

Bridgeton Landfill, LLC

13570 St. Charles Rock Road
Bridgeton, Missouri 63044

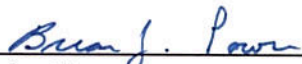
October 15, 2014

Mr. Chris Nagel
Director, Solid Waste Management Program
Missouri Department of Natural Resources
1738 East Elm Street
Jefferson City, MO 65102

Dr. Mr. Nagel:

Please find enclosed the Investigation of Odor Control Technologies summarizing the evaluation of alternative odor neutralizers and control technologies for third quarter of 2014, conducted pursuant to Paragraph 27.C. of the Second Amendment to the First Agreed Order.

Best regards,



Brian Power
Environmental Manager
Bridgeton Landfill, LLC

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October 15, 2014

Investigation of Odor Control Technologies – 3rd Quarter 2014

This Update on Odor Control Technology Investigation is being submitted by Bridgeton Landfill, LLC (“Bridgeton Landfill”) pursuant to Paragraph 27(C) of the Second Amendment to the First Agreed Order.

The Bridgeton Landfill is always focused on improving odor controls for the site and to that end is continually investigating new and improved ways to manage and mitigate odor. Consistent with that effort Bridgeton Landfill is providing quarterly submittals detailing these efforts as part of the Second Amendment to the First Agreed Order between Bridgeton Landfill, LLC and the State of Missouri.

During Third Quarter 2014 Bridgeton Landfill identified a product with significant potential to improve site odor controls. An existing odor control supplier, GOC Technologies, has recently introduced a new technology that has shown significant perimeter odor control potential in early use at other solid waste facilities across the country. In collaboration with current site odor control methods the perimeter controls can provide redundancy in the mitigation of any potential odors. This technology utilizes effectively the same product (QuikAir 0900) that GOC Technologies provides the Bridgeton Landfill currently for atomized and mist based odor controls, but rather than needing to be in a mixture with water the product is instead vaporized by dedicated equipment, and run through perforated piping, allowing the vaporized product to release into the atmosphere and counteract existing odors.

This change in distribution results in a system that needs less maintenance, less product, and can be maintained day and night, seven days a week, year round without any of the frequent seasonal problems associated with other distribution methods (icing of various components in the winter for example).

Attached is a brochure from GOC Technologies that gives a more complete description of how this method of distribution is not only a preferred mechanism for the sustained operation of odor controls, but also effective in actually mitigating or eliminating odors. It is the intent of the Bridgeton Landfill to implement an initial application of this method along the entire south face by mounting it to the existing south fence line (excluding access gates). The installation of this

control is currently being planned by site staff and the necessary contractors, with time sensitive parts already having been ordered and in assembly.



GOC Technologies

Odor Control with QuikAir™ Vapor Technology

Ever try chasing a car with a bicycle? That's similar to chasing a molecule of gas with a water particle. Odors are compounds that have volatilized – transitioned to gaseous or vapour state. That is why we can smell them. We don't actually smell liquids or solids. We smell the portions of them that make the transition into the vapor state – making them light enough to travel in the air and into our nostrils.

Atomizing or misting systems discharge water based particles containing deodorizers. No matter how small those particles are they will still be liquid particles and will be far heavier than the molecules they are trying to catch. Using the car and bicycle analogy, imagine a race. You on the bike. Odor in the car. You start on the same line with the finish line one mile away. The car will get there long before you do. No matter how hard you pedal. The point of this is: the best way to chase a vapor is with a vapor. It certainly increases your odds of success.





As if odor control isn't difficult enough, try to imagine a million cubic feet of air. Now imagine one cubic foot of odor mixed randomly throughout that million cubic feet. With many odors that's all it takes to be a problem. With some odors one cubic foot per billion cubic feet of air is enough to be odorous! The deodorizer has to try and find all the bits of that one cubic foot and contact them. That's a tall order – and an impossibility when water based particles are involved.

Using vapor doesn't guarantee success, but it certainly improves the odds. Theoretically, the deodorizer vapor will move in much the same manner as the odor particles, and stay in the air as long as they do. This alone increases the chance of contact and deodorization.

The QuikAir Vapor System uses pipe to transport an air stream filled with vaporized deodorizer along or around the perimeter of any area where deodorization is desired or required. The vapor itself is created by a unique system that moves air across a tank of QuikAir V deodorizer. The deodorizer is designed specifically to vaporize when subjected to air movement or minor turbulence. Heat is not used. The

chemical is not “evaporated”. The vaporizer contains only a motor and blower, a tank, and the vacuum system for creating the vapor and delivering it into the airstream. Once pressurized, the system is calibrated to insure even distribution of vapour throughout the covered area. This is accomplished by variation in pipe and outlet sizes.



QuikAir V Deodorizer was created specifically to be vaporized. It contains no propellants or alcohols, and its component parts are all approved for cosmetic use or greater. We use most of the components every day by the time we walk out the front door. These ingredients are carefully designed to vaporize together, retaining their integrity. This is why heat is not used. Heating any blend of volatile ingredients results in a loss of integrity because each component will have a different evaporation rate and temperature threshold. Using heat to create vapor simply separates the deodorizer back into its component parts.

How QuikAir™ V Works

The basic chemistry used in QuikAir V is identical to that used in many of other GOC products, including QuikAir 0900. We start with a number of amine groups, mix them with additional parts that have specific ionic or reactive properties, and create sets of amino complexes with high reactive affinity toward certain odorous groups. Many of these complexes are amino hydroxyl groups which will react on contact with organic acids, long chain amines, mercaptans, and many reduced sulphur

compounds.* With mercaptans for example. To break up the mercaptan, we have to break the sulphur/hydrogen (SH) bond that characterizes this set of odorous compounds. This is done through a series of ionic and displacement reactions that replace the SH bond with an OH (oxygen/hydrogen) bond.

Another type of complex involves an amino group with a carbohydrate . These complexes form in many diverse molecular shapes, and react with odorous compounds whose shape allows them a “wedge” or entry point to break the compound’s chemical bonds. Additionally, some of these groups adsorb odor molecules, eliminating their odor characteristics in the process.

In reality, QuikAir V is very similar to the deodorants and shampoos each of us uses. It simply performs in vapor state rather than liquid state. QuikAir V provides an environmentally and personally safe deodorization method while conserving water and energy.

*QuikAir V is not recommended for treatment of hydrogen sulphide.

Advantages of Vapor

Deodorizer is delivered in lightweight particles, similar to the weight of the odors .
No additional water is needed.
Maintenance is minimal.
The deodorizer is unobtrusive, relatively quiet, dry, and invisible.

