April 20, 2015

Mr. Kendall B. Hale
Permit Section Chief
Missouri Department of Natural Resources – Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176

RE: Response to MDNR Letters of February 11 and March 25, 2015
Bridgeton Landfill

Dear Mr. Hale:

This letter provides the Bridgeton Landfill's response to MDNR's letter dated February 11, 2015, from yourself and the letter dated March 25, 2015 from Ms. Leanne Tippet Mosby. Both MDNR letters were sent in response to the Stage 2 Sulfur Removal Technology Evaluation (Stage 2 Evaluation), provided to MDNR January 23, 2015.

We note that these two correspondences from MDNR are directed to the same submittal by the Bridgeton Landfill (i.e. the Stage 2 Evaluation submitted January 23rd) and address many of the same points, presenting similar requests in some cases. With this letter, Bridgeton Landfill personnel have done our best to address all of the points presented in both of the letters provided by MDNR.

We also would like to highlight that Bridgeton Landfill has maintained a very proactive approach to resolving this very unique and challenging situation and Bridgeton personnel have done their very best to communicate with and involve both the MDNR and the St. Louis County Health Department (SLCHD) every step of the way. We will continue to work diligently with the MDNR and the SLCHD to resolve the current situation.

Below, in bold, are the documentary requests posed by the two MDNR letters with the Bridgeton responses immediately below each..

Responses to MDNR Letter dated February 11th, 2015:

1. *Clarify whether or not the Stage 2 pilot study will consist of a single or dual stage approach for removing sulfur compounds; where one of the stages consist of the MV Technologies system.*

The purpose of the second pilot test is to identify the appropriate technologies for removal of sulfur compounds from the landfill gas (LFG) collected at the Bridgeton Landfill. As discussed within the previous Stage 1 & 2 evaluations, there are certain sulfur compounds specific to the LFG collected at Bridgeton Landfill which traditional sulfur gas treatment

technologies, such as the MV Technologies iron sponge process, are ineffective at removing: di-methyl sulfide (DMS) and dimethyl disulfide (DMDS). The Stage 2 Evaluation identified two treatment processes which could conceptually be effective at removal of sulfur compounds from the LFG at Bridgeton Landfill; a caustic based liquid scrubber process and a solvent based liquid scrubber process. The second pilot test will consist of a small scale, single stage system which will evaluate each of the two scrubber technologies independently. The MV Technologies system will not be further evaluated in the second stage pilot test. It is unknown at this time whether a permanent treatment system will consist of a single stage or multiple stage process employing a single or multiple treatment technologies. It is the goal of the second pilot test to identify feasible technologies and appropriate design basis for the design and construction of a permanent sulfur treatment system.

2. Evaluate the full capabilities of the sulfur removal technologies analyzed during pilot testing. Upon conclusion of the pilot testing, Bridgeton Landfill, LLC should provide a report detailing the maximum sulfur removal capabilities of each technology and provide documentation based upon the pilot test to support any claim that a higher removal efficiency is not possible. The report shall recommend a maximum emission limitation for SO_2 which the control technology is capable of achieving. It shall also detail how Bridgeton Landfill, LLC will document compliance with this limit.

The second pilot test will evaluate the full capabilities of the two treatment processes identified in the Stage 2 Evaluation. The pilot test will be configured and data will be collected so that the information collected can be later used within a formal BACT or "BACT-like" analysis, if required, evaluating maximum control efficiency as well as economic, environmental and energy costs of any technologically feasible sulfur removal systems identified.

The results of the second pilot test and effectiveness of the two technologies will be summarized within a technical report prepared by a third party engineer. The focus of the pilot test technical report will be to evaluate effectiveness of the two technologies and identify the correct design basis for a permanent, full scale system.

If required a formal BACT or BACT-like analysis will be prepared as part of any air permit package for the permanent sulfur removal system (as applicable), once a technically feasible removal technology has been identified and a permit-level engineering design has been prepared.

3. Sample the landfill gas for the purposes of determining the total reduced sulfur concentration. The sampling needs to be done on a weekly basis, and during pilot testing should be done daily. The sampling should also determine the concentration of the different sulfur compounds (i.e,. hydrogen sulfide, dimethyl sulfide, etc.) This will allow for a more accurate estimate of the SO_2 emissions from the landfill gas flares.

Based in part on your request within the MDNR February 11th letter, Bridgeton Landfill began testing total reduced sulfur concentrations within the LFG via EPA Method 15/16 on a weekly basis beginning the week of March 12th, 2015. Bridgeton Landfill will continue weekly testing of sulfur concentrations through conclusion of the pilot test program in order evaluate current emissions of SO_2 as well as to develop accurate design basis for a permanent full scale sulfur removal system.

As an integral part of the actual field pilot testing activities, a third party engineer will deploy a gas chromatograph to the site which will be utilized to analyze real-time concentrations of sulfur at the inlet and outlet of the pilot scale systems during pilot system operation. The frequency of sulfur testing during pilot test field activities will be at the discretion of the third party engineers, who have been retained by Bridgeton Landfill and are delegated with responsibly to manage and oversee the pilot test program. However, it is anticipated that multiple gas analytical tests will be conducted daily for each technology during actual field pilot testing in order to fully evaluate control efficiency of each technology and make operational adjustments to pilot test equipment as applicable.

A technical memo describing the onsite GC equipment to be used as part of the pilot test program is provided as an attachment to this letter.

4. *Once the pilot testing is completed and a possible SO_2 emission rate determined, Bridgeton Landfill, LLC needs to conduct a refined air quality analysis for SO_2 in order to demonstrate compliance with the NAAQS for SO_2.*

Trinity Consultants (Trinity) has been retained by Bridgeton Landfill to develop the air dispersion model in order to demonstrate NAAQS compliance for SO_2. Trinity will prepare a preliminary modeling protocol for MDNR review prior to conducting the air dispersion modeling. Bridgeton will provide the modeling protocol to the MDNR by April 24, 2015.

Responses to MDNR Letter dated March 25th, 2015, Corrective Measures Required:

1. As part of the Sulfur Removal Evaluation, Stage II study, the facility shall begin collecting gas samples and flow rate measurements of landfill gas going to the flares on a weekly basis. The gas samples shall be analyzed for sulfur compound concentrations and TRS concentrations. Bridgeton Sanitary Landfill shall summarize the data on a monthly basis and submit the summary as part of the Monthly Report required by the Second Amendment to the First Agreed Order due to the department on the 20th of the month. The first summary shall be submitted with the Monthly

Report due to the department on May 20th. Weekly collection and analysis of gas samples and flow rate measurements shall continue until determined otherwise by the department.

As indicated in our response to MDNR request No. 3 above, Bridgeton Landfill began weekly testing of sulfur concentrations in the LFG on a weekly basis beginning the week of March 12th. Bridgeton Landfill also began weekly LFG flow measurements concurrently with collection of weekly sulfur analytical samples, beginning the week of March 12th. Bridgeton's third party engineering consultant utilizes EPA Reference Method 2 (*Determination of Stack Gas Velocity and Volumetric Flow Rate*) testing to validate the flow rate of the permanently installed thermal mass flow meters, manufactured by Thermal Instruments. The Thermal Instruments flow meter is a standard in the landfill industry. These meters are calibrated to the specific gas characteristics of the Bridgeton Landfill and each flow meter is re-calibrated, and certified, for greenhouse gas emission compliance on an annual basis by Thermal Instruments at their factory located in Trevose, PA. Bridgeton has historically relied upon these thermal mass flow meters to provide accurate flow rate data used for estimating flare emissions in addition to quantification of GHG emissions.

2. Within 30 days from the date of this letter, Bridgeton Sanitary Landfill shall submit for review and approval PTE calculations for the Bridgeton Sanitary Landfill installation on an emission unit basis for each pollutant found in 10 CSR 10-6.020(3)(A), Table 1— De Minimis Emission Levels. The PTE calculations shall be based upon current operating conditions and the submittal shall include supporting explanations and documentation for the calculations.

Bridgeton Landfill is in agreement with the statement within the MDNR February 11th letter that "it is hard to accurately predict an SO_2 emission rate based on extremely small sample size." Due to the dynamic nature of the Bridgeton Landfill gas collection system operation, used primarily for odor control, the suspected over reporting of flow by the current flow metering system in place (based on EPA method 2 comparison) and variation observed within the relatively small sample set of sulfur test data available to date, it will not be possible to provide accurate actual or potential SO_2 emission rates by April 24th, as requested. Bridgeton Landfill proposes that additional data be collected throughout conclusion of the pilot test (field activities currently anticipated to occur in May/June) and that updated emission calculations, based on current operating conditions as requested, be presented concurrent with the technical results of the second pilot test, anticipated to be available at the end of June/beginning of July.

3. Within 30 days from the date of this letter, Bridgeton Sanitary Landfill shall submit for review and approval a protocol for conducting an air quality impact analysis for SO_2.

As summarized in our response to request No. 4 of MDNR's February 11th letter, Bridgeton will provide the modeling protocol prepared by Trinity Consultants to the MDNR by April 24th, 2015.

4. Within 30 days of receiving approval of the protocol and PTE calculations from the department's APCP, Bridgeton Sanitary Landfill shall submit for review and approval an air quality impact analysis for SO_2 currently being emitted.

Within 30 days of receiving approval of the air modeling protocol prepared by Trinity, Bridgeton Landfill will provide MDNR with air quality impact analysis for SO_2 currently being emitted. The air quality analysis will be based on the best data available at that time as it relates to LFG flow rate and sulfur concentrations. However, Bridgeton Landfill reserves the right to update the air quality impact analysis for SO_2 in accordance with our proposed schedule to obtain additional data and complete updated emission calculations as addressed in our response to items No.1 & 2 of MDNR's March 25th letter.

5. Within 180 days from the date of this letter, Bridgeton Sanitary Landfill shall submit a permit application to the department's APCP pursuant to 10 CSR 10-6.060, Construction Permits Required, for the two 4,000 scfm John Zink candlestick flares, the one 2,500 scfm LFG Specialties candlestick flare, and the 2,500 scfm John Zink candlestick flare.

Based on evaluation of additional sulfur concentration test data and further analysis of actual LFG flow rate (as addressed in our responses above), should it be determined that SO_2 levels implicate a need for a revision to the permitted status of the Bridgeton landfill, then by October 1, 2015 Bridgeton will submit to the MDNR a permit application consistent with the requirements of 10 CSR 10-6.060, *Construction Permits Required* for the two 4,000 scfm John Zink candlestick flares, the one 3,500 scfm LFG Specialties candlestick flare, and the 2,500 scfm John Zink candlestick flare. As discussed above with the air quality impact analysis, Bridgeton Landfill reserves the right to amend the application submission materials during the application review process should additional data become available that is material to the establishment of the terms and conditions of the construction permits for the four flares.

If you have any questions or comments about the information presented in this letter, please do not hesitate to contact me at (314) 744-8139.

Sincerely,

Bridgeton Landfill, LLC

James A. Getting, PE
Environmental Manager

cc: Ms. Darcy Bybee, MDNR/APCP Enforcement Chief
Ms. Kathrina Donegan. St. Louis County Department of Health
Mr. Tom Phillips, Missouri Attorney General's Office
Mr. Aaron Schmidt, Division of Environmental Quality
Mr. Chris Nagel, Solid Waste Management Program
Mr. Tom Markowski, St. Louis Regional Office
Mr. Russell Anderson, Bridgeton Landfill, LLC
Mr. Michael Liebert, Trinity Consultants

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Attention: Greg McCarron
Reference: Instrumentation for Odor Component Quantification

The purpose of this letter is to describe the instrumentation to be used on-site for compound detection and quantification during the trial for landfill gas odor component removal at the Republic landfill. The variety of detectable compounds and the instrument's accuracy in quantifying each compound are also conveyed. Please see the details below and let me know of any questions or comments you may have.

Best regards,

David Engel, Ph. D.
Nexo Solutions

Gas Chromatograph

The instrument to be used for this testing application is the Agilent 490 Micro GC. There are several versions of the Agilent 490 Micro GC, all of which use GC channels consisting of an Electronic Gas Control (EGC) injector, column, and thermal conductivity detector. The Micro GC is a self-contained package with all of the normal GC components. A computer with a chromatography data system (CDS), high purity helium carrier gas, and tubing/fittings are needed to complete the system (and will be provided by Nexo).

The instrument to be used has two installed channels with "PPU" and "13CB" columns designed specifically for hydrocarbon and sulfur compound detection and quantification. All compounds will be detected and quantified at levels above 50 ppm (generally at levels above 10 ppm), with no upper detection limit, and an accuracy of < 0.5% RSD (Repeatability of Standard Deviation).

1) The PPU column separates and allows for the individual detection and quantification of (in the following order) methane, carbon dioxide, ethane, hydrogen sulfide, carbonyl sulfide, and propane. See Table 1 for complete set of detected species. Compounds that elute from the column first are detected more accurately and at lower detection limits. In general, lower detection limits range between 1 and 5 ppmv. Hydrogen sulfide for example can be detected at levels between 1 and 3 ppmv, and ethane can be detected at levels at least as low as 1.4 ppm (depending on instrument care and maintenance, sample compatibility, etc.). The accuracy of the detector in this channel is < 0.1% RSD.

2) The 13CB column separates and allows for the individual detection and quantification of hydrocarbons including (in the following order) i-butane, n-butane, i-pentane, n-pentane, n-hexane, n-heptane, n-octane, and n-nonane. See Table 1 for complete set of detected species. The column also separates and allows for individual detection and quantification of sulfur compounds including (in the following order) methyl mercaptan, ethyl mercaptan, dimethyl sulfide, methyl ethyl sulfide, tert-butyl mercaptan (TBM), and diethyl sulfide. In general, lower detection limits range between 1 and 10 ppmv for sulfur species and between 1 and ~30 for hydrocarbons. TBM for example can be detected at levels at least as low as 4 ppm (depending on instrument care and maintenance, sample compatibility, etc.). The accuracy of the detector in this channel is < 0.5% RSD.

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Engineering & Technology

TABLE 1. Compounds Detectable by Agilent 490 Micro GC		
Column:	**PPU 10m HI-BF(185)**	**13CB TBM HI-Str(262)**
Compound:	Methane	*i*-Butane
	Carbon Dioxide	*n*-Butane
	Ethane	*i*-Pentane
	Hydrogen Sulfide	*n*-Pentane
	Carbonyl Sulfide	*n*-Hexane
	Propane	*n*-Heptane
		n-Octane
		n-Nonane
		n-Decane
		Methyl Mercaptan
		Ethyl Mercaptan
		C3 Mercaptans
		C4+ Mercaptans
		Tetrahydrothiophene
		Dimethyl Sulfide
		Methyl Ethyl Sulfide
		Diethyl Sulfide
		Dimethyl Disulfide