



ODOR CONTROL AT RUMPKE SANITARY LANDFILL

Rumpke has operated Rumpke Sanitary Landfill in Colerain Township since 1945. Over the years, we have constantly looked for ways to reduce or eliminate odors. We are always striving to be the best neighbor we can be. We too want zero odor and zero impact beyond our property line.

Gas Recovery

Implementing a state-of-the-art gas recovery facility is a standard effort to help address odors and emissions associated with landfill gas. Most landfills simply flare the gas; at Rumpke we're making energy. Our gas recovery system (*pictured below*) has grown into one of the world's largest landfill gas to direct pipeline energy systems, providing enough natural gas energy for up to 25,000 homes and a growing fleet of 22 compressed natural gas garbage trucks. Most recently, the gas recovery system operator, GSF Energy installed a replacement thermal oxidizer unit (TOX). The updated equipment is designed to reduce odors resulting from the gas recovery process.



Keeping It Covered

Over the years, Rumpke has also implemented other best management practices such as a smaller working face or dumping area for the garbage, more efficient compaction and new odor reducing landfill cover options.

New Technology

During the past decade, Rumpke began utilizing an odor neutralizing system which releases an all-natural mist made from plant (mainly fruit and vegetable) extracts. Today, 6,150 linear feet of high pressure tubing connected to 200 atomizing nozzles delivers odor neutralizing mist to the perimeter of the landfill. Rumpke has also added four industrial size fans to disperse odor control at the trash disposal area.

Addressing the North End

With the arrival of the north end reaction, odor minimization efforts became much more challenging. Rumpke consulted with experts and has spent millions on additional odor minimization equipment. Including the items listed below.

- In the north end area, Rumpke has installed approximately 32,250 feet of deep and shallow trenches to capture escaping odors from the reaction area.

- Rumpke has installed 56 acres of Odor Control Blanket (OCB) constructed of high density polyethylene (HDPE) liner material.



- The OCB area has 14 stationary high volume industrial fans (*pictured above*) located across the top delivering a specific odor neutralizing agent for this area. There are also 6 stationary high volume industrial fans below the OCB area around the northeast side of the facility.
- Waste water lift stations have been fitted with carbon based odor scrubbers to eliminate odors resulting from the water generated by the reaction.
- RSL dedicates personnel to constantly survey the north end in an effort to proactively address odors.
- Rumpke has installed and relocated a second flare to destroy captured odors.

FAQ: Rumpke Sanitary Landfill Odor Neutralization

When did Rumpke begin using odor control neutralizer at Rumpke Sanitary Landfill?

Rumpke began testing approved neutralizers in 1998.

What brand of odor neutralizer is used at Rumpke Sanitary Landfill?

NXC Technologies makes the NovoAir odor neutralizer that is used at Rumpke Sanitary Landfill. The firm works with customers throughout the United States and Canada to identify appropriate products to address specific odor situations.

Why did Rumpke choose NXC Technologies products over others?

Rumpke carefully researched various products from around the country and those products typically used in the waste industry.

Research indicates that NXC's product line best matches our needs. NXC has proven success in treating odors from landfills, rendering plants and sewage.

Is the product safe for humans, animals and the environment?

The product is made from plant extracts. These are the same substances used in home deodorizers and flavor enhancers. All products are nontoxic, non-hazardous and safe. The odor control is comprised of nontoxic materials, as per the Ohio Toxic Contaminants list and other federal lists. The components used in the formulas for these odor control products do not contain any chemicals from the Ozone Depleting Substances list included in Section 602 of the Clean Air Act. Furthermore, the compounds do not contain any chemicals included on the List of Hazardous Air Pollutants from Section 112 of the Clean Air Act Amendments of 1990.

Who regulates the safety of these products?

The products used by Rumpke are composed of nontoxic materials as outlined in Ohio EPA's Air Toxic Contaminant list and other federal lists. As always all activities at Rumpke are monitored by:

- Southwest Ohio Air Quality Agency
- Hamilton County General Health District
- Ohio EPA
- US EPA

What is the odor control substance made out of?

The odor control substance is made from a combination of essential oils made from fruit, vegetable and other plant extracts. It's the same types of oils that are used to make many household deodorizers, as well as the oils used to make flavor enhancers and cooking oils.

The odor control is comprised of nontoxic materials such as alcohols and aldehydes, esters, ethers, ketones, lactones and surfactants. These products are formulated with surfactants, as emulsions (a mix of two or more liquids that are normally unmixable like the ingredients in vinaigrette), for use with high-pressure water atomization.

Rumpke mixes the odor control with water. The final combination may vary according to the type and intensity of the odors. Generally, one gallon of deodorizer is mixed with 1,000 gallons of water.

How do the essential oils work to eliminate odors?

Three different approaches are used to control odors in the air.

1. Modifying the shape and size of the malodorous molecule before it gets to the nose
2. Changing the number of malodorous molecules getting to the receptors
3. Changing the perception of the odor

To reach these objectives, odors are eliminated without harmful byproducts and hazardous chemicals through identification of

each essential oils' unique characteristics and the optimization of simple reactions.

How much odor neutralizing mix does Rumpke use monthly? How big of an increase in deodorizer usage is Rumpke is proposing?

On average Rumpke uses about 867 gallons of odor mixture mixed with 867,000 gallons of water monthly. Quantities may vary depending on weather, odor type and intensity. When the permit is approved we will be permitted to use up 2,741 gallons mixed with more than 2.7 million gallons of water, it is likely that we will not use that higher amount. A more realistic average use is probably 1,700 gallons of deodorizer a month.

The increase in deodorizer requested is directly linked to the public input received. Rumpke continues to invest considerable resources to address the odor issue and is committed to employing management practices and technology that best minimizes odors.

When does Rumpke use the products?

Rumpke uses the products when necessary and when weather conditions allow to reduce odors. Varying combinations of ingredients are used depending on weather patterns, outdoor temperatures and odor type (gas recovery, garbage, composting or reaction area).

The products are mixed with water and will freeze at 30 degrees Fahrenheit, restricting use of the products to times when outdoor temperatures are above 30 degrees Fahrenheit.

Where does Rumpke use the products?

Rumpke distributes the odor control product via 6,150 linear feet of high pressure tubing connected to 200 atomizing nozzles (pictured below). At the northern end of the site, 14 stationary high volume industrial fans located across the top deliver a specific odor neutralizing agent for the area, while 6 stationary high volume industrial fans below the odor control blanket in the north end reaction area are stationed around the northeast side of the facility.



Does it eliminate or mask odors?

The product Rumpke uses, does not mask odors, but biologically reacts with the odor causing molecules and renders them odorless. It is designed to work as an odor eliminator.

Does it have to have its perfume scent?

The scent that is released is created from the essential oils that are used, the essential oils are tested and proven safe. The combination of essential oils is created to combat a specific malodor, for example odors resulting from trash, compost, landfill gas or the north end reaction. On site evaluations using an odor panel indicate that the current product best neutralizes odor molecules resulting from the north end reaction.

What happens when you run it through your ventilation system for your furnace or air conditioner? What happens at high temperatures and at low temperatures?

The deodorizer product to water ratio results in an extremely minute concentration of deodorizer as it moves off site. We also know that at low temperatures it freezes much like water.

North End Reaction

What is going on with the north end reaction? Is it a fire?

In August 2009, Rumpke officials contacted the EPA after noting two gas recovery wells with elevated temperatures. After much research, regulators have determined a reaction is occurring about 100 feet below the surface of part of the landfill.

No. It's not a fire. There is nothing going on to indicate a fire, no smoke, steam or charring.

However, the reaction is costly and does cause odor, increased gas well temperatures, settlement and poor landfill gas quality. Since the reaction began, Rumpke has installed 32,250 feet of gas collection trenches, additional odor control misters and a synthetic odor control blanket (*pictured below*) over the area.



Does the reaction pose a health risk?

Research indicates that the reaction poses no long term health risks. Air quality monitoring on site and around the site occurs continuously.

What caused the reaction?

The cause is unknown. Rumpke continues to work with environmental experts to resolve the extremely costly and challenging reaction.

Rumpke has always complied with all state and federal landfill construction requirements. An assessment of waste placed in the area did not reveal a cause.

Landfill Safety

What about the methane at Rumpke? Is it safe?

The methane recovery system is state of the art. It is very safe, and operates much like the natural gas system that delivers energy to your home. Its existence reduces emissions and produces energy from your garbage. Up to 25,000 homes obtain their natural gas from Rumpke Sanitary Landfill. Rumpke also uses some of the gas to power collection vehicles which also reduces emissions and ensures a positive environmental impact.

Without Rumpke's gas recovery operation, all of landfill gas which is produced as garbage decomposes, would simply be flared (combusted) into the air, while flaring is still sometimes necessary, the bulk of the gas is recovered for reuse.

Are employees at Rumpke safe?

Compliance and safety is what keeps us successful. The safety of our team members and community is our top priority. Safety is ensured through environmental monitoring, and extensive safety training and protective equipment.

What safety measures are employed to ensure environmental protection?

Landfills are built with protective liners under the garbage, as well as gas collection systems and waste water and storm water collection systems. Liners include a 3 foot layer of clay, a high density polyethylene liner, a drainage layer, sand, and a fluff layer of light trash.

Liners are tested and must be approved by regulators. The gas collection system and waste water removal and storm water removal systems are highly regulated as well. Gas is recovered and sent to three GSF plants on site. Waste water is hauled or piped to the Metropolitan Sewer District and storm water (water that has not come into contact with waste) is discharged to a specially designed sediment pond. The water is cleaned and released.

Does the EPA test for chemicals in the air?

The Southwest Ohio Air Quality office and the Ohio EPA check the air quality at and around Rumpke Sanitary Landfill. For complete details visit www.southwestohioair.org and www.epa.ohio.gov.

More Information

For more details please call (513) 851-0122 ext. 3526. Tours are always available by calling (513) 741-2617 or by visiting www.Rumpke.com.

All inspections of Rumpke Sanitary Landfill are public record and are available by contacting the Ohio EPA and Hamilton County Environmental Services.

