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# WasteAdvantage magazine

The Advantage in the Waste and Recycling Industry



**MR. T CARTING:**  
Celebrating 70 Years

**CHINA AND  
RECYCLED  
COMMODITIES:**  
The Perfect Storm?

**WHAT IS YOUR  
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Mr. T Carting Scholes Street Recycling and Hi-Tech staff.

Photo courtesy of Mr. T Carting (Glendale, NY).

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As one of the six largest private trash haulers in New York City, Mr. T Carting aims to be one of the top two by working towards enhancing the perception of the waste management industry and highlighting its ongoing role as a key part of New York City's waste and recycling infrastructure and its contributions to the local and regional economy.



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BEN OSBORNE

# Odor Emissions: A New Social and Legal Dynamic

Adding sustainable and environmentally-responsible odor emissions control technology reduces complaints and scrutiny from regulators, helps avoid fines or lawsuits, improves community relations and protects the reputation of the company.

■ By Mike Lewis

The U.S. population is expanding slowly, however, urbanization (the migration of people to population centers) has drastically increased—the impact of which is acutely felt by MSW managers and site operators in growth areas. According to a Yale University study published in *Journal Nature*, the average person in the U.S. throws away roughly 2/3 of their body weight in trash every month ( $\approx 4.4$  lbs. p/day).<sup>1</sup> As this trend persists, the need for efficient high-volume MSW processing operations increases.

Despite advancing technologies in recycling and waste reduction, a perpetual challenge for MSW facilities is managing odors. In the past, odor control planning may have been as simple as placing landfills far from populated areas. However, due to the need for greater efficiency,

environmental conservation and cost management (transport, land value, regulatory restrictions, etc.), the demand for massive far-flung landfills is waning among civic planners and city/county administrators in charge of approving waste management plans. Instead, more centralized and efficient processing is preferable in Material Recovery Facilities (MRFs), but that option presents its own set of issues.

As land values increase, families continue to seek housing within a reasonable price range. New communities encroach on landfill sites, composting operations and MSW processing centers, exposing inhabitants to odor emissions and resulting in complaints, which draws the attention of regulators. In response, the “we were here first” argument posed by operators rarely yields positive results. Regardless of

Diluted to a 500:1 water to chemical ratio, airborne odor control can be delivered as a vapor.  
Photos courtesy of BossTek.



being new to the area, the people in these communities are still voters with influence over lawmakers. Moreover, the community's ability to file lawsuits and influence local media creates a growing concern for odor-emitting industries.

This article examines some of the impacts of odor emissions. If proper action is not taken in response to complaints both from workers and surrounding communities, companies are discovering that the consequences are different from those that existed just a decade ago. This piece will also survey some of the existing methods and new technologies that companies are now employing to address the issues, such as biodegradable deodorizers and vapor distribution cannons.

### Legal Precedent

In 2013, the South Carolina Supreme Court issued an award of more than \$2 million for damages to six property owners in *Perrin Babb V. Lee County Landfill*.<sup>2</sup> The lawsuit cited "nuisance, trespass and negligence" due to industrial odor emissions from the landfill. According to the court, odor is a tangible infringement on the owners' property.

Prior to this decision, plaintiffs were required to prove physical damages to their property, such as soil or ground water contamination, of which odor emissions are only one element. As a result of that

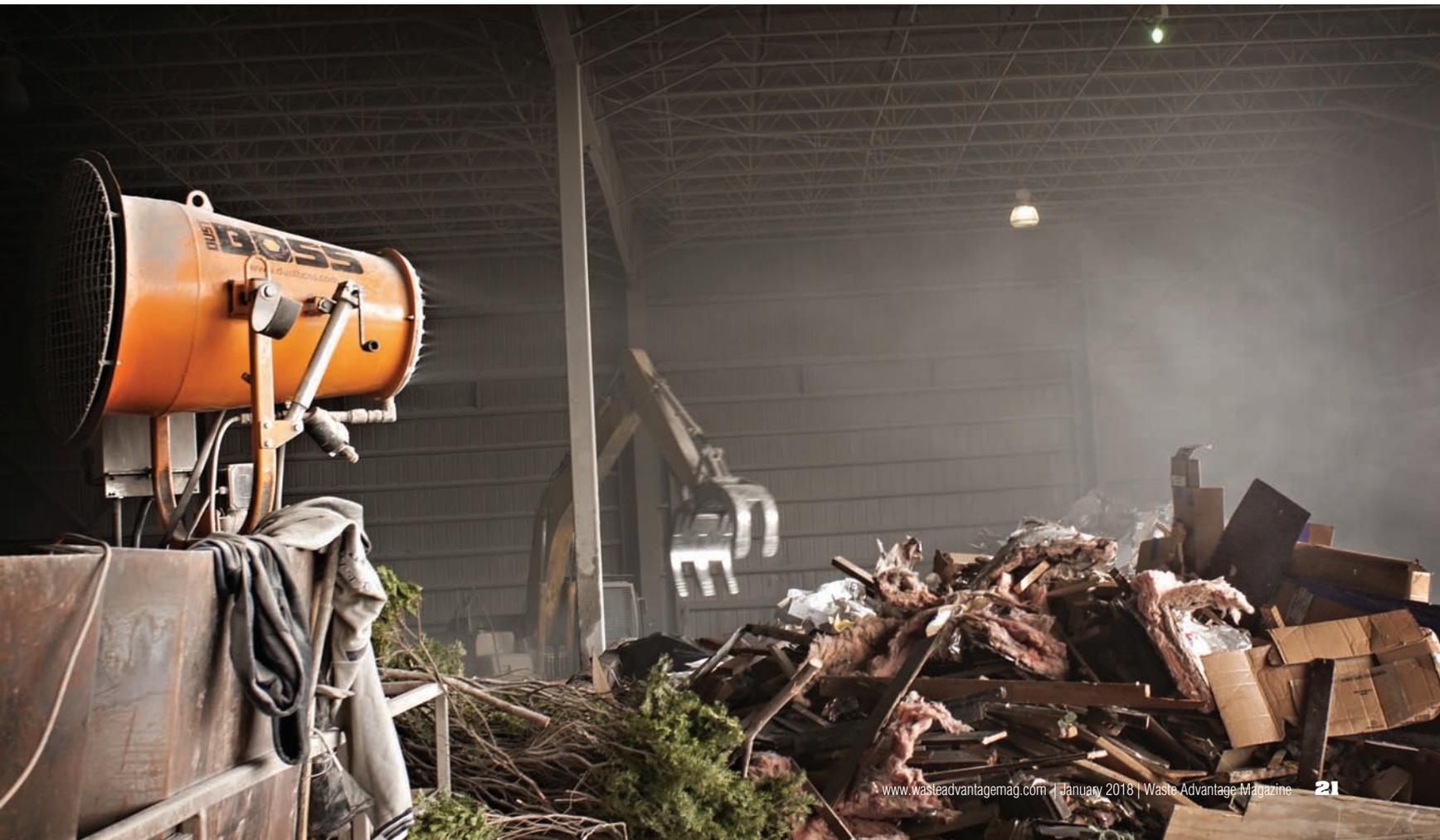
precedent, odor emissions can now be considered "trespassing" onto private land, resulting in monetary damages from hindering or preventing the property owner's ability to rent or sell.

According to the decision, there are three elements by which odor emitters can be exposed to a lawsuit: "trespassing" resulting in "a physical, tangible invasion" of the property, causing a "nuisance" and subsequent "damages to the person incurred through the loss of enjoyment of the property." This leads to proof of "negligence" where "physical injury or property damage" was established through diminished property and rental value. Using this as precedent, several lawsuits have been filed across the U.S., exposing odor-emitting industries that previously had enjoyed relative autonomy to expensive consequences.

### Environmental Impact?

A detailed study commissioned by the Italian government regarding the environmental effects of odor caused by volatile organic compound (VOC) emissions from landfills was released in 2013.<sup>3</sup> Researchers concluded that the direct impact from odor on the affected area is negligible, but the indirect impact is profound. Odor can be absorbed by surrounding soil and can cause certain animal and insect species to avoid the area, initiating an unknown impact on the ecosystem.

Topical chemicals settle on the surface to treat odors released from exposed material.





Dispersing a nearly invisible cloud of vapor, the deodorizer attacks odor on a molecular level.

Though the study is not conclusive, this may have an effect on future environmental impact assessments as more data is collected in subsequent studies.

### Community and Media Relations

According to the Agency for Toxic Substances and Disease Registry (ATSDR),<sup>4</sup> odor toxicity is contingent upon the quantity and concentration of a substance in the air and the frequency and duration of exposure. However, the ATSDR further elaborates that people who are sensitive to environmental odors may react adversely to low concentrations and that sensitivity can form after long-term exposure.

This eventual sensitivity can lead to a serious community relations/public relations issue. Local print, television and online media often cover the story because it concerns their audience. Constituents in affected districts can put pressure on municipal, county and state representatives, prompting increased inspections, fines and new regulatory guidelines.

### Economic Consequences

The economic consequences can be separated into tangible and intangible:

- Tangible economic impacts of odor are legal payouts or settlements, regulatory fines, production/revenue loss from forced downtime, odor control equipment improvement or replacement costs and increased labor costs for monitoring and maintenance of emissions.

- Intangible economic impacts of odor are lower staff morale/productivity, bad press that negatively affects stock price, and tense community relations leading to complaints and wider regulatory scrutiny. Moreover, lack of adequate action to eliminate odor emissions can sour relations with local lawmakers, environmentalists and community organizers, possibly limiting future growth in the area.

### Chemicals Used for Odor Suppression

Generally, there are five categories of chemicals used for odor control:

1. Masking agents introduce another smell intended to overpower, improve or dilute foul odor emissions. Modern chemical masking agents are formulated to be delivered as a fine spray or as a concentrated additive, but are largely considered to be inadequate on an industrial scale. Their sole intent is to hide the odor.

2. Neutralizers are chemicals that block olfactory sensory neurons in order to dampen the neuron's ability to detect and discern smells. Delivered as a fine mist intended to travel on ambient air currents with odor emissions, most neutralizers are considered environmentally

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safe, however, they carry the potential of preventing humans and other animals with similar olfactory mechanisms from smelling hazardous toxins or gases.

3. Oxidizers introduce oxidating agents (oxygen, peroxide, hydrogen peroxide, chlorine or chloride) into a substance in order to kill bacteria that cause odor. Completed in specialized chambers at the processing level or in preparation for disposal of waste products, oxidation is applicable to specific industrial activities such as treating wastewater or preventing the formation of odorous biofilm in liquid impounds.

4. Topical treatments are chemicals such as foams and deodorizers (see below). Foams trap gas emissions by forming a protective coating. A benefit of foam is that the operator can visually confirm full coverage. The method is most economical for open truck or train transport or storage piles that experience little disruption, because odor emissions can escape once the topical barrier is broken.

5. Deodorizers have been found to be an effective control for the majority of industrial odor emissions, treating the smell on a molecular level by removing the odor-causing element. These chemical additives are available as biodegradable formulations that are completely safe to plants, animals and humans. They can be dispensed using a variety of technologies. Topical deodorizers treat material on the ground at the point of emission, while the airborne delivery system relies on engineered droplets small enough to travel long distances on ambient air currents with odor molecules and interact with them.

### **Odor Suppression and Chemical Distribution Methods**

Beyond the common practice of impounds, odor can be suppressed

through several means. The common methods of odor control occur either during production or at the point of emission. Some processes allow odor to be washed, filtered or suppressed using biofilters or bioscrubbers prior to producing the finished product. Other applications emit odor constantly and require covering, masking or suppression using topical coverage or airborne treatments.

#### *Topical Chemicals*

These can be applied by various methods in landfills and MRFs. Foams are generally distributed from a tank, often by hose with an aerating nozzle. More effective deodorizers are distributed using powerful industrial atomized mist cannons, sprayer tanker trucks with hose attachments or via misting bars, saturating the material and disrupting the biological process that causes odor.

#### *Chemical Air Treatment*

Can be a deodorizer, neutralizer or masking agent that is distributed by industrial vapor cannons, overhead sprinkler lines or perimeter misting systems. Operators have found that the most effective air treatment method is a cannon that delivers a deodorizer in a fine engineered vapor over a wide area, allowing the tiny droplets to be light enough to drift with odor molecules in the atmosphere, attaching to them and altering their composition to eliminate the odor-causing element.

#### *Activated Sludge Diffusion*

This is a biological floc composed of bacteria, protozoa and oxygenated



The OB-60G comes on a mobile carriage housing all that is needed to quickly relocate the unit.

air that is injected into odor-causing liquids to treat VOCs in surface impounds, storage ponds and waste water operations. The process removes phosphates, eliminates gases such as carbon dioxide, ammonia and nitrogen and oxidizes carbonaceous biological matter.

### Bioscrubbers

These consist of two reactors. In the first reactor, the odorous substances are absorbed in a tower in a “liquid phase,” then go to a second reactor, which is an activated sludge unit. In the last phase, microorganisms grow in suspended flocs in the water, degrading the pollutants.

### Biotrickling

Forces waste gas through special filters made of chemically inert material such as plastic or ceramic structured packing (rings, saddles, etc.), open pore foam, unstructured celite, activated carbon or mixtures of different materials. The filter serves as a carrier for biofilm-creating microorganisms. While passing through the column, the pollutants from the gas diffuse into the biofilm and are degraded by microbial activity. In general, most of the odorous material is degraded in the biofilm, but may also be removed by suspended microorganisms in the recycled liquid.

### Choosing the Correct Method

The mistake some operators make is seeking the option with the lowest initial investment, only to discover that it is inadequate,

seasonal or unsustainable over time due to labor and equipment costs. After implementing several methods in an attempt to avoid investing in a permanent viable solution, they often spend more money than they would have if they had just invested in field-tested and proven technology.

Biotrickling filters and bioscrubbers are costly to install and maintain, but are very viable options used by operators who anticipate odor emissions. However, if the facility expands or increases volume, improving or adding similar technology to compensate for the volume may be costly. As mentioned above, perfumes and neutralizers have not been found to be a viable long-term solution in most industrial settings. Foams often require hand spraying, increasing the cost of labor and exposing workers to a safety hazard by working around large machinery, at times on unstable ground.

A field-proven solution for operators in the solid waste industry is the odor suppression cannon that distributes either mist or vapor, which can be mounted with a tank on mobile carriages for easy placement, depending on the needs of the application and wind direction. To operate year-round in cold climates, heat-traced pipes and an insulated tank enclosure protect the water and chemical flow from freezing. Environmentally friendly chemical additives biodegrade within three days and are safe for consumption by plants, animals and humans.

### Protect Your Reputation

Addressing odor emissions is unique to each operation. It is incumbent upon the operator to walk the site perimeter periodically, know the general seasonal wind patterns of the area and monitor new construction activity around the area that could potentially be affected by odor emissions. Also, awareness of how emissions impact the workplace can reduce staff exposure to illness and improve morale.

Adding sustainable and environmentally responsible odor emissions control technology reduces complaints and scrutiny from regulators, helps avoid fines or lawsuits, and improves community relations. Over the long run, it protects the reputation of the company, while reducing the costs and consequences of odor emissions. | **WA**

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