

IN THE CIRCUIT COURT OF ST. LOUIS COUNTY
STATE OF MISSOURI

FILED

MAY 13 2013

JOAN M. GILMER
CIRCUIT CLERK, ST. LOUIS COUNTY

STATE OF MISSOURI ex rel.,)
Attorney General Chris Koster and)
the Missouri Department of Natural)
Resources,)

Plaintiff,)

Case No. 13SL-CC01088

REPUBLIC SERVICES, INC.,)

ALLIED SERVICES, LLC, d/b/a)
Republic Services of Bridgeton, and)

BRIDGETON LANDFILL, LLC)

Defendants.)

First Agreed Order of Preliminary Injunction

Plaintiff State of Missouri, at the relation of Attorney General Chris Koster and the Missouri Department of Natural Resources and Defendant Bridgeton Landfill, LLC (“Bridgeton Landfill”), have agreed to the entry of this Agreed Order of Preliminary Injunction (“Agreed Order”). The Court has read the State of Missouri’s Petition. The State and Bridgeton Landfill stipulate and agree to this Agreed Order based on the following Stipulated Facts and Conclusions of Law. The parties understand that this Agreed Order imposes preliminary, emergency, and remedial actions necessary to prevent violations of Missouri environmental laws and does not resolve the claims set forth in the Petition.

Stipulated Facts

1. The State of Missouri filed a Petition for Public Nuisance, Injunctive Relief, Civil Penalties, Cost Reimbursement, and Natural Resource Damages on March 27, 2013.

2. This Court has jurisdiction over the subject matter of this Agreed Order and over the State and Bridgeton Landfill. The subject matter of this litigation involves allegations of violations of the Missouri Solid Waste Management Law, Hazardous Waste Management Law, Clean Water Law, and Air Conservation Law, along with claims for public nuisance, Costs and natural resource damages at the Bridgeton Sanitary Landfill, which is owned and operated by Bridgeton Landfill and located at 13570 St. Charles Rock Road in Bridgeton, St. Louis County, Missouri, as more fully set out in the State's Petition.

3. The Court finds that the State and Bridgeton Landfill have stipulated that facts supporting issuance of this Agreed Order presently exist. If Bridgeton Landfill does not take actions required by this Agreed Order, then violations of environmental laws identified in the Petition are imminent.

4. The parties reserve their rights to all claims and defenses that arise out of the State's Petition for further litigation.

Conclusions and Orders

It is hereby ORDERED, ADJUDGED, AND DECREED:

I. Satisfaction and Reservation of Rights

5. This Agreed Order shall not be construed to limit any rights of the State to obtain natural resource damages, civil penalties, or further injunctive relief under the Missouri environmental laws, regulations, and common law claims as alleged in the Petition. Without limiting the foregoing, the parties expressly agree that:

A. Nothing in this Agreed Order shall prevent the State from applying to the Court for further orders or relief if violations of this Agreed Order occur.

B. Nothing in this Agreed Order shall preclude the State from seeking equitable or legal relief for violations of the Missouri laws or regulations that were not alleged in the Petition.

C. Nothing in this Agreed Order shall preclude the State from seeking equitable or legal relief for future violations of Missouri environmental laws or regulations promulgated under their authority.

D. The State further reserves all legal and equitable remedies to address any imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, the Site, whether by acts or omissions and whether related to the violations addressed in this Agreed Order or otherwise.

E. The State reserves any right to bring an action against Bridgeton Landfill under any applicable law for recovery of all future response costs, including Oversight Costs that have not been reimbursed by Bridgeton Landfill.

II. Mutual Objectives of the Parties

6. The mutual objectives of the parties to this Agreed Order are to protect human health and the environment and to ensure emergency remedial and corrective action as well as cost reimbursement for identified actions in this Agreed Order.

III. Definitions

7. Terms used in this Agreed Order shall have the same meaning as provided in the Missouri Solid Waste Management Law, Hazardous Waste Management Law, Clean Water Law, Air Conservation Law, and their implementing regulations. In addition, the following terms are specifically defined:

A. “Agreed Order” means this Agreed Order and all attachments, which are included by reference and fully enforceable as a term of the Agreed Order.

B. “Bridgeton Landfill” means Bridgeton Landfill, LLC.

C. “Department” means the Missouri Department of Natural Resources.

D. “Oversight Costs” or “Costs” means reasonable and necessary direct and indirect costs associated with time; and travel, personal protective equipment, and associated lodging expenses incurred by Department personnel or the Missouri Department of Health and Senior Services; contractor costs to collect, transport, and analyze samples; oversight and performance evaluation of work required by this Agreed Order; discussions regarding Dispute Resolution that may arise as a result of this Agreed Order; and review of plans, reports, and other documents submitted pursuant to this Agreed Order after February 1, 2013.

E. “Plaintiff” and “State” mean the State of Missouri on the

relationship of Attorney General Chris Koster and the Department.

F. “North Quarry” means the northern 17.4 acres of the Site. A map of the Site is attached as Exhibit A.

G. “St. Louis County” means the St. Louis County Department of Health.

H. “Site” means the Bridgeton Sanitary Landfill, Solid Waste Disposal Area Permit #0118912, which is owned and operated by Bridgeton Landfill and located at 13570 St. Charles Rock Road in Bridgeton, St. Louis County, Missouri.

I. “Subsurface Smoldering Event” or “SSE” means the underground heat-generating reaction that began in December 2010 and continues to exist at the Site.

J. “South Quarry” means the southern 34.6 acres of the Site, including the “neck area.” See Exhibit A.

IV. Jurisdiction and Venue

8. This Court has jurisdiction over the subject matter of this Agreed Order and the State and Bridgeton Landfill in this case pursuant to §§ 27.060 and 526.010 RSMo. Venue is proper in this court pursuant to § 508.010.5 RSMo because Bridgeton Landfill’s conduct giving rise to this action took place in St. Louis County.

V. Parties Bound

9. The provisions of this Agreed Order shall be binding upon the State and Bridgeton Landfill as well as their agents, servants, employees, successors and assigns. In all future contracts to perform work under this Agreed Order, Bridgeton Landfill shall

provide a copy of, and mandate compliance with, this Agreed Order.

VI. Injunctive Relief

State Oversight

10. **Cooperation:** Bridgeton Landfill shall cooperate with the Department by obtaining Department approval before taking steps necessary to control the effects of the Subsurface Smoldering Event at the Site and minimize emissions/odors from the Subsurface Smoldering Event. This Section shall not preclude Bridgeton Landfill from responding to Site conditions or emergency situations as necessary. Bridgeton Landfill shall collect data to assess and monitor the depth, extent, and progression of the Subsurface Smoldering Event and continue to respond proactively. A primary goal of all remedial and corrective actions is control of the effects of the Subsurface Smoldering Event while minimizing health, safety, and environmental impacts. If conditions at the Site worsen or intensify such that a rapid response is needed to protect the public health or prevent environmental pollution, Bridgeton Landfill will quickly mobilize and respond to that situation to control the effects of the Subsurface Smoldering Event and to minimize public health risks.

11. Bridgeton Landfill shall respond to and adequately address to the Department's satisfaction all of the Department's comments, as well as comments by the Department's agents or consultants on Bridgeton Landfill's proposed work, reports, and plans required under this Agreed Order. This will be accomplished by submitting to the Department revisions to the plans incorporating the Department's comments within twenty days of Bridgeton Landfill's receipt of the Department's comments, unless an

alternate deadline is appropriate and agreed upon by the parties.

12. **Additional Work**: The Department retains all rights to require additional work, including emergency response, remedial and corrective action, or work necessary to ensure compliance with the Missouri environmental laws. This Agreed Order should not be interpreted to limit the rights of the parties to respond to environmental and public health concerns or community concerns or requests.

13. **Worker Safety**: Bridgeton Landfill shall implement appropriate and lawful health and safety plans to address employee safety, and shall continue to require that contractors develop and implement appropriate and lawful health and safety plans to address the safety of contractors working on the Site. These plans shall address appropriate personal protection, preventative, and emergency response equipment.

14. **Status Reports**: Beginning on June 3, 2013, and on the first business day of each month thereafter, Bridgeton Landfill shall file a status report in St. Louis County Circuit Court under the above-captioned case regarding, at a minimum, Bridgeton Landfill's work at the Site, compliance with this Agreed Order, and planned activities for the next thirty days.

Missouri Solid Waste Management Law

15. **Approved Work Plans**: Bridgeton Landfill shall comply with and continue to implement the following work plans and submittals, including the schedules of compliance contained therein, which have been approved by the Department:

A. "RCP Abandonment Plan: Bridgeton Landfill," submitted to the Department on March 14, 2013, and approved March 22, 2013. Bridgeton

Landfill will commence work under the RCP Abandonment Plan on May 20, 2013, or as soon thereafter as possible. In addition, Bridgeton Landfill shall not commence work required under the RCP Abandonment Plan until the Alert Protocol and Lodging Program, referenced in Section 18 and 41 are implemented.

B. “2013 Gas Interceptor Well System - Expanded Design,” received by the Department on February 7, 2013, approved February 8, 2013, and already implemented by Bridgeton Landfill. Bridgeton Landfill is not precluded from using the interceptor wells as a portion of the gas extraction system.

C. “Bridgeton Landfill - Gas Interceptor Well Design,” received by the Department on January 10, 2013, approved January 11, 2013, and already implemented by Bridgeton Landfill.

D. “Temperature Monitoring Probe Installation Plan, Bridgeton Landfill,” received by the Department on September 17, 2012, approved September 27, 2012, and already implemented by Bridgeton Landfill.

E. “Subsurface Smoldering Event, Gas System Expansion, Gas Migration, and Odor Control,” received by the Department June 21, 2012, approved October 3, 2012, and already implemented by Bridgeton Landfill.

F. “Final Incident Management Plan,” submitted by Bridgeton Landfill in March 2013, and already implemented by Bridgeton Landfill.

G. “Ethylene Vinyl Alcohol (EVOH) Capping Plan for South Quarry,” submitted to the Department the week of March 25, 2013. Bridgeton Landfill shall provide the Department twenty-four hours’ notice prior to commencing the

work required under this plan.

H. “Landfill Gas Corrective Action Plan,” submitted to the Department on November 27, 2012.

16. **Pending Work Plans:** Bridgeton Landfill has submitted the following work plans, which are currently under review by the Department. Bridgeton Landfill shall not undertake any of the work proposed in the following work plans until approved by the Department:

A. “Bridgeton Landfill Liquid Tank and Container Management Plan,” including the “Bridgeton Landfill Liquid Sampling Plan,” submitted to the Department in March 2013 and currently under review by the Department’s Hazardous Waste Program as of the date of approval of this Agreed Order.

B. “300,000 gallon Leachate Tank Operations and Hook up to Current System,” a draft plan has been provided to the Department and detailed plans are to be submitted to the Department in May 2013.

C. “Bridgeton Landfill Leachate Tank and Transport Disposal Plan,” submitted to the Department on March 7, 2013, approved for compliance with the Missouri Solid Waste Management Law and regulations on March 20, 2013, and awaiting approval by the Department’s Hazardous Waste Program, as of the date of the signing of this Agreed Order.

17. **Future Work Plans:** Bridgeton Landfill shall submit the following additional work plans to the Department by the dates identified in Exhibit B. All work plans shall be reviewed and signed by a professional engineer licensed in the State of

Missouri, or other qualified professionals, as noted below in Exhibit B. Bridgeton Landfill shall not undertake any of the work proposed in the following work plans or any other future work plans until approved by the Department:

A. “North Quarry Contingency Plan,” to be submitted to the Department in two parts in accordance with the timing set forth in Section 22.

This plan shall, at a minimum, address those items referenced in Section 22.

B. “Emergency Action Plan,” to be prepared by Pattonville and Robertson Fire Departments. This plan will be submitted to the Department by Bridgeton Landfill when received by Bridgeton Landfill.

C. “Final Operation Maintenance and Monitoring Program Manual” to be submitted within forty-five days of completion of the work under the “Ethylene Vinyl Alcohol (EVOH) Capping Plan for South Quarry.”

D. “Leachate Pre-Treatment System Plan” to be submitted by September 1, 2013.

18. **Alert Protocol**: The State has devised and will utilize the Alert Protocol developed by the Missouri Department of Health and Senior Services and the Missouri Department of Natural Resources and incorporated in this Agreed Order as Exhibit C. If the State determines that conditions warrant such action, the State shall issue a “Stop Work” order as set forth in Section 19. For the purposes of determining whether an alert should be issued under the Alert Protocol, the State shall use air quality monitoring data gathered on- and off-site on a daily basis by the State or its contractors.

19. **Stop Work Authority:** Bridgeton Landfill shall stop work required under this Agreed Order upon direction of the State whenever the State determines that an “orange” alert level is necessary under the Alert Protocol or conditions warrant cessation of work. Work may re-commence as authorized by the State.

20. **Temperature Monitoring:** Bridgeton Landfill shall monitor temperature probes in order to track the movement of the Subsurface Smoldering Event toward the “neck” area between the North and South Quarries. Bridgeton Landfill shall analyze temperature data to determine the impact that the operation of the Gas Interceptor Well Plan has on the heat and gases generated by the Subsurface Smoldering Event. The Department may require the installation of additional Temperature Monitoring Probes, or alternative monitoring equipment, along with expanded settlement monitoring, as reasonable and necessary to monitor the Subsurface Smoldering Event.

21. **South Quarry Control:** As of April 8, 2013, Bridgeton Landfill began operation of the interceptor wells to create a low pressure area vacuum curtain or “wall” that allows the landfill gasses and the heat associated with the Subsurface Smoldering Event to be destructed through the Site’s gas collection and control system. In order to control the effects of the Subsurface Smoldering Event, Bridgeton Landfill shall continue operating the interceptor wells until discontinuing operation is approved by the Department.

22. **North Quarry Contingency Plan:** Bridgeton Landfill shall submit to the Department for review and approval the “North Quarry Contingency Plan” in two parts in accordance with the schedule set forth below. Upon approval, Bridgeton Landfill shall

implement these plans according to certain triggers. The North Quarry Contingency Plan shall include, at a minimum:

- A. Within forty-five days of entry of this Agreed Order, Bridgeton Landfill shall submit Part 1 which shall include:
 - i. Establishment of trigger criteria for installation of additional Temperature Monitoring Probes in the North Quarry, along with a plan and schedule for such installation, if triggered;
 - ii. Establishment of trigger criteria for installing interceptor wells within the North Quarry to control further migration of the Subsurface Smoldering Event, along with a schedule for such well installation, if triggered; and
 - iii. Establishment of trigger criteria for capping the North Quarry with an EVOH geomembrane cap, along with a schedule for such capping, if triggered.

- B. Within seventy-five days of entry of this Agreed Order, Bridgeton Landfill shall submit Part 2 which shall include:
 - i. Construction plans for the installation of additional interceptor wells in the North Quarry, if triggered;
 - ii. Construction plans for installation of an EVOH geomembrane cap over the North Quarry, if triggered;
 - iii. Establishment of trigger criteria for an isolation break between the North Quarry and radiological materials contained in West

Lake Landfill Site OU-1 Area 1, along with a plan and schedule for such break, if triggered.

23. **Landfill Gas Control:** To the extent required by the Missouri Solid Waste Management Law, Bridgeton Landfill shall control landfill gas generated at the Site to prevent migration off-site from the subsurface. Bridgeton Landfill shall continue to implement the November 27, 2012; Landfill Gas Corrective Action Plan, and shall submit an updated Landfill Gas Corrective Action Plan that considers Subsurface Smoldering Event control measures within seventy five days of entry of this Agreed Order.

24. **Natural Gas Line:** In December 2012 Bridgeton Landfill began discussions with Laclede Gas for the installation and operation of a natural gas line for supplementation to gas extraction flares. Bridgeton Landfill shall continue to work diligently with the utility to implement this project. Bridgeton Landfill shall submit a written report detailing its progress to the Department every sixty days.

25. **Financial Assurance Instruments:** Bridgeton Landfill shall continue to comply with the Financial Assurance requirements of the Missouri Solid Waste Management Law, including such requirements applicable to Corrective Action. The Department has requested Bridgeton Landfill to update the current Corrective Action Financial Assurance instrument. Within the time frame set forth by that letter, Bridgeton Landfill shall submit to the Department reasonable estimates for the amount necessary to fund corrective action financial assurance instruments for the following corrective actions, consistent with the requirements of the Missouri Solid Waste Management Law

and to the extent such actions are not already sufficiently covered in existing Closure and Post-Closure Financial Assurance instruments:

- A. Leachate pumping, treatment, and storage;
- B. Operate, maintain or repair the infrastructure and environmental control systems for the Site;
- C. Landfill gas collection, extraction, and destruction, including control of gas migration.

26. Within thirty days of Department approval of each estimate referenced in the preceding paragraph, Bridgeton Landfill shall update the corrective action financial assurance instrument to reflect the approved estimate, as required by the Missouri Solid Waste Management Law.

Missouri Air Conservation Law

27. **Odor Control**: Bridgeton Landfill shall abate odors to the extent required by the Missouri Air Conservation Law and Missouri Solid Waste Management Law, at a minimum, through use of Department-approved odor control technology to be identified by Bridgeton Landfill. To ensure compliance with this Section, Bridgeton Landfill shall account for odor management within those plans identified in Section 15, and, within thirty days of entry of this Agreed Order shall submit a compilation of odor control plans for the remaining work. Bridgeton Landfill shall submit an odor control plan that includes the use of acceptable control technology as part of the “Final Operations, Maintenance and Monitoring Program.” Upon Department and St. Louis County approval, Bridgeton Landfill shall implement the odor control plan. Should the approved

methods fail to eliminate odor violations or fail to abate the odor nuisance, new methods must be implemented until proven effective.

28. **Air Monitoring**: The parties agree that the Department will conduct certain air monitoring with consultation from consultants retained for that purpose, and the Department shall obtain reimbursement from Bridgeton Landfill for Oversight Costs pursuant to Section 45 of this Agreed Order. The Department retains the right to request Bridgeton Landfill to conduct air monitoring in addition to the Department's ongoing air monitoring if the Department deems it necessary. Bridgeton Landfill shall pay for the costs of air monitoring equipment, data collection, and analysis and shall post the final report including the results, within three business days of report completion, on their website.

Missouri Clean Water Law

29. **Leachate**: Bridgeton Landfill shall continue to work with the Department to ensure that the "Bridgeton Landfill Liquid Tank and Container Management Plan" complies with the Missouri Clean Water, Hazardous Waste Management, and Solid Waste Management Laws. The "Bridgeton Landfill Liquid Tank and Container Management Plan" must, at a minimum, include an emergency plan for unexpected discharges of leachate from the leachate collection system; ongoing operation, maintenance, and inspection of leachate collection lines and equipment; and reporting of leachate outbreaks which are not collected and controlled within the Site, to the Department on a weekly basis. Agreed leachate management procedures shall be included or referenced in the "Final Operations, Maintenance and Management Plan."

30. The State agrees to make reasonable efforts to continue to work with Bridgeton Landfill and third parties to the extent of their ability and authority to assist in facilitation of off-site leachate treatment and disposal, so long as Bridgeton Landfill complies with the terms of this Agreed Order.

31. Bridgeton Landfill shall immediately fix any significant cracks, leaks, or weaknesses discovered within the leachate collection system.

32. Bridgeton Landfill shall continue the performance of groundwater monitoring, including preparation of the groundwater assessment and investigation plan, commonly referred to as the “Assessment Monitoring Plan” and completion of “Assessment Monitoring” in compliance with the requirements and schedule set forth by the Solid Waste Management Law and the requirements of Permit No. 0118912. Bridgeton Landfill agrees to conduct off-site groundwater monitoring and assessment if and to the extent required by the Missouri Solid Waste Management Law.

Missouri Hazardous Waste Management Law

33. **Characterization:** Consistent with the processes set forth in the “Bridgeton Landfill Liquid Tank and Container Management Plan,” and “Bridgeton Landfill Liquid Sampling Plan,” Bridgeton Landfill shall perform compliant characterization of landfill liquids and associated waste, both prior to and following treatment if applicable, to form a sufficient basis for a waste determination and subsequent disposal.

34. Bridgeton Landfill shall fully characterize the landfill liquid for toxicity characteristics under 40 CFR § 261.24, incorporated in 10 CSR § 25-5.262, using the

Toxicity Characteristic Leaching Procedure, test Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846.

Sampling parameters shall include all constituents in 40 CFR § 261.24 Table 1. The analysis of the samples shall be conducted in accordance with the most current method specified in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; EPA SW-846.

35. If landfill liquids are determined to be characteristic hazardous waste for any TCLP constituent, Bridgeton Landfill shall perform any additional sampling and analysis that is necessary to determine the applicability of 40 CFR Part 265 including, but not limited to, Subparts AA, BB and CC, incorporated in 10 CSR § 25-7.265. The sampling and analysis shall be conducted in accordance with the “Bridgeton Landfill Liquid Tank and Container Management Plan,” and “Bridgeton Landfill Liquid Sampling Plan.”

36. Bridgeton Landfill shall submit characterization analyses to the Department in accordance with the Information Collection requirements of Section 52. Characterization analyses must be completed according to the TCLP in SW846 and results provided to the Department. Analyses must also include field notes, field screenings, and all other quality assurance/quality control information. In addition, analyses must include the percent solids for each sample.

37. Bridgeton Landfill shall provide a copy and any updated version of the “Bridgeton Landfill Liquid Tank and Container Management Plan” to the Department.

38. If applicable, within thirty days of characterizing any wastes as hazardous

wastes, Bridgeton Landfill shall update the “Bridgeton Landfill Liquid Tank and Container Management Plan” to describe how the containers and tank system used for liquids management will meet regulations applicable to generators of hazardous waste who treat hazardous waste in accumulation tanks and containers including 40 CFR Part 262, as incorporated and modified in 10 CSR 25-5.262 and any applicable parts of 40 CFR § 265 including, but not limited to, Subparts J, AA, BB, and CC, as incorporated and modified by 10 CSR 25-7.265, and how Bridgeton Landfill will meet the specified regulatory time limitations for storage.

39. **Manifest Documentation:** In accordance with the Information Collection requirements of Section 52, Bridgeton Landfill shall provide copies of manifests or shipping papers to the Department of each off-site shipment of hazardous and non-hazardous waste related to leachate management (including leachate and treated leachate, contaminated personal protective equipment, investigation-derived waste, and contaminated equipment) within the prior month. This may be accomplished with electronic copies or submissions.

Community Outreach

40. **Community Contact:** To the extent permitted by law including the Missouri Rules of Professional Conduct, Bridgeton Landfill shall send notifications regarding increased odor events, potential environmental or public health hazards, and anticipated construction projects to concerned members of the community via email. To implement this Section, Bridgeton Landfill shall establish a method of notification and a method of accepting applications for placement in the email group. Bridgeton Landfill

shall provide the Department with a list of individuals and businesses who elect to receive email notices pursuant to this order. Bridgeton Landfill shall begin emailing individuals and businesses under this Agreed Order within ten business days of entry of the Agreed Order.

41. **Lodging Program:** At the request of the Attorney General, in advance of commencement of work under the RCP Abandonment Plan, Bridgeton Landfill shall implement a Lodging Program by providing nightly lodging or alternative temporary relocation assistance, for residents within the Spanish Village subdivision, Terrisan Reste Mobile Home Community, the following buildings within the Carrollton Village Condominiums: 4146 -4148; 4150 -4161; 4163; and 4165-4169 Gallatin Lane Bridgeton, MO 63044, and the Turner/Boenker property adjacent to Bridgeton Landfill. Provided however that neither the provision of nightly lodging, nor the funding of alternative temporary relocation assistance, shall be deemed as an admission of any impairment of use, unreasonable use or liability, or evidence of fact of, amount of or value of damages, in this or any other judicial, administrative or other proceeding. Bridgeton Landfill shall provide eligible households advance notification of the RCP Abandonment work and information on the voluntary option of participation in the Lodging Program on May 7, 2013, May 14, 2013, and May 17, 2013. The Lodging Program shall remain in place for the duration of work under the RCP Abandonment Plan, and may be extended at the discretion of Bridgeton Landfill.

42. In addition to email notifications, to the extent permitted by law including the Missouri Rules of Professional Conduct, Bridgeton Landfill shall send written

notification to all residents and businesses located within a two-mile radius of the permitted boundary of the Site at least one week prior to Bridgeton Landfill's commencement of work under the "Ethylene Vinyl Alcohol (EVOH) Capping Plan for South Quarry," or within ten business days of issuance of this Agreed Order, whichever is later.

43. **Website**: Bridgeton Landfill shall enhance its existing website to ensure the website provides:

A. Contact information for Bridgeton Landfill as well as the telephone number for a public information hotline. If the hotline utilizes a recorded message to convey information about the Bridgeton Landfill, the hotline shall be updated at least once every forty-eight hours with verbal notification of the information required in Paragraph C of this Section;

B. Twenty-four hours' notice of activities Bridgeton Landfill believes are likely to generate increased odors at the Site with updates to the website within four hours of significant changes to those odor events. Notification shall include, if known, the suspected cause and estimated duration of odors. In addition, Bridgeton Landfill shall post weekly updates of construction activities, progress reports, and anticipated project activity for the week; and

C. Comprehensive reporting of all finalized reports prepared at the direction of the Department, including associated final sample data obtained by Bridgeton Landfill or their agents as a result of environmental sampling events or investigations undertaken by Bridgeton Landfill or their agents.

Cost Recovery

44. **Oversight and Response Costs**: Pursuant to the conditions of this Section 44, subject to the Cap of Section 46, and subject to Dispute Resolution, Bridgeton Landfill agrees to reimburse the Department for Oversight Costs associated with the implementation and execution of this Agreed Order, in the following manner:

A. Bridgeton Landfill has already reimbursed the Department for \$91,342.90 in past Costs. This payment shall not be construed as an admission of liability, or agreement on the part of Bridgeton Landfill as to any legal basis for the State's recovery of such costs.

B. Bridgeton Landfill shall reimburse the Department for future Oversight Costs. Payment shall be made within twenty days of receipt of an Invoice for such Oversight Costs, provided the Invoice includes documentation appropriate to demonstrate the consistency of such costs with this Agreed Order. This payment shall not be construed as an admission of liability, or agreement on the part of Bridgeton Landfill as to any legal basis for the State's recovery of such Costs.

C. All Costs shall be paid by Bridgeton Landfill to the Department for deposit into the Solid Waste Management Fund. Bridgeton Landfill shall make payment by money order, certified check, company check, wire transfer, or cashier's check submitted to the following address:

Missouri Department of Natural Resources
PO Box 477
Jefferson City, MO 65102

D. Upon Bridgeton Landfill's request, but no more than once per calendar quarter, the Department shall provide Bridgeton Landfill with an itemized list for Costs drawn from the Solid Waste Management Fund associated with the Site. The Department will ensure that only Costs, as defined within this Order, and related to the Site are invoiced.

45. **Contract Reimbursement**: The Department has hired consultants to assist the Department and to conduct air sampling and laboratory analytical services in order to evaluate the current and changing condition at the Site. Those consultants will continue to work for the Department. Within fifteen days of entry of this Agreed Order, and within fifteen days of the end of each month moving forward, the Department will send Bridgeton Landfill an itemized bill for the consultants' past work. Pursuant to the conditions of this Section, subject to the Cap of Section 46, and subject to Dispute Resolution, Bridgeton Landfill agrees to reimburse the Department for reasonable and necessary costs associated with air sampling and laboratory analytical services in the manner provided in Section 44(C) of this Agreed Order. The parties agree that this Agreed Order does not require Bridgeton Landfill to reimburse the State for Costs associated with the State's consultation with hired experts other than the Costs specifically authorized for recovery herein. Both the State and Bridgeton Landfill reserve all claims and defenses for reimbursement of Costs not covered by this Order. This payment shall not be construed as an admission of liability, or agreement on the part of Bridgeton Landfill as to any legal basis for the State's recovery of such costs.

46. **Cap on Reimbursement:** Bridgeton Landfill's agreement to reimburse Costs pursuant to this Agreed Order is explicitly limited to \$900,000 total. Bridgeton Landfill and the State reserve their rights as to any additional costs.

47. **Dispute Resolution:** Bridgeton Landfill shall raise any disputes arising under this Agreed Order to the State, in writing, within fifteen working days of the disputed action. The State and Bridgeton Landfill shall expeditiously and informally attempt to resolve any disagreement. If the State and Bridgeton Landfill reach agreement on the dispute at any point, the agreement shall be set forth in writing and shall, upon signature of both parties, be incorporated into and become an enforceable part of this Agreed Order. If the State and Bridgeton Landfill cannot reach agreement, the parties agree to submit the dispute to the Director of the Department and meet with the Director regarding the dispute. The Director of the Department shall issue the Department's final position. If the State and Bridgeton Landfill do not agree on the final position provided by the Director, the parties agree to submit the dispute to the Court for final resolution, within ten days of receipt of the Department's final position. This provision does not limit the State's ability to seek court enforcement of any violation of this Agreed Order.

48. The existence of a dispute and the State's consideration of matters placed in dispute shall not excuse, toll, or suspend any other compliance obligation or deadline required pursuant to this Agreed Order during the pendency of the dispute resolution process except as agreed by the Department in writing. The invocation of dispute resolution does not stay the accrual of stipulated penalties under this Agreed Order.

Site Emergency Planning

49. Bridgeton Landfill has already prepared and submitted an “Incident Management Plan” to the Department, St. Louis County, and the Pattonville and Robertson Fire Protection Districts. An “Emergency Action Plan,” will be prepared by Pattonville and Robertson Fire Districts.

50. Within thirty days of finalization of the “Bridgeton Landfill Liquid Tank and Container Management Plan,” Bridgeton Landfill shall, if required by law, submit a “Site Contingency and Emergency Response Plan” to the Department, St. Louis County, and the Pattonville and Robertson Fire Protection Districts for comment. The “Site Contingency and Emergency Response Plan,” if required, shall, at a minimum, include the requirements set forth at 40 CFR Part 265 if applicable.

VII. Information Collection and Retention

51. **Access:** The Department, through its legally authorized representatives, shall have the right of entry into the Site, at all reasonable times, upon presentation of credentials, to:

- A. monitor the progress of activities required under this Agreed Order;
- B. verify any data or information submitted to the State in accordance with the terms of this Agreed Order;
- C. obtain documentary evidence, including photographs, samples, and similar data; and
- D. assess Bridgeton Landfill’s compliance with this Agreed Order.

52. **Information Collection:** Bridgeton Landfill shall submit to the Department in electronic format, or such other format as reasonably designated by the Department:

A. The Quality Assurance Plan for all types of analytical work conducted by Bridgeton Landfill's laboratory;

B. All reports and work plans required under Missouri environmental laws and this Agreed Order by the date identified in this Agreed Order or by a date set by the Department if not identified in this Agreed Order, including any associated field data and/or data analyses collected by Defendants or their agents as a result of future environmental sampling efforts, elevated temperatures in gas extraction wells, the Subsurface Smoldering Event, landfill cap settlement, methane gas monitoring, and any other investigations undertaken to identify the cause or source of the Subsurface Smoldering Event, including inspection reports and lab data.

C. Final, QA/QC'd data collected by Bridgeton Landfill or its agents in support of the reports submitted under this Agreed Order;

D. Within thirty days after the last day of each quarter, the following data for the previous quarter:

i. As-built drawings of any infrastructure that has changed since the previous quarterly submittal;

E. Within twenty days after the last day of each month, the following data for the previous month:

- i. Daily flare monitoring data, including device flow, inlet data, and associated graphs;
 - ii. A list of work conducted on Site for the past month;
 - iii. A list of work planned for the upcoming month;
 - iv. Carbon monoxide maps (for readings above 2,000 ppm using increments of 1,000 ppm);
 - v. Hydrogen maps (for readings above 40% use increments of 10%);
 - vi. Settlement front maps, including maps for the neck area and South Quarry.
 - vii. Well data as currently collected, including well field temperature, analysis, and monitoring by well;
 - viii. Wellhead temperature maps (continue 20° increments up to 231° and if above 231° note highest temperature in legend); and
 - ix. Summary of new complaints received by Bridgeton Landfill and response action(s) taken by Bridgeton Landfill;
 - x. Leachate characterization data collected under this Agreed Order;
 - xi. Manifests documenting shipment of leachate for the prior month.
- F. On a weekly basis, the following data for the previous week:
- i. Leachate levels in leachate collection sumps/wells (LCS 1D,

2D, 3C, 4B, 5A, and 6B).

- ii. Temperature Monitoring Probe raw data and analytical charts;
and
- iii. Gas inceptor wellhead temperatures.

53. Unless an approved plan provides for a different notice, Bridgeton Landfill shall notify the Department at least forty-eight hours in advance of any non-routine sampling event, unless an emergency response requires sampling on a more expedited basis, in which case, Bridgeton Landfill shall notify the Department of the emergency through the Department's emergency phone number: 573-634-2436. Upon request, Bridgeton Landfill shall provide the State, through its authorized representatives, the opportunity to collect splits of any samples taken by Bridgeton Landfill.

54. This Agreed Order in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the State pursuant to applicable federal or state laws, regulations, or permits, nor does it limit or affect any duty or obligation of Bridgeton Landfill to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

55. **Electronic Communication:** The State and Bridgeton Landfill shall work together to maximize the use of electronic communications, including electronic file transfer, in the exchange of notices, reports, documents and communications in a format approved by the Department.

VIII. Stipulated Penalties

56. In the event that Bridgeton Landfill fails to comply in a timely manner with

terms of any Approved Plan referenced in this Agreed Order and any Future Plans approved pursuant to this Agreed Order, Bridgeton Landfill shall be liable for stipulated penalties in accordance with the following schedule:

- A. \$250 per day for each day of each violation up to seven days.
- B. \$2500 per day for each day of violation, from eight days to thirty days.
- C. \$5,000 per day for each day of each violation, from thirty-one days to sixty days.
- D. \$10,000 per day for each day of each violation, beyond sixty days;

57. Stipulated penalties shall be due and payable within ten days of demand being made by the Attorney General's Office. Bridgeton Landfill shall pay stipulated penalties by check made payable to the "*State of Missouri (St. Louis County)*" and mailed, along with a copy of the State's stipulated penalty demand letter, to: Collections Specialist, Missouri Attorney General's Office, P.O. Box 899, Jefferson City, MO 65102-0899. That check will be deposited and processed by the State in accordance with the Agreed Order and Missouri law.

58. The inclusion of stipulated penalty provisions in this Agreed Order, and the payment of stipulated penalties, does not mandate the State's assessment of such penalties, nor does it limit the State's ability to pursue other penalties for the same acts, if and to the extent permitted by law; where a violation of this Agreed Order also constitutes a violation of a statute, stipulated penalties may be collected in addition to statutory penalties imposed for those violations.

IX. Notices and Submittals

59. Whenever under the terms of this Agreed Order notice is required to be given or a report or other document is required to be forwarded by one party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice in writing of another individual designated to receive such communications. Notice to the individuals listed below or such other individuals designated pursuant to the foregoing, in writing and hand-delivered or sent by registered or certified mail, postage prepaid, shall constitute complete satisfaction of any notice requirement of the Agreed Order. The parties may agree to allow for electronic submission to satisfy the Notice criteria, including for report and data submission.

To the Missouri Department of Natural Resources:

Aaron Schmidt
Project Manager
Division of Environmental Quality
P.O. Box 176
Jefferson City, Missouri 65102
Phone: 573-751-3443
Fax: 573-526-5268
aaron.schmidt@dnr.mo.gov

To the Attorney General's Office:

Jessica Blome
Assistant Attorney General
State of Missouri Office of Attorney General
P.O. Box 899
Jefferson City, Missouri 65102
Phone: 573-751-3640
Fax: 573-751-8796
jessica.blome@ago.mo.gov

To the St. Louis County Department of Health:

Environmental Health Division
6121 North Hanley Road
Berkeley, MO 63134
Phone: (314) 615-0600
airpollution.doh@stlouisco.com

To Bridgeton Landfill LLC:

Craig Almanza
Bridgeton Landfill, LLC
13570 St. Charles Rock Road
St. Louis, MO 63134
Phone: 314-744-8195
Fax: 314-656-2107
calmanza@republicservices.com

With a copy to:
William G. Beck
Lathrop & Gage LLP
2345 Grand Blvd., Suite 2200
Kansas City, MO 64108
Phone: 816-460-5811
Fax: 816-292-2001
wbeck@lathropgage.com

and:

Jessica E. Merrigan
Lathrop & Gage LLP
2345 Grand Blvd., Suite 2200
Kansas City, MO 64108
Phone: 816-460-5706
Fax: 816-292-2001
jmerrigan@lathropgage.com

60. In the event of an emergency, Bridgeton Landfill shall notify the Department of the emergency through the Department's emergency phone number: 573-634-2436.

X. Modification and Termination

61. **Modification:** Except as otherwise specified herein, this Agreed Order

may be modified or amended only upon written agreement by and among the parties, their successors and assigns. All modifications shall be in writing and filed with the Court.

62. **Termination:** This Agreed Order shall terminate six months after the Department's approval of the Operations, Maintenance and Monitoring Plan.

The parties hereby consent to this Agreed Order through their duly authorized representatives as indicated below.

BRIDGETON LANDFILL, LLC

W.F. Eggleston, Jr.
Name: W.F. Eggleston, Jr.
Title: VP

Date: 5/6/13

MISSOURI ATTORNEY GENERAL'S OFFICE

By: Jessica L. Blome
Jessica L. Blome
Assistant Attorney General
Date: 5/7/13

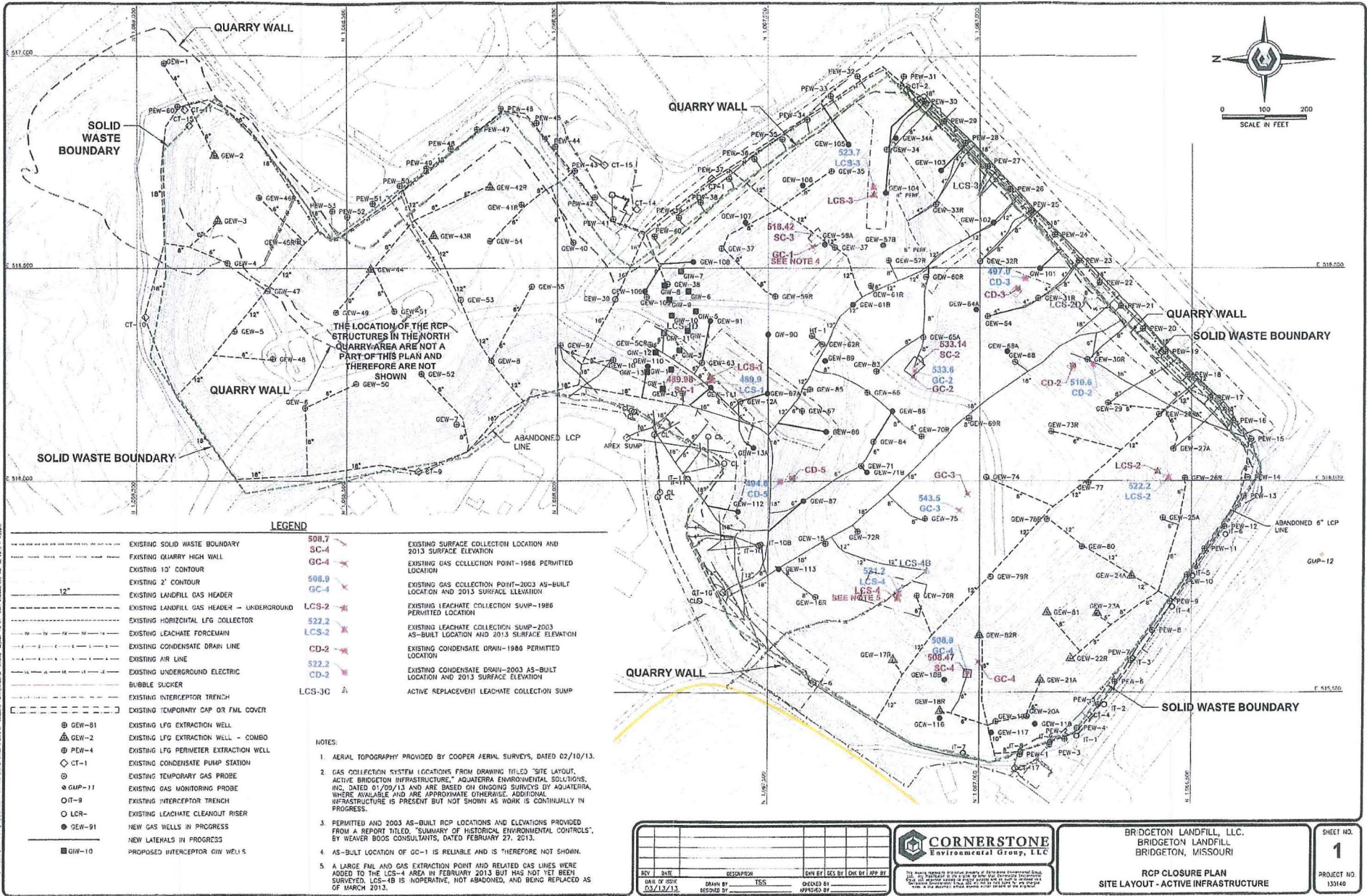
MISSOURI DEPARTMENT OF NATURAL RESOURCES

By: Sara Parker Pauley
Sara Parker Pauley
Director
Date: 5/7/13

SO ORDERED

Michael J. ...
Circuit Judge
Date: 5-13-13

Exhibit A
Map of Site



THE LOCATION OF THE REPT STRUCTURES IN THE NORTH QUARRY AREA ARE NOT A PART OF THIS PLAN AND THEREFORE ARE NOT SHOWN

LEGEND

- | | | | |
|-----|--------------------------------------------|--------|---------------------------------------------------------------------------------------|
| --- | EXISTING SOLID WASTE BOUNDARY | 508.7 | EXISTING SURFACE COLLECTION LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING QUARRY HIGH WALL | GC-4 | EXISTING GAS COLLECTION POINT - 1986 PERMITTED LOCATION |
| --- | EXISTING 10' CONTOUR | 508.9 | EXISTING GAS COLLECTION POINT - 2003 AS-BUILT LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING 2' CONTOUR | GC-4 | EXISTING GAS COLLECTION POINT - 2003 AS-BUILT LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING LANDFILL GAS HEADER | LCS-2 | EXISTING LEACHATE COLLECTION SUMP - 1986 PERMITTED LOCATION |
| --- | EXISTING LANDFILL GAS HEADER - UNDERGROUND | LCS-2 | EXISTING LEACHATE COLLECTION SUMP - 2003 AS-BUILT LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING HORIZONTAL LFG COLLECTOR | LCS-2 | EXISTING LEACHATE COLLECTION SUMP - 2003 AS-BUILT LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING LEACHATE FORCEMAIN | CD-2 | EXISTING CONDENSATE DRAIN - 1986 PERMITTED LOCATION |
| --- | EXISTING CONDENSATE DRAIN LINE | 522.2 | EXISTING CONDENSATE DRAIN - 2003 AS-BUILT LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING AIR LINE | CD-2 | EXISTING CONDENSATE DRAIN - 2003 AS-BUILT LOCATION AND 2013 SURFACE ELEVATION |
| --- | EXISTING UNDERGROUND ELECTRIC | LCS-3C | ACTIVE REPLACEABLE LEACHATE COLLECTION SUMP |
| --- | BUBBLE SUCKER | | |
| --- | EXISTING INTERCEPTOR TRENCH | | |
| --- | EXISTING TEMPORARY CAP OR FAIL COVER | | |
| ○ | GEW-81 | | |
| △ | EXISTING LFG EXTRACTION WELL | | |
| △ | EXISTING LFG EXTRACTION WELL - COMBO | | |
| △ | EXISTING LFG PERIMETER EXTRACTION WELL | | |
| ◇ | CT-1 | | |
| ◇ | EXISTING CONDENSATE PUMP STATION | | |
| ○ | EXISTING TEMPORARY GAS PROBE | | |
| ○ | GMP-11 | | |
| ○ | EXISTING GAS MONITORING PROBE | | |
| ○ | IT-9 | | |
| ○ | EXISTING INTERCEPTOR TRENCH | | |
| ○ | LCR | | |
| ○ | EXISTING LEACHATE CLEANOUT RISER | | |
| ○ | GEW-91 | | |
| ○ | NEW GAS WELLS IN PROGRESS | | |
| ○ | NEW LATERALS IN PROGRESS | | |
| ■ | GIW-10 | | |
| ■ | PROPOSED INTERCEPTOR GIN WELLS | | |

NOTES:

- AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS, DATED 02/10/13.
- GAS COLLECTION SYSTEM LOCATIONS FROM DRAWING TITLED "SITE LAYOUT, ACTIVE BRIDGETON INFRASTRUCTURE" AQUATERRA ENVIRONMENTAL SOLUTIONS, INC. DATED 01/09/13 AND ARE BASED ON ONGOING SURVEYS BY AQUATERRA, WHERE AVAILABLE AND ARE APPROXIMATE OTHERWISE. ADDITIONAL INFRASTRUCTURE IS PRESENT BUT NOT SHOWN AS WORK IS CONTINUALLY IN PROGRESS.
- PERMITTED AND 2003 AS-BUILT RCP LOCATIONS AND ELEVATIONS PROVIDED FROM A REPORT TITLED, "SUMMARY OF HISTORICAL ENVIRONMENTAL CONTROLS", BY WEAVER BOOS CONSULTANTS, DATED FEBRUARY 27, 2013.
- AS-BUILT LOCATION OF GC-1 IS RELIABLE AND IS THEREFORE NOT SHOWN.
- A LARGE FAIL AND GAS EXTRACTION POINT AND RELATED GAS LINES WERE ADDED TO THE LCS-4 AREA IN FEBRUARY 2013 BUT HAS NOT YET BEEN SURVEYED. LCS-4B IS INOPERATIVE, NOT ABANDONED, AND BEING REPLACED AS OF MARCH 2013.

REV	DATE	DESCRIPTION	OWN BY	DES BY	CHK BY	APP BY
1	03/13/13					

CORNERSTONE
Environmental Group, LLC

THIS WORK WAS PREPARED FOR BRIDGETON LANDFILL, LLC. THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF CORNERSTONE ENVIRONMENTAL GROUP, LLC. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED IN THE CONTRACT. ANY REUSE OR MODIFICATION OF THIS INFORMATION WITHOUT THE WRITTEN CONSENT OF CORNERSTONE ENVIRONMENTAL GROUP, LLC IS STRICTLY PROHIBITED.

BRIDGETON LANDFILL, LLC.
BRIDGETON LANDFILL
BRIDGETON, MISSOURI

RCP CLOSURE PLAN
SITE LAYOUT - ACTIVE INFRASTRUCTURE

SHEET NO.
1

PROJECT NO.
130140

Exhibit B
Reporting Deadlines

Report/Task Due	Deadline
North Quarry Contingency Plan	Part I within 45 days after entry of Agreed Order; Part II within 75 days after entry of Agreed Order
Final Operation Maintenance and Monitoring Program Manual (including Odor Control Plan and Leachate Management Procedures)	Within 45 days of completion of work under EVOH Capping Plan for South Quarry
Update to November 2012 Landfill Gas Corrective Action Plan	75 after entry of Agreed Order
Monthly Progress Report to St. Louis County Court	First business day of each month
Natural Gas Line Improvement Update	Every 60 days until completion
Quarterly Data (infrastructure changes)	Within 30 days after the end of each quarter
Monthly Data (daily flare data, work conducted at site in past month, work planned for upcoming month, carbon monoxide maps, hydrogen maps, settlement maps, leachate characterization, manifests)	Within 20 days after the last day of each month
Weekly Data (temperature monitoring data, leachate levels)	On a weekly basis
Leachate Pre-Treatment System Plan	September 1, 2013
Payment of Oversight Costs	Within 20 days of receipt of Invoice
Contractor Costs	Within 20 days of receipt of Invoice

Exhibit C

Missouri Department of Health and Senior Services Alert Protocol

Bridgeton Sanitary Landfill Ambient Air Response Alert Protocol
Department of Health and Senior Services
May 2013

Background and Purpose

The purpose of this document is to provide recommended response levels in order to assess monitoring data being generated by the Missouri Department of Natural Resources or their contractor for the Bridgeton Sanitary Landfill subsurface smoldering event response. Monitoring equipment being used includes AreaRAE monitors, an UltraRAE benzene monitor and a Jerome J-605 hydrogen sulfide monitor. In preparing this review, the Department of Health and Senior Services (DHSS) reviewed available comparison values (guideline concentrations) from the Environmental Protection Agency, Agency for Toxic Substances and Disease Registry and National Institute for Occupational Safety and Health. When determining appropriate guideline concentrations to choose, DHSS elected to choose the lowest appropriate and detectable guideline concentration available for each response level. Where the lowest guideline concentration was below the detection limit capability of an instrument, the lower detection limit of the monitoring instrument was chosen as the appropriate response trigger concentration. Any response decision triggered by monitoring results should be coordinated between responsible agencies and determined based on valid data, site conditions, meteorological conditions, planned site activities, and any other appropriate information. Below is a review of the four chemicals of concern for monitoring around the Bridgeton Sanitary Landfill, a summary table of available guideline concentrations reviewed (Table 1) and a table of response trigger concentrations (Table 2).

Hydrogen Sulfide

Concentrations \geq 0.07 ppm

- DNR staff determine data validity and 30-minute average concentration
- If 30-minute average is \geq 0.07 ppm (ATSDR's acute EMEG), coordinate "yellow" response

Concentrations \geq 0.3 ppm

- DNR staff determine data validity and 30-minute average concentration
- If 30-minute average is \geq 0.33 ppm (EPA's 8-hr AEGL-1), coordinate "orange" response

Concentrations \geq 5 ppm

- DNR staff determine data validity and 10-minute average concentration
- If 10-minute average concentration is \geq 5 ppm [half of NIOSH's 10-minute REL (10 ppm)], coordinate "red" response

**EPA's 8-hr AEGL-2 (long-term effect /serious short-term effect threshold) is 17 ppm.*

EPA's 10-minute AEGL-2 is 41 ppm.

**EPA's 8-hr AEGL-3 (life-threatening effect threshold) is 31 ppm.*

EPA's 10-minute AEGL-3 is 76 ppm.

Yellow and orange response levels: ATSDR's environmental media evaluation guide (EMEG) for acute (<14 days) inhalation exposure to hydrogen sulfide is a concentration not expected to pose a health threat to the general population, including sensitive individuals such as children and asthmatics. EPA's acute exposure guideline level-1 (AEGL-1) for eight hour exposure to hydrogen sulfide is a concentration above which the general public, including sensitive individuals, could experience transient, reversible symptoms such as discomfort and irritation. Both the EMEG and AEGL-1 are based on a study in which asthmatics exposed to 2 ppm hydrogen sulfide for 30 minutes developed headache and some measurable changes in lung function. ATSDR's EMEG was established for a longer exposure

period of up to 14 days and, as a more conservative value, may be more protective of sensitive individuals, including asthmatics and others with chronic respiratory disease.

Red response level: The NIOSH recommended exposure limit (REL) for hydrogen sulfide is an upper limit of exposure during a work-shift for prevention of any acute effects, especially on the respiratory and nervous systems. EPA's AEGL-2 values are concentrations above which the general public, including sensitive individuals, could experience serious short-term or long-lasting health effects. EPA's AEGL-3 values are concentrations above which the general public could experience life-threatening health effects. Although NIOSH's REL was established for worker exposure, it is the more conservative value and, therefore, was used to determine a red-level response value. The red-level response trigger of 5 ppm was determined by dividing the NIOSH REL in half. This would provide agencies with the ability to confer on the situation and act to help prevent exposures of public health concern should the need arise.

Sulfur Dioxide

Concentrations \geq 0.1 ppm

- DNR staff determine data validity and 30-minute average concentration
- If 30-minute average concentration is \geq 0.1 ppm (i.e., at least the lower detection limit of the monitoring instrument), coordinate "orange" response

Concentrations \geq 0.3 ppm

- DNR staff determine data validity and 10-minute average concentration
- If 10-minute average concentration \geq 0.375 ppm [half of AEGL-2 (0.75 ppm)], coordinate "red" response

**ATSDR's acute EMEG is 0.01 ppm.*

**NAAQS 1-hr average level is 0.075 ppm.*

NAAQS 24-hr average is 0.14 ppm.

**EPA's AEGL-1 is 0.20 ppm.*

**NIOSH REL is 2 ppm.*

**NIOSH STEL and OSHA's 8-hr PEL are 5 ppm.*

**EPA's 8-hr AEGL-3 is 9.6 ppm.*

EPA's 10-minute AEGL-3 is 30 ppm.

Orange response level: ATSDR's EMEG for acute (<14 days) inhalation exposure to sulfur dioxide is a concentration not expected to pose a health threat to the general population, including sensitive populations such as children and asthmatics. The EMEG is based on a study in which especially sensitive asthmatics exposed to 0.1 to 0.5 ppm sulfur dioxide for 10 minutes while exercising exhibited slight increases in airway resistance. EPA's AEGL-1 is a concentration above which the general public, including sensitive individuals, could experience transient, reversible symptoms such as discomfort and irritation. NAAQS 24-hour and 1-hour average levels of exposure were established for the protection of public health, including the health of sensitive individuals such as children and asthmatics. Because the lower detection limit of the AreaRae sensor (0.1 ppm) exceeds the more conservative guidelines (the EMEG and 1-hour NAAQS) but not other protective comparison values (EPA's AEGL-1 and 24-hour NAAQS), the detection limit was chosen as a guideline for determining an orange-level response.

Red response level: EPA's AEGL-2 value is a concentration above which the general public, including sensitive individuals, could experience serious short-term or long-lasting health effects. The AEGL-2 is based on a study in which asthmatics exposed to 0.75 ppm sulfur dioxide while exercising (for 10 minutes to 3 hours) clearly exhibited significant increases in airway resistance. EPA's AEGL-3 values are concentrations above which the general public could experience life-threatening health effects. NIOSH recommended exposure limit (REL) and short-term exposure limit (STEL) and OSHA

permissible exposure limit (PEL) for sulfur dioxide are average upper exposure limits for workers in an occupational setting. The AEGL-2 is more conservative than either the STEL or PEL and may be the most protective comparison value for determining red-level response. The red-level response trigger of 0.375 ppm was determined by dividing the AEGL-2 in half. This would provide agencies with the ability to confer on the situation and act to help prevent exposures of public health concern should the need arise.

Benzene

Concentrations \geq 0.05 ppm

- DNR staff determine data validity and 30-minute average concentration
- If 30-minute average concentration is \geq 0.05 ppm (i.e., at least the lower detection limit of the monitoring instrument), coordinate “orange” response

Concentrations \geq 0.5 ppm

- DNR staff determine data validity and 10-minute average concentration
- If 10-minute average concentration is \geq 0.5 ppm [half of NIOSH’s STEL (1 ppm)], coordinate “red” response

**ATSDR’s EMEG is 0.009 ppm*

**EPA’s 8-hr AEGL-2 is 200 ppm.*

**EPA’s 8-hr AEGL-1 is 9 ppm.*

EPA’s 10-minute AEGL-2 is 2,000 ppm.

EPA’s 10-minute AEGL-1 is 130 ppm

Orange response level: ATSDR’s EMEG for acute (<14 days) inhalation exposure to benzene is a concentration not expected to pose a health threat to the general population, including sensitive individuals. The EMEG is based on an animal study in which immunological effects were observed in mice exposed to 2.5 ppm (human-equivalent concentration) benzene. EPA’s AEGL-1 for exposure to benzene is a concentration above which the general public, including sensitive individuals, may experience transient, reversible symptoms. The AEGL-1 is based on a human study in which mild, subjective effects (specifically, nervous system effects such as dizziness) were not observed during 2-hour exposure to 110 ppm benzene. Because the lower detection limit of the benzene sensor (0.05 ppm) exceeds the most conservative guideline (ATSDR’s EMEG) but not other protective comparison values (EPA’s AEGL-1), the detection limit was chosen as a guideline for determining an orange-level response.

Red response level: The NIOSH STEL for benzene is an upper limit of exposure during a work-shift for prevention of any acute or long-term effects. EPA’s AEGL-2 values are concentrations above which the general public, including sensitive individuals, could experience serious short-term or long-lasting health effects. The AEGL-2 is based on an animal study in which rats exposed to 4,000 ppm for 4 hours showed no evidence of reduced activity. EPA’s AEGL-3 values are concentrations above which the general public could experience life-threatening health effects. Although NIOSH’s STEL was established for worker exposure, it is the more conservative value and, therefore, was used to determine a red-level response value. The red-level response trigger of 0.5 ppm was determined by dividing the NIOSH STEL in half. This would provide agencies with the ability to confer on the situation and act to help prevent exposures of public health concern should the need arise.

Carbon Monoxide

Concentrations \geq 9 ppm

- DNR staff determine data validity and 30-minute average concentration

- If 30-minute average concentration is ≥ 9 ppm (NAAQS 8-hr limit), coordinate “orange” response

Concentrations ≥ 13.5 ppm

- DNR staff determine data validity and a 10-minute average concentration
- If 10-minute average concentration is ≥ 13.5 ppm [EPA’s 8-hr AEGL-2 (27 ppm)], coordinate “red” response

**NAAQS 1-hr limit and NIOSH REL are 35 ppm. *EPA’s 8-hr AEGL-3 is 130 ppm.*

**EPA’s 10-minute AEGL-2 is 420 ppm.*

EPA’s 10-minute AEGL-3 is 1,700 ppm.

Orange response level: The NAAQS 8-hour limit was established for the protection of public health, including the health of sensitive individuals, and is currently the most health-protective guideline. Neither ATSDR nor EPA has established acute exposure guidelines for transient, “less severe” health effects.

Red response level: EPA’s AEGL-2 values are concentrations above which the general public, including sensitive individuals, could experience serious short-term or long-lasting health effects. EPA’s AEGL-3 values are concentrations above which the general public could experience life-threatening health effects. A NAAQS 1-hour limit has been established for the protection of public health, including sensitive individuals. The AEGL-2 established for 8-hour exposure is lower than the NAAQS 1-hour limit and, therefore, was used as a potentially more protective value for determining a red-level response value. The red-level response trigger of 13.5 ppm was determined by dividing the AEGL-2 in half. This would provide agencies with the ability to confer on the situation and act to help prevent exposures of public health concern should the need arise.

Table 1. Guideline Concentrations (ppm) for Acute Exposure to Chemicals in Air

Chemical	LDL^a (ppm)	ATSDR Acute EMEG^b	Acute Exposure Guidelines									
			EPA AEGL-1^c		EPA AEGL-2^c		EPA AEGL-3^c		NIOSH REL/ STEL^d	EPA NAAQS^e		
			8 hr	10 min	8 hr	10 min	8 hr	10 min		24 hr	8 hr	1 hr
Hydrogen Sulfide	0.001	0.07	0.33	0.75	17	41	31	76	10 (10 min)	ND	ND	ND
Sulfur Dioxide	0.1	0.01 ^f	0.20	0.20	0.75	0.75	9.6	30	2 (10 hr)	0.14	ND	0.075 ^f
Benzene	0.05	0.009 ^f	9	130	200	2,000	990	9,700	1 (15 min)	ND	ND	ND
Carbon Monoxide	0.1	ND	ND	ND	27	420	130	1,700	35 (10 hr)	ND	9	35

^aLower detection limit (LDL) of monitoring instrument

^bAgency for Toxic Substances and Disease Registry (ATSDR) Environmental Media Evaluation Guide (EMEG) for acute (<14 day) exposure. Concentrations equal to EMEGs are not expected to cause adverse health effects in the general population, including sensitive individuals including children and asthmatics.

^cEnvironmental Protection Agency (EPA) Acute Exposure Guideline Level (AEGL) for 8 hour and 10 minute exposure.

Concentrations that exceed AEGLs are predicted to cause transient, reversible health effects (AEGL-1), serious long-term or short-term effects (AEGL-2), or life-threatening effects (AEGL-3).

^dNational Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) or Short Term Exposure Limit (STEL) during work-shift.

^eNational Ambient Air Quality Standard for 24 hour, 8 hour, and 1 hour periods, for the protection of public health, including sensitive individuals such as children and asthmatics.

^fBelow detection limit capabilities.

ND = not determined

Table 2. Response Trigger Concentrations (ppm) of Landfill Gases in Ambient Air

Chemical	Response Level		
	Yellow 30-minute average concentration	Orange 30-minute average concentration	Red 10-minute average concentration (1/2 of red guideline concentration)
Hydrogen Sulfide	0.07	0.33	5.0
Sulfur Dioxide	NA	0.1	0.375
Benzene	NA	0.05	0.5
Carbon Monoxide	NA	9.0	13.5

*Valid data: no sensor error and, according to meteorological conditions, site activity, data review, etc., exceedances are determined to be site-related

Response Levels (any response should be determined based on valid data, site conditions, meteorological conditions, planned site activities, etc.)

Yellow: Possible short-term, “less severe” health effects, such as headache, eye/nose/throat irritation. Sensitive individuals including asthmatics and people with other respiratory diseases should stay inside as much as possible, avoid outside strenuous activities, and seek medical attention for any acute symptoms.

Orange: Possible short-term, “less severe” health effects. All individuals should stay inside as much as possible, avoid outside strenuous activities, and seek medical attention for any acute symptoms. DNR contacts DHSS and other concerned agencies to coordinate a response, taking into consideration site conditions, meteorological conditions, planned site activities, etc.

Red: Prevention of possible long-term effects or serious short-term effects. DNR contacts DHSS and other concerned agencies to coordinate a response, taking into consideration site conditions, meteorological conditions, planned site activities, etc.

Standing Alert

Due to strong odors, individuals may experience undesirable, transient symptoms such as headache and nausea. Asthmatics and other sensitive individuals may be especially susceptible to strong odors. Also, although guideline values are protective of the general public including sensitive individuals such as children and asthmatics, certain individuals may experience health effects due to idiosyncratic response when concentrations are below those guideline levels. During periods of objectionable odor, sensitive individuals and persons with chronic respiratory diseases should limit time spent outdoors and seek medical advice for any acute symptoms.