

B&F Engineering's Tim Tieaskie agrees with the idea of sealing the facility but prefers to connect the closing of a ventilator's louvers to a thermostat so as to always have a regulator. He also prefers to place the ventilator system on the side wall with a corresponding intake on the opposite wall. This creates a flow of air and diminishes the potential of leaks in the roof. His side-mounted ventilator systems are designed with a carbon filter to eliminate odors.

Enclosed facilities are part of a containment policy for NODS. But NODS have an arsenal of weapons to confuse managers. Odor is especially adept at playing a game of counterinsurgency, so to speak, with the workers of a facility.

Odor deceives the olfactory senses and tricks people into thinking they cannot smell the pungent stench recognizable immediately to any visitor. Humans have three nesting odors. These are odors with which we become familiar and comfortable. The first nesting odor is in the home. Many of us have experienced the intestinal wrenching when stepping into a person's home who cares for a herd of animals, who all may be very happy, but the totality of the odor is overwhelming to the visitor. More horrific than the initial pungency is the visitor's realization that he no longer detects the smell. The second nesting location is a person's car and the final one is in the workplace.

"These nesting odors are very powerful" says Charles McGinley, of St. Croix Sensory Inc., "and odor policies should be implemented to compensate for the physiological and psychological effects of odor." An odor management plan is usually an afterthought to a problem occurring as opposed to preventing its occurrence.

St. Croix Sensory Inc. provides training for odor investigators. Over a three-day period, nascent investigators learn to find odor sources, identify odor causes, document complaints, determine compliance with standards, and measure performance of a facility. This last point is a benchmarking tool for managers of waste transfer facilities. By implementing strict measurement of data and collecting routinely in and around one's facility, managers can see change over time with respect to odor.

Hennepin County's Environmental Management Division represents the county's ownership of the Hennepin Energy Recovery Center (HERC) and has implemented an odor data collection program. Operated by Covanta Energy Corp., HERC resides in downtown Minneapolis and takes in 1,000 tons of trash a day. Odor is always a potential problem for the plant, which opened its doors in 1989 and won the Solid Waste Association's Facility of the Year Award in 1995.

Jake Smith, the county's senior environmentalist, led a team of five county employees into an odor monitoring operation. Smith called upon St. Croix Sensory to educate his team on the science of smell, how the nose works, and characterizing smell in a way that categorizes the elements that make up an odor.

Hennepin County purchased St. Croix Sensory's Nasal Ranger. McGinley patented this field olfactometer in 2003. It is one of two such instruments on the market, the other being the Scentometer, which was developed in the late 1950s and now manufactured by Barnebey Sutcliffe Corp. McGinley had been in the odor profession since the 1960s when 3-M employed him on scratch-and-sniff technology. He then worked for the Minnesota Pollution Control Agency to enforce regulations. He next worked for Hormel's Environmental Division to design equipment for wastewater and air pollution control. In 1980, he opened St. Croix Sensory, where he currently investigates odor in a laboratory and at clients' sites.

Twenty-one monitoring locations were chosen from where one of Hennepin's five trained odor investigators stop five days a week, take a breath through a carbon filter to clear the nasal pallet, and then quantify the odor with the Nasal Ranger.

Hennepin has been collecting odor data since March 2004. The collections are done five days a week and the information is placed into a database and overlaid on a geographic information system to better see change over time.

This new odor management practice has helped HERC both by operationally evaluating alternatives and by providing defensible evidence. Operationally, HERC's enclosed facility had odor seeping out of its doors. After the benchmarking of odor was instituted, HERC installed some Crawford high-speed fabric roll-up doors that complete their action within seconds. Once installed, the county's odor data showed a drop in odor escaping from the building.

The second example is something that McGinley calls “defensible” data. A community discussion began on the prospect of placing a new baseball stadium in downtown Minneapolis. HERC’s smell became an issue. With the odor data collected over time, however, that issue dissipated for lack of evidence.

McGinley represents a science that is bringing a quantifiable paradigm to odor that heretofore has been left to a nose-vs.-nose mentality. Some waste managers have had the experience of inspectors coming out to their sites because the investigator received a complaint about noxious smells. The inspector then sniffs around and, whether there is a smell or not, a notation is made in the facility’s file. If a concerted effort were made to lodge complaints, then the facility’s file would be brimming with odor notations. Eventually such a file could cause permitting problems for the waste facility.

Quantifying odor is defensible data to mitigate, if not eradicate, the subjective element of odor complaints.

On the opposite end of the odor spectrum is Mike Durham who owns Enzymatic Odor Solutions Inc. (EOSI). While working in furniture manufacturing for 20 years, Durham was inspired to enter into the odor fighting business by his ex-father-in-law. His frugal father-in-law had purchased a nearly new Chrysler LeBaron with low mileage for a little over \$1,000 from Dade County’s automobile impound lot. The police had confiscated the car after it had been abandoned for some time at the airport parking lot with a dead body in the trunk. One only has to think of the heated Florida humidity and a dead body shoved in a trunk like a ham sandwich in a plastic bag to imagine the stench clinging to every fabric of that car.

Durham and a friend—evidently a very good friend—scrubbed the interior of the car with his odor-control solution. To Durham’s surprise, the putrid odor was gone. From this beginning, Durham eventually created a successful business that implements systems to contain and dissolve odors. His business has been operating for the past 15 years, and his is one of two odor solution companies providing WMX with systems and products since 2001.

EOSI provides material safety data sheets on each of its proprietary odor control and remediation formulas that contain essential oils, enzymes, micronutrients, and biological catalysts. These materials accelerate the biodegradation process. The cost is approximately \$40 and up for four gallons.

“You have to get the odors at their source,” Durham says. “If you do that, then a high percentage of the odor will immediately be taken care of and will have no chance to get offsite.” The more contained the odor is, he points out, the more cost-efficient it is to handle.

Systems that can bring the product to the source are important but often site specific. Odor solution companies will come onto a site and create a plan to build a system to handle the specific layout and loads of the client. Anything from a stationary oscillating fan aimed and timed to spray specific areas to high-pressure perimeter misting can be configured to a facility.

Of all the NODS, smoke is considered the least problem. Emission controls on equipment have diminished the pollution that comes out of motorized equipment such as the rubber tire loaders, transfer trucks, and collection vehicles depositing the material into the waste facilities.

The Sanitation Districts of Los Angeles County, however, in its Puente Hills facility operates motorized equipment running on liquefied natural gas (LNG). This fuel is produced by cooling natural gas to a point of -259°F when hydrocarbons, carbon dioxide, and some sulfur compounds can be extracted or reduced.

Cleaner fuel and well-maintained equipment can limit the amount of smoke in a waste facility.

An enclosed facility helps to contain the noise of trucks, backup beepers, and metal buckets hitting the concrete floor scraping across the deck. B&F Engineering out of Hot Springs, AR, has been designing transfer stations since it did that state’s first permitted facility 30 years ago. B&F’s Tim Tieaskie places emphasis on acoustical control material such as Thermal Batt Insulation with a hardened vinyl cover for durability and the use of concrete to absorb noise. Truck lanes should also be graded to minimize gearing.

Landscaping can help soak the noise before it gets offsite. Large trees and thick hedges can create both a noise and sight curtain to a facility. Careful consideration of plantings can also assist in diminishing and substituting offensive odor.

Actions to prevent nuisances include the following:

Odor

- Enclose facility
- Trash off floor and contained at the end of the day

- Clean the facility deck, surge pit, and equipment with water every day and dilute if necessary with vinegar to thin the water for harder-to-clean areas
- High-speed roll-up doors
- Doors opposite prevailing winds as much as safe traffic flow will accommodate
- Active ventilation with filtering system
- Odor bonding agent directed at source of smell
- Do not stack up full transfer trailers onsite
- Odor monitoring policy implemented and tracked
- Landscape to counter odor
- Design facility with flush surfaces so material does not get stuck

Dust

- Pave truck lanes and parking
- Clean roads on a regular and frequent basis with street sweeping equipment
- Enclose facility
- High-speed roll-up doors
- Clean the facility deck, surge pit, and equipment with water every day and dilute if necessary with vinegar to thin the water for harder-to-clean areas
- Mist trash with water or bonding agent to drop dust to the floor
- Active ventilation with filtering system
- Trap odors inside transfer trailers with chemical bonding agents and leak proof carriage

Noise

- Enclose facility
- High-speed roll-up doors
- Use sound-absorbing material throughout the structure
- Think of landscape as sound-absorbing material
- Use earthen berms with vegetation
- Design openings away from the most traffic

Smoke

- Enclose facility
- High-speed roll-up doors
- Maintain motorized equipment in good working order
- Utilize cleaner fuel
- Active ventilation with filtering system

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