

# **REPORT OF INSPECTION**

## **FACILITY**

Bridgeton Sanitary Landfill  
13570 St. Charles Rock Road  
Bridgeton, MO 63044  
St. Louis County  
MDNR Permit #118912

## **INTRODUCTION**

On February 11, 2014, an inspection was conducted of the Bridgeton Sanitary Landfill (hereafter Bridgeton Landfill). The inspection was conducted under the authority of Sections 260.210.1(5) and 260.225.1(9) of the Missouri Solid Waste Management Law. Mr. Joe Trunko represented the Missouri Department of Natural Resources, St. Louis Regional Office and Mr. Larry Lehman represented the Missouri Department of Natural Resources, Solid Waste Management Program. Mr. Brian J. Power and Mr. Bryan Sehie represented Bridgeton Landfill. The inspection was conducted in order to determine the facility's compliance with the Missouri Solid Waste Management Law, implementing regulations and with the terms and conditions of Permit #118912.

## **FACILITY DESCRIPTION**

Bridgeton Landfill is currently owned by Bridgeton Landfill, LLC and is a subsidiary of Republic Services, Inc. Bridgeton Landfill was initially permitted on Nov. 18, 1985 and ceased accepting waste on Dec. 31, 2004. The landfill waste mass encompasses approximately 52 acres with approximately 240 feet below the ground's surface and an estimated total waste thickness of 320 feet. The waste is located in two distinct areas known as the North and South Quarries with a narrow area referred to as the "neck" lying between the quarry areas.

On December 23, 2010, Bridgeton Landfill reported the landfill was experiencing elevated temperatures in several gas extraction wells. The facility began testing landfill gas from the gas extraction system and found elevated hydrogen and carbon monoxide and reduced methane concentrations, conditions indicative of a subsurface smoldering event (SSE). The Solid Waste Management Program tasked the facility owner with researching, designing and implementing actions to isolate the area with elevated temperatures in order to prevent expansion of the SSE. By spring 2011, Bridgeton Landfill began implementing a series of corrective actions to address the increased temperatures. Through winter 2011, subsidence levels at the landfill remained within the normally expected range for decomposing waste at depth and gas extraction wells continued to show elevated temperatures. In early spring 2012, subsidence levels began to exceed the normally expected range and an increase in odors was noticed. Odor complaints were also filed by nearby residents and businesses. On July 23, 2012, the Solid Waste Management Program issued Bridgeton Landfill Notice of Violation #30428 for conditions associated with the SSE.

The facility is not "closed." While the work plan for the final cap was approved by the Department on July 1, 2011, and the work plan for the vegetative cap was approved by the Department on December 22, 2011, the final survey plat and Easement, Notice and Covenant Running with Land have been submitted to the SWMP but have not been approved. In 2013, Bridgeton Landfill installed an Ethylene Vinyl Alcohol (EVOH) synthetic cap over the entire South Quarry and is in the process of installing an EVOH cap over the North Quarry. This synthetic cap is not an approved final cover and as the entire fill area was stripped of vegetation and graded prior to placement of the EVOH capping material, there no longer exists a vegetative cap. As the SSE has continued to expand throughout the South Quarry, additional soil and rock have been placed and as a result, it now appears the underlying, compacted clay cap has been affected.

Due to the ongoing SSE and compliance issues at the facility, a First Agreed Order of Preliminary Injunction (Agreed Order) was entered by the St. Louis County Circuit Court on May 13, 2013. The Agreed Order required that numerous corrective actions be taken by Bridgeton Landfill including, but not limited to, development of a leachate pre-treatment system/management plan, an odor management plan, an updated landfill gas corrective action plan, an emergency action plan, a final operations, maintenance & monitoring program and a North Quarry action plan. The Agreed Order also required that Bridgeton Landfill submit weekly and monthly status updates to the Department concerning current site conditions and work progress in regards to the SSE and compliance with the order. Due to the ongoing SSE and actions required by the Agreed Order, significant changes have been made to the landfill infrastructure over the past year.

#### Landfill Cap

As described above, to capture increased emissions generated by the SSE and as part of a gas collection and control system expansion, an EVOH cap was installed on the South Quarry (42 acres) over the summer of 2013. Extension of the EVOH capping material into the North Quarry area began in the fall of 2013. Approximately 4.35 acres were installed at which point work stopped due to winter weather conditions. Construction of the cap in the North Quarry is scheduled to resume in early spring 2014. Photos of the cap on the South Quarry are included in Attachment 1, photos 26 & 27.

#### Leachate Management

Leachate is collected in six main leachate collection sumps (LCS). A site map indicating the location of the sumps is included in Attachment 2. A photo of each LCS is included in Attachment 1, photos 7 – 13. The depth of the liquid within the leachate sumps is checked on a weekly basis and recorded in a field book. A summary of the sump measurements from March 27, 2013 to January 14, 2014 is included in Attachment 2. LCS-K128 is located within the 118903 permitted landfill area (west of the South Quarry). Leachate that collects in LCS-K128 also discharges into the leachate collection system. The depth of the liquid within this sump is checked on a monthly basis and recorded in the facility records (log sheet included in Attachment 2).

Leachate is also collected from several former Reinforced Concrete Pipe (RCP) areas, gas extraction wells (GEW's), horizontal collectors/trenches, perimeter sumps, trench sumps, lateral sumps, and knock out/condensate traps. There are eight frac tanks (Attachment 1, photos 14-17) located around the perimeter of the landfill to collect leachate from sumps and/or wells that contain higher levels of solids due to the effects of the SSE. Currently, Bridgeton is working to install grit chambers as part of the upgrade to the leachate conveyance system. Once these grit chambers are operational, the frac tanks will be decommissioned and removed from the facility property. Two facility vac trucks and a number of contracted vac trucks are utilized to de-water condensation sumps and to clean-up leachate spills.

Untreated leachate is sampled on a weekly basis and analyzed for hazardous waste characteristics. Leachate management/sampling onsite is coordinated by Feezor Engineering, Inc. (Bill Abernathy).

Leachate flows from the landfill via the leachate conveyance system to a buffer tank farm consisting of 24 frac tanks located west of the "amphitheater" area of the landfill (Attachment 1, photos 19). Each tank has a capacity of 21,000 gallons, resulting in a total storage capacity of 480,000 gallons. There are also 16 additional frac tanks onsite (Attachment 1, photo 18) to provide additional emergency storage capacity.

From the storage tanks, leachate is pumped to a 316,000 gallon tank (Attachment 1, photo 20) where it is pre-treated (agitation and aeration). Treatment occurs at night on a batch basis. Each batch is approximately 240,000 gallons. Emissions from the 316,000 gallon tank are destructed in the thermal oxidizer unit. Leachate can also be pre-treated in four tank batteries (TB1 – TB4), each consisting of four frac tanks (Attachment 1, photo 21 & 22). These tanks are equipped with carbon canisters to control or limit emissions. As observed during on-site visits and the inspection, odors originate in this frac tank area of the landfill property.

Once treated, the leachate is either discharged directly to the Metropolitan Sewer District (MSD)-Missouri River Plant or loaded directly from the 316,000 gallon tank (Attachment 1, photo 20) into tanker trucks and hauled to the MSD-Bissell Point Plant in St. Louis, the American Bottoms Regional Treatment Facility in East St. Louis, IL or the Heritage Covanta facility in Indianapolis, IN. If additional storage capacity for treated leachate is needed on-site, there are six additional frac tanks available for this purpose (Attachment 1, photo 24). When leachate is being directly discharged to the MSD-Missouri River Plant, the treated leachate is first pumped to a 96,000 gallon tank located at the southwest corner of the site (Attachment 1, photos 17 & 23). A maximum of 20,000 gallons/day at a rate of 1,500 gallons/hour can be discharged. Direct discharge is not allowed during certain times of the year due to disinfection requirements at the plant. Leachate can also be loaded into trucks directly from the tank batteries (Attachment 1, photo 22).

Mr. Bult's, Inc. (MBI), a hauling company, is utilized to transport the leachate to the treatment facilities. A leachate transport log for January 29, 2014 to January 31, 2014 is included (Attachment 3). A maximum of 200,000 gallons/day is allowed for disposal at the MSD-Bissell Point Plant and a maximum of 30,000 gallons/day is allowed for disposal at the American

Bottoms Regional Treatment Facility. On average, 1.2 million gallons of leachate is disposed of per week (240,000 gallons per day).

Each treated leachate batch is sampled in an on-site mobile lab operated by New Age Landmark to ensure compliance with the discharge limits established by the wastewater treatment plants utilized for disposal (analytical report included in Attachment 11). A sample is also collected of each batch and sent for analysis at Pace Analytical Services in Lenexa, Kansas for confirmation and expanded analysis (analytical report included in Attachment 10). The benzene concentration must be below 140 ug/l for disposal at the MSD plants. The benzene concentration must be below 130 ug/l and the methyl ethyl ketone concentration must be below 100,000 ug/l for disposal at the American Bottoms plant.

A new leachate pre-treatment system is currently under construction. The system includes four 1-million gallon tanks and a pre-treatment plant (Attachment 1, photos 18 & 19). Before the 1-million gallon tanks and pre-treatment plant can become operational, Bridgeton Landfill must submit a comprehensive Leachate Management Plan, an Operating, Maintenance & Monitoring Plan and a detailed piping plan. Until the pre-treatment plant is completed (anticipated in May or June 2014), the interim leachate management plan will involve treatment of leachate in one of the 1-million gallon tanks (anticipated at the end of March 2014). Shortly after the interim leachate management plan becomes effective, the frac tanks currently on-site will be decommissioned and removed.

#### Gas Collection

Landfill gas is collected in numerous gas extraction wells, perimeter extraction wells and horizontal trenches located within the North and South Quarries. In early 2013, several gas interceptor wells were installed between the North and South Quarries in the "neck" area as a means to contain the SSE in the South Quarry. There are currently approximately 200 extraction wells on the landfill. Gas is burned in a total of four candlestick flares. Three candlestick flares are located northeast of the South Quarry (Attachment 1, photo 25) and the fourth candlestick flare is located on the southeast side of the South Quarry (Attachment 1, photo 14).

Approximately 7,000 scfm of gas is currently burned in the flares. In 2013, installation of new and/or replacement extraction wells in the North Quarry began. As per the Landfill Corrective Action Plan Update submitted to the Department on January 15, 2014, twenty-one of thirty wells have been completed. Well installation was postponed over the winter and is scheduled to resume late in the first quarter of 2014.

Methane gas is monitored in a series of gas monitoring probes located on the south, east and north sides of the landfill. A site map indicating the monitoring probe locations is included in Attachment 4. The probes are sampled on a weekly or quarterly basis depending on compliance status. Monitoring results for the period November 7, 2013 to December 27, 2013 are included in Attachment 4. Section 23 of the Agreed Order required that an updated Landfill Gas Corrective Action Plan (LGCAP) be submitted. An updated plan was submitted on July 26, 2013. On October 18, 2013, the SWMP approved the submittal of quarterly updates to the LGCAP. The most recent LGCAP update was submitted on January 15, 2014.

## Storm Water

Missouri State Operating Permit MO-0112771 was issued to Bridgeton Landfill on April 23, 2011, with an expiration date of April 21, 2016. Storm water is monitored at five outfalls (003 – 007). A site map indicating the outfall locations is included in Attachment 7. Photos of outfalls 003, 005 and 007 are included in Attachment 1, photos 28 – 30. Storm water that discharges off the southeast side of the South Quarry collects in a lined basin located at the southeast corner of the landfill. If the water has not been contaminated with leachate, it is manually pumped to a second lined basin and discharges at outfall 005. Storm water from the west side of the South Quarry and the leachate treatment area discharges at outfall 003. During construction of the EVOH cap in summer 2013, the former leachate pond located southwest of the landfill was converted to a storm water detention basin. Storm water discharging at outfall 003 now flows into the basin in a lined channel (Attachment 1, photo 34). Knife-gates were installed at the influent to the basin to prevent leachate spills from entering the basin should they occur. The discharge from the basin is located at the southwest corner of the basin. Storm water from the northeast side of the South Quarry and the borrow area flows to a detention basin and discharges at outfall 004. Storm water from the east side of the North Quarry flows to a small detention basin and discharges at outfall 006. Storm water from the west side of the North Quarry flows to outfall 007, which is located near the landfill entrance.

## Miscellaneous

In an effort to monitor current conditions in the South Quarry and effects of the SSE on the landfills infrastructure, quadrant checks are conducted on a daily basis by Bridgeton Landfill staff. A site map with the quadrants designated is included in Attachment 8. Gas and leachate collection system components are inspected for conditions that could result in increased odors or discharges. These include malfunctioning pumps, broken piping, torn or loose seals and leachate spills. The general condition of the EVOH liner and areas of subsidence are also checked. The results of the quadrant checks are recorded in a log book (a separate book is maintained for each quadrant). Examples of the log sheets that are maintained are included in Attachment 8.

## AREAS OF NON-COMPLIANCE

1. Section 260.210.1.(4) of the Revised Statutes of Missouri (RSMo) prohibits the storage or disposal of solid waste in a manner that creates a public nuisance or adversely affects public health. Since at least December 2010, an SSE has been occurring in the South Quarry of the landfill. This event has created odors, which are migrating offsite and have resulted in numerous odor complaints received by the Department. Further, offsite monitoring conducted by the Department or its' contractor have documented odors at several established offsite monitoring locations on a routine basis. A summary of daily monitoring readings exceeding a 7:1 dilution taken with a Nasal Ranger Field Olfactometer from May 6, 2013 to January 18, 2014 is included as Attachment 5. Odors continue in both frequency and intensity.

2. 10 CSR 80-3.010(19)(A) requires that sanitary landfills be operated in a manner which protects the health and safety of personnel and others associated with and affected by its operation. Due to the SSE, several hazards exist on an on-going or periodic basis at the site including, but not limited to, elevated carbon monoxide and benzene levels, elevated hydrogen levels, heat, leachate spills, and the potential for collapses at or near SSE impacted areas.
3. 10 CSR 80-2.020(1)(F) requires that the operation of solid waste disposal areas comply with the terms and conditions set forth in the permit to prevent or minimize potential health hazards or conditions that could create a public nuisance or environmental pollution. Permit #118912 does not allow for solid waste to be burned. The event has created conditions that have and continue to damage the environmental control infrastructure at the landfill, including the leachate collection system and gas control system allowing for uncontrolled emissions, including odor, from the facility extending beyond the permitted boundary of the facility into the surrounding communities.
4. 10 CSR 80-3.010(13)(C) prohibits the burning of solid waste at a sanitary landfill, except in accordance with Chapter 643 RSMo, its corresponding rules, the terms, conditions or both, of the plans, permit or both, and all local requirements. Further, Section 260.210.1.(3) prohibits solid waste burning operations in violation of the rules and regulations of the Missouri Air Conservation Commission or the Department. Significant settlement has occurred in the South Quarry due to the SSE. The amount and duration of the settlement indicates that a significant amount of waste has been and continues to be consumed by the SSE.
5. 10 CSR 80-3.010(14)(C)2 prohibits methane from exceeding 2.5 percent by volume in the soil at the property boundary. Further, 10 CSR 80-3.010(14)(C)1 prohibits decomposition gases from migrating laterally from the landfill. Monitoring results submitted to the Department continue to identify exceedences of this requirement at the property boundary, which has been allowed to continue in the following gas monitoring probes: GMP-01, GMP-02, GMP-03, GMP-4S, GMP-5S, GMP-14S, GMP-14D, GMP-1S, GMP-2S, GMP-2M, GMP-2D, GMP-3S, GMP-3M, GMP-3D. A site map showing the location of these probes is included in Attachment 4. A summary of the monitoring data for the period November 7, 2013 to December 27, 2013 is also included in Attachment 4.
6. 10 CSR 80-3.010(5)(C)1 requires that the landfill be constructed and operated in accordance with the approved plans and specifications. Further, 10 CSR 80-3.010(9)(C)1 requires that the leachate collection system be properly installed, operated and maintained per the permit and approved plans. Specifically, such operation of a leachate collection system is to minimize spills, breaks and releases minimizing pollution of surface waters and soil. In addition, 10 CSR 80-3.010(9)(C)2 requires that leachate not be allowed to discharge off-site. Leachate spills and breaks in lines occurred on at least three occasions since February 2013 (2/2/13, 12/12/13 and 2/9/14) that allowed leachate to leave the permitted property's boundary.

Condition 6D of Permit #118912 requires that leachate levels in the leachate collection sumps located in the South Quarry not exceed 30 feet from the landfill's bottom and not exceed 50 feet from the landfill's bottom in the North Quarry. Liquid levels in LCS-1D, LCS-3C and LCS-4B have not been monitored due to excess pressure in the sumps and at multiple points over the past year these sumps have been reported as inoperable. As a result of these operational issues, the facility has been unable to demonstrate compliance. Presently, LCS-4B is not equipped with a pump. However, excess pressure at this location continues to eject liquid from LCS-4B. In February 2014, progressive cavity pumps were installed in LCS-1D and LCS-3C. A summary of the LCS liquid level measurements for the period March 27, 2013 to January 24, 2014 is included in Attachment 2.

### **REQUIRED CORRECTIVE ACTIONS**

Bridgeton Landfill, LLC must continue to implement the required actions specified in the Agreed Order dated May 13, 2013. Further, Bridgeton Landfill LLC must continue to assess and address odor sources and implement corrective actions.

### **AREAS OF CONCERN**

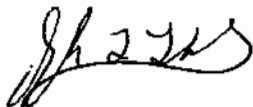
1. Six areas of increased subsidence were observed. A site map indicating the location of these areas is included in Attachment 6 and photos of the areas are included in Attachment 1, photos 1 – 6. Gas and leachate being released from these areas continues to result in increased odors. Bridgeton Landfill must develop and submit a plan to the Department that explains how these areas will be remediated.
2. On February 9, 2014, a leachate release occurred at outfall 003 due to a failed seal on a GEW pump and a malfunctioning leachate extraction pump. The leachate did flow into the lined ditch up-gradient of the storm water sedimentation basin. The gates into the pond were closed to prevent the leachate from entering the basin. Photos of the area where the leachate release occurred are included in Attachment 1, photos 31-34. A similar release occurred on December 12, 2013, due to a leachate pump freezing. Approximately 30,000-40,000 gallons of leachate discharged at outfall 003 and flowed into the sedimentation basin. Bridgeton Landfill, LLC submitted a closure report to the SWMP on February 28, 2014, describing the December 12, 2013 event. Bridgeton Landfill, LLC must submit an incident report to the SWMP for the February 9, 2014 event that summarizes the cause of the release and the actions taken to remediate the issue.
3. On February 16, 2014, a surface fire occurred on the south side of the South Quarry due to a broken pressurized airline. A small area of the EVOH liner was damaged. During the week of February 24, 2014, repair of the liner and other infrastructure damaged as a result of the fire was conducted. On March 7, 2014, Bridgeton Landfill, LLC submitted an incident report to the SWMP that summarized the cause of the fire and the actions taken to remediate the issue. No further action concerning this issue is required by Bridgeton Landfill, LLC at this time.

4. On January 29, 2014, Bridgeton Landfill, LLC was issued a Letter of Warning (LOW) for Clean Water Act violations related to the December 12, 2013 leachate release. The LOW required that a modification to MSOP MO-0112771 be submitted to reflect changes in operations at the landfill. Specifically, the modification request must address relocation of outfall 003. In addition, due to several recent releases of leachate from the South Quarry, the modification must request that MSOP MO-0112771 include effluent limitations provided in the Effluent Limitation Guidelines (40 CFR 445.21). Further, a review of the Discharge Monitoring Reports submitted to the Department indicate exceedences of the effluent limitations specified in MSOP MO-0112771 at outfalls 003 and 007 during all four quarters in 2013. Bridgeton Landfill, LLC must continue to work with the Department's Water Protection Program concerning these issues.
5. The untreated commingled leachate is sampled once per week for hazardous waste characteristics (TCLP). Sample results have indicated that the leachate can be hazardous for benzene (exceeds 0.5 mg/l TCLP) on occasion. An analysis report for a sample collected on January 17, 2014 is included in Attachment 9. Bridgeton Landfill, LLC must continue to work with the Department's Hazardous Waste Program concerning this issue and the applicability of the Missouri Hazardous Waste Management Law and Rules.

#### **ADDITIONAL COMMENT**

As per 10 CSR 80-3.010(20)(C)1, all records must be maintained at the landfill office. Records five years old or older may be stored at an alternate site if approved by the Department. These records include, but are not limited to, monitoring data, sample analysis data, leachate disposal documentation, quadrant check log books and field books, major operational problems, complaints received and odor control efforts. Bridgeton Landfill, LLC must continue to ensure that these records are maintained onsite and made available to the Department upon request.

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