



Bridgeton/West Lake Landfill

Radiological Sampling

(Interim Report)

November 4-5, 2015

Missouri Department of Health and Senior Services



Bureau of Environmental
Epidemiology
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Table of Contents

Section 1	Site History	Page 3
Section 2	Air Sampling and Analysis	Page 4
Section 3	Ambient Gamma Radiation Monitoring	Page 5
Section 4	Equipment	Page 6
Section 5	Radon	Page 7
Section 6	Conclusion	Page 8
Figures 1 - 2	Air Sample Locations	Page 9-10
Photographic Log		Page 11-12

Bridgeton/West Lake Landfills

Section 1: Site History

The site is located a parcel of approximately 200 acres in Bridgeton, Missouri. The site consists of the Bridgeton Sanitary Landfill, which stopped receiving waste on Dec. 31, 2004, and several old inactive areas with municipal solid waste and demolition debris. The site is divided into two Operable Units, or OUs. OU-1 consists of radiological areas and OU-2 consists of the other landfill areas (including Bridgeton Sanitary Landfill), which did not receive any radiologically contaminated soil. In 1990, West Lake Landfill was listed on the National Priorities List making it a Superfund site.

On December 23, 2010, Bridgeton/Republic reported to the Missouri Department of Natural Resources (DNR) that the Bridgeton Sanitary Landfill was experiencing elevated temperatures on some gas extraction wells. The facility began testing landfill gas from the gas extraction system and found elevated hydrogen, carbon monoxide and reduced methane concentrations, which is indicative of a subsurface smoldering event.

By spring 2011, Bridgeton/Republic began implementing a series of corrective actions addressing the increased temperatures. In April 2012, DNR and Bridgeton/Republic began meeting to determine additional corrective actions necessary to address the subsurface smoldering event and associated odors.

On February 2, 2013, staff from the Missouri Department of Health and Senior Services (DHSS) collected air samples for particulate radioactive material at the BLF. Laboratory analysis of the DHSS samples by two different laboratories confirmed that no radioactivity was detected above normal background levels. Additional testing was conducted by DNR on May 16, 2013, and analysis of these samples showed no radioactivity distinguishable from natural background levels. The results of this additional testing are located on the DNR website <http://www.dnr.mo.gov/env/hwp/fedfac/westlakelandfill-ffs.htm>.

During the month of June 2013, additional air sampling was conducted by DHSS due to continued community concerns about radiation, specifically alpha/beta radiation. The results confirmed that alpha/beta activities around the Bridgeton and West Lake Landfills during this time were indistinguishable from natural background levels. The results of this additional testing are located on DHSS website <http://www.health.mo.gov/living/environment/bridgeton/pdf/rasamplingreport.pdf>.

Section 2: Alpha/Beta Radiation Air Sampling and Analysis

Introduction: On November 4th and 5th, 2015, staff from DHSS visited the Bridgeton Sanitary Landfill and West Lake Landfill to collect particulate air samples to be analyzed for alpha/beta activity. These samples were collected daily at locations around the landfills including residential areas. Additional samples were collected in the St. Charles area for a background comparison.

A total of 31 particulate air samples were collected in predominant upwind and downwind directions around the landfill for comparison with 13 air samples that were collected in “background” areas west of the site but in relative proximity of the landfill with a total of 44 samples being collected. See enclosed figures 1 and 2 for location of samples.

Objective: The objective of the DHSS air sampling operation was to determine if the levels of alpha/beta activity around the landfill in upwind and downwind locations were distinguishable from levels in background locations. Additionally, like the sampling event completed in June 2013, this sampling event provided an opportunity for acquiring additional baseline data around the landfills.

Meteorological Conditions: Wind direction was relatively consistent during the two day event with winds mainly coming from a south to south-south east direction during sample collection. Wind direction was obtained prior to sample collection near the site from the DNR meteorological station.

Sample Locations: Locations of air samples were arranged prior to the sampling event and upwind/downwind designations were based on the wind direction obtained from the DNR meteorological station that day. See enclosed figure 1.

Background Sample Locations: Background samples were arranged prior to the sampling event from locations in the St. Charles area. The St. Charles area was chosen due to its close proximity to the landfill site. See enclosed figure 2.

Collection and Analysis of Airborne sample results: Airborne particulates were collected by five DHSS teams using standard operating procedures by drawing air through a glass fiber membrane with an air sampling pump placed approximately 3-5 feet above the ground. (See section 4, Equipment) A total volume of 10,000 liters was drawn through the filter. The filter was placed in a glassine envelope and then placed in a bag. The bag was surveyed for external exposure and contamination using a Ludlum 2241-3 with 44-38 and 44-9 probes. (See section 4, Equipment) Samples collected for the two day event were sent off to the laboratory and particulate material collected on the filter was analyzed for alpha/beta activity.

Analysis of air samples collected around the Bridgeton and West Lake Landfills will be completed by Eberline Analytical/ Oak Ridge Laboratory, Oak Ridge, TN following analytical method LANL MLR-100 Modified. The reports of the analysis are reported as radioactive concentrations in microcurie per milliliter (uCi/mL).

All analysis findings as a result of this air sampling event will be included in a forthcoming final report following review by DHSS staff.

Section 3: Ambient Gamma Radiation Monitoring:

Introduction: Collection of gamma radiation data was performed by DHSS staff with equipment suitable for radiation exposure monitoring (see Section 4: Equipment Description). Typical exposure rate readings in outdoor environments fluctuate around 10 $\mu\text{R/hr}$ as a result of cosmic and terrestrial sources of radiation (National Council on Radiation Protection and Measurements 1987). Construction materials can also have an effect on background radiological readings due to naturally occurring radioactive materials found in them.

Objective: Ambient gamma readings were taken by DHSS staff approximately every 15 minutes at sample locations around the landfills and in background locations. Individual instrument readings over the two day period will be evaluated to ensure constancy from location to location.

Results: Over the two day sampling period, staff collected 168 gamma exposure rate readings at locations where air sampling was conducted, summarized in Table 1 below. From this data, the following conclusions made:

- the average of the individual readings by detector is consistent from site to site
- the average results show a normal range for “natural background” radiation levels (i.e. 0.5 to 11.2) for all detectors

The highest individual reading recorded over the two day period was at location A06 (upwind location) with a measurement of 14.4. This is slightly over the 10 $\mu\text{R/hr}$ that is typically found in outdoor environments and can be accounted for through normal fluctuations of naturally occurring radioactive material and cosmic radiation.

Table 1. Ambient Gamma Exposure Rate Data (micro-roentgen per hour).

Detector 25009985					
Station 2	LPHA	Station 5			
7.7	6.8	7.3			
Detector 25009986					
A01	A03	A05	A06	A09	
9.6	10.3	10.2	11.2	10.7	
Dectector 25003413					
A01	A02	A03	A06	A08	A09
0.9	1.3	0.5	3.0	2.9	1.2
Detector 25007091					
A02	A04	A05	A07	A09	
1.7	3.9	2.1	2.3	0.7	

Section 4: Equipment

- **Air Sampling:**
 - Radeco Model H810 AC High Volume air samplers with holder to accommodate a two-inch particulate filter.
 - Model 0750-37 particulate filters 99% efficient
 - Ludlum Model 2241-3 with 44-38 Energy Compensate GM probe and 44-9 pancake probe.
- **Ambient Gamma Monitoring**
 - Ludlum Model 9DP Ion Chamber

Section 5: Radon

Radon is a naturally occurring radioactive gas that can be an indoor air hazard anywhere in Missouri. It comes from the natural decay of uranium that is found in nearly all soils. Radon is a noble gas, which means it does not burn or react readily with other chemicals. It typically moves up through the ground to the air above, where it dissipates to low levels. The U.S. Environmental Protection Agency (EPA) estimates that naturally occurring background levels for radon are around 0.4 pCi/L. However, a home or other building can trap radon inside where it can build up. Any home may have a radon problem. This means new and old homes, well-sealed and drafty homes, and homes with or without basements.

Although isotopes at the nearby West Lake Landfill do generate radon, ambient air concentrations are expected to dissipate quickly to background levels.

DHSS continues to assess the best method to adequately evaluate outdoor radon levels.

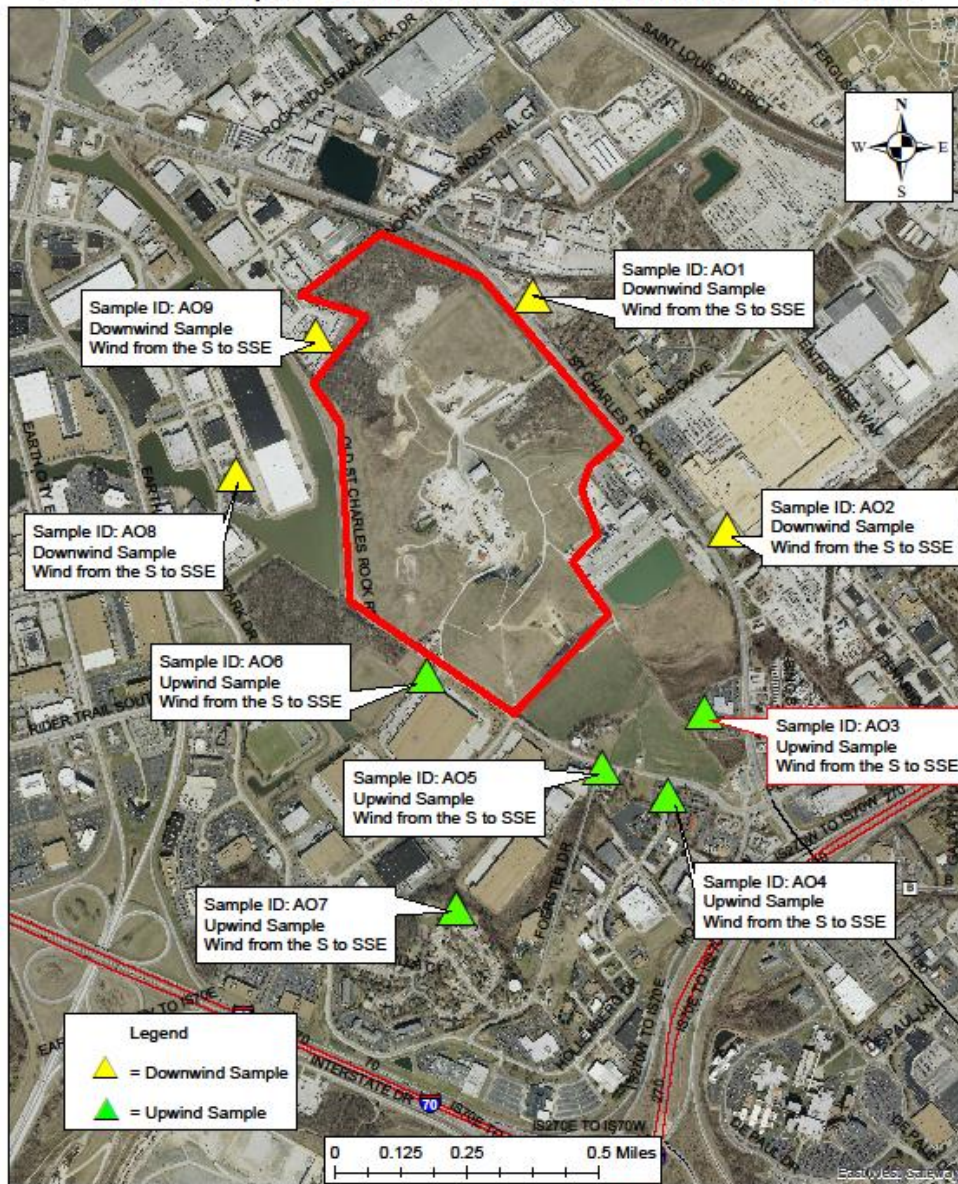
Section 6: Conclusion

This interim report provides an update on airborne radiological survey activities around the Bridgeton/Westlake Landfill by DHSS on November 4 through November 5, 2015. As part of this effort, DHSS and DNR performed radiological surveys and sampling at numerous locations in the vicinity of the Bridgeton/West Lake Landfill. This interim report discusses ambient gamma readings and air samples collected and sent for laboratory analysis. Results from air samples will be included and discussed in the DHSS's final report.

DHSS has communicated all information to the EPA and will share all laboratory data as it is received and evaluated for quality assurance. The final report, when completed, will be posted on the DHSS website. Results from the DNR West Lake Landfill vicinity radiological survey will be presented in a separate report.



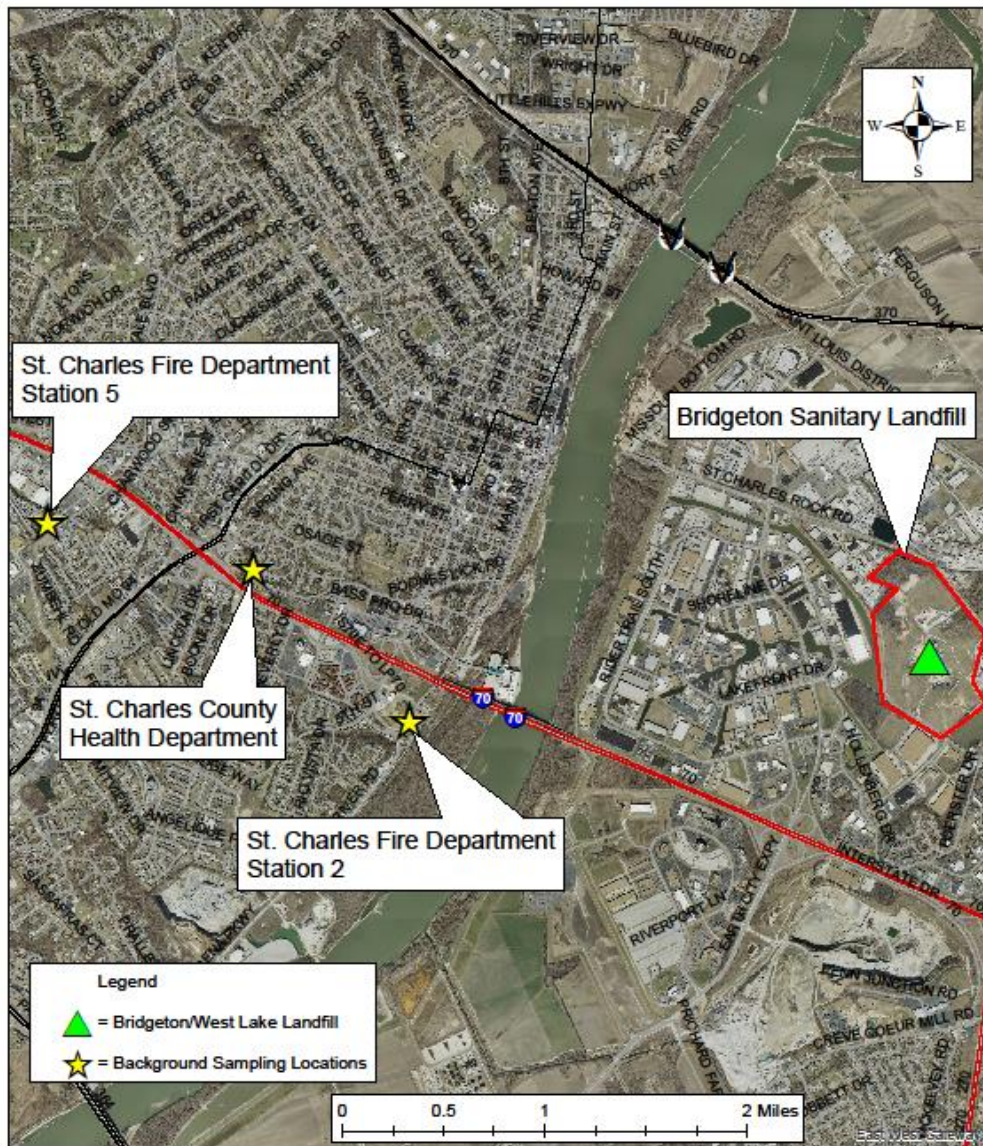
Figure 1
 Bridgeton/West Lake Landfill
 Air Sample Collection Points November 4-5, 2015



AIR_SAMPLING_LOCATION_ID	DESCRIPTION
A01	Lot across road from OU2, 13751 St Charles Rock Rd, typ downwind of OU1 Area 2
A02	Hussmann Lot with DNR trailer.
A03	Former Gas Station by Terrisan mobile home park
A04	Boenker Ln Location Alt A, Boenker Road & Hollenberg Rd SW Corner, Doctors Office
A05	Boenker Ln Location Alt B, Boenker Road & Foerster Dr SE Corner, D&E Automotive Products
A06	Old St Charles Rock Rd, MSD Lift Station & CLM Pallet Recycling
A07	Spanish Village park
A08	13374 Lakefront Dr. This is a vacant property
A09	AAA Trailer Service Lot adjoining OU1 Area 2



Figure 2
 Bridgeton/West Lake Landfill
 Background Sampling Locations
 November 4-5, 2015



AIR_SAMPLING_LOCATION_ID	DESCRIPTION
Station 2	1550 S. Main St., St. Charles Mo
St. Charles County Health Dept	1650 Boone's Lick Rd, St Charles, Mo
Station 5	1650 Hawks Nest, St. Charles, Mo

Photographic Log

Photo 1: Location A05 looking north toward the landfill.



Photo 2: Location A02 looking west toward the landfill.



Photo 3: Location A08 looking east toward the landfill.



Photo 4: Location A09 looking south toward the landfill.

