

**Bridgeton Landfill  
Laboratory Analytical Results for  
SWAPE/MDNR Duplicate  
Dioxin Sampling  
June 17 – 18, 2013**

Summary of Analytical Results –  
Supplement to Second Comprehensive  
Air Monitoring Study



September 1, 2013



**Stantec**

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Dioxin sampling  
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During the second comprehensive monitoring study (May 7-8, 2013), the high volume polyurethane foam (“PUF”) samples collected by SWAPE/MDNR were deemed as unrepresentative samples due to an undisclosed laboratory issue. SWAPE/MDNR re-mobilized to the site on June 17, 2013 to collect representative ambient air samples from upwind, downwind and onsite locations, as well as source gas samples from under the flexible membrane liner (“FML”). Due to short notice, Stantec was unable to obtain PUF sample media from ALS labs (Houston, TX). SWAPE/MDNR agreed to provide Stantec with duplicate samples collected from each of the six locations. Stantec mobilized to Bridgeton landfill and was on-site during sample collection.

Prior to sample collection, the high volume samplers were calibrated by SWAPE/MDNR personnel. The calibration data is necessary to calculate the total volume of air sampled and hence compound concentrations; the data was provided to Stantec soon after the completion of the sampling event. The upwind, downwind and onsite samples were 24 hour samples and started at approximately 7:00 A.M. June 17, 2013 and ended the following day at approximately 12:00 P.M. Samples of source gas from under the FML were collected over an approximate 2 hour period on June 17-18, 2013. At the completion of each sampling event, the sample media was removed from the high volume samplers and packaged according to laboratory protocol. The duplicate samples were shipped to ALS in Houston, Texas for analysis by EPA Method TO-9a.

As noted, SWAPE provided the calibration data and calibration curves to Stantec. The calibration curves provided by SWAPE/MDNR were fit using a log-linear model. Stantec re-fit the data to a linear equation for the calculation of total air volumes and dioxin concentrations to be consistent with the methodology used for all other high volume samples collected by Stantec for this project.

Consistent with the US EPA guidance, the detected concentrations of the individual dioxins and dibenzofuran isomers were converted to 2, 3, 7, 8-TCDD TEQs. Table 1 presents the total TCDD TEQ calculated for dioxins for ambient air and source gas duplicate samples and the dioxin results for samples collected by Stantec during the second comprehensive sampling study. The TCDD TEQ concentrations were similar regardless of whether the linear or log-linear method was used to fit the calibration curves. Dioxin TEQ concentrations did not exceed the US EPA residential RSL, 6.4E-08, in any sample.

**Table 1: 2,3,7,8 – TCDD TEQ Sampling Summary  
Duplicate Sampling Event for Comprehensive Sampling Event #2  
May 7-8, 2013 & June 18, 2013**

Location	Relative Wind Direction	SWAPE/MDNR Duplicate Sampling 6/17 to 6/18/2013		2 <sup>nd</sup> Comprehensive 5/7 to 5/8/2013
		Log Linear Calibration <sup>1</sup>	Linear Calibration <sup>2</sup>	Linear Calibration
		2,3,7,8 – TCDD Concentration	2,3,7,8 – TCDD Concentration	2,3,7,8 – TCDD Concentration
		µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>
Hussmann	Upwind <sup>3</sup>	2.55E-08	2.82E-08	1.22E-08
MSD/Gas Station	Downwind <sup>4,5</sup>	4.02E-08	2.98E-08	1.69E-08
Amphitheater	Onsite	1.90E-08	1.93E-08	6.31E-09
Amphitheater	FML	2.63E-07	2.32E-07	8.68E-08
Second Tier	FML	3.46E-07	2.80E-07	1.49E-07
Back Side	FML	-- <sup>6</sup>	4.16E-08	1.05E-07

1. SWAPE/MDNR constructed calibration curves for the high volume samplers using a Log/Linear equation to describe the relationship between magnahelic reading and adjusted flow.
2. Stantec re-fit calibration data to linear equations to describe the relationship between magnahelic reading and adjusted flow
3. Upwind sample on 5/7/2013 was collected on upper level of Grassy Knoll
4. Downwind sample on 6/18/2013 was collected at MSD and then moved to the abandoned gas station on St. Charles Rock Road at approx. 8:30 a.m.
5. Downwind sample on 5/7/2013 was collected at the MSD lift station.
6. Log Linear calibration curve predicted negative flow at an average magnahelic reading of 4.5, therefore total adjusted flow and hence concentration could not be determined.
7. **The 2,3,7,8-TCDD concentration in ambient air did not exceed residential RSL 6.40E-08 µg/m<sup>3</sup> or industrial RSL 3.2E-07 in any sample.**