



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

## DEPARTMENT OF NATURAL RESOURCES

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**JUL 24 2013**

CERTIFIED MAIL # 7009 3410 0001 9190 6291  
RETURN RECEIPT REQUESTED

Mr. Brian Power  
Area Environmental Manager  
Republic Services, Inc.  
13570 St. Charles Rock Road  
Bridgeton, MO 63044

RE: North Quarry Contingency Plan, Subsurface Smoldering Event, Bridgeton Landfill, LLC,  
Permit Number 0118912, St. Louis County

Dear Mr. Power:

This letter is in response to Republic Services' notice to the Attorney General's Office that a submittal entitled "Bridgeton Landfill North Quarry Contingency Plan - Part 1" (Plan) dated June 27, 2013, was posted to an FTP site pursuant to Sections 17. and 22.A of the First Agreed Order Case No. 13SL-CC01088 and was ready for review. The Plan was prepared by P. J. Carey & Associates, P.C. and Civil & Environmental Consultants, Inc. and was submitted in "Draft" form.

Timely completion of the Contingency Plan is essential for ensuring protection of human health and the environment in the community surrounding the Bridgeton Landfill. The department met with Republic Services' staff and consultants on July 16<sup>th</sup> and 18<sup>th</sup> to begin the process to clarify and discuss expectations related to the Plan. Relevant comments from those discussions will be referenced in the balance of this comment letter.

**Section 17** of the First Agreed Order required the following in regard to Part 1:

- i.) Future work plans will be reviewed and signed by a professional engineer licensed in the State of Missouri, or other qualified professionals, as detailed in Exhibit B of the First Agreed Order;
- ii.) Bridgeton Landfill will not undertake any of the work proposed in the work plan or any other future work plans until approved by the department;
- iii.) The "North Quarry Contingency Plan," will be submitted to the department in two parts in accordance with the timing set forth in Section 22; and
- iv.) The plan will, at a minimum, address those items referenced in Section 22 of the First Agreed Order.

**COMMENT:**

1. The Plan was submitted in draft form and was not signed and sealed by a Professional Engineer, registered in the State of Missouri, as required by the First Agreed Order.

Routinely, the Solid Waste Management Program (SWMP) would not review documents that fail to meet the compliance requirements set forth in an Agreed Order. Due to the Subsurface Smoldering Event (SSE) occurring at the Bridgeton Landfill and the need for timely implementation of a Plan, the SWMP has reviewed the "Draft" Plan submittal for compliance with the Missouri Solid Waste Management Law and regulations and the First Agreed Order, Case No. 13SL-CC01088. As submitted, the Plan is incomplete and not approvable as written. It includes unacceptable trigger criteria and timeframes for completion of work, and overall lacks sufficient detail/clarity which requires submission of additional or clarifying information.

**Section 22.A.** of the First Agreed Order stated the following would be addressed in Part 1:

- i) Establishment of trigger criteria for installation of additional Temperature Monitoring Probes (TMP) in the North Quarry, along with a plan and schedule for such installation, if triggered;
- ii) Establishment of trigger criteria for installing Gas Interceptor Wells (GIW) within the North Quarry to control further migration of the SSE, 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.

Please review the following comments and respond accordingly before re-submitting.

**COMMENTS:**

**Trigger Values**

1. The proposed trigger values of 220° F or two consecutive months of field-verified settlement front movement of 1.35 feet per month in the Plan - Part 1 are too high to be approved by the department given our understanding of subsurface smoldering events. As discussed, Republic Services views settlement as an indicator of the actual location of the SSE. However, the purpose of the Plan - Part 1 is to establish triggers that allow sufficient time for completion of work plans to prevent movement of the SSE into the North Quarry and may ultimately result in installation of an isolation break between the North Quarry and West Lake Landfill Operable Unit 1, Area 1 as a final solution should other preventative measures fail. The following table details the department's Temperature and Carbon Monoxide (CO) criteria for Contingency Plan Action.

Note: The department agrees that physical characteristics such as vertical settlement data can provide confirmation of the actual location of an existing SSE, but it is not a predictor of an SSE.

**Table 1**

**Proposed Sentry Criteria<sup>1,2</sup>**

**Bridgeton Sanitary Landfill, North Quarry Isolation Break**

Indicator	Volume or/and Temperature	Isolation Break Required	Parameters
<b>Carbon Monoxide (CO)</b>			
CO levels in any gas extraction well or sentry monitoring well in the North Quarry.	>1,500 ppm	YES	CO result shall be repeatable and re-measured within 8 hours of receipt of the data. CO measurements shall be based on laboratory analysis and not field equipment. DNR and the fire authority shall be notified within 48 hours. Should any result exceed 1,500 ppm CO, the isolation break shall be constructed.
CO levels in two or more gas extraction wells and/or sentry monitoring well in the North Quarry.	>1,000 ppm	YES	Re-measure the initial CO result over 1,000 ppm within five days of receipt of the data. CO results greater than 1,000 ppm, but less than 1,500 ppm shall be re-measured 4 times for 4 weeks. DNR and the fire authority shall be notified within 5 days. Should all the retest exceed 1,000 ppm CO, the isolation break shall be constructed.
CO levels in any gas extraction well or sentry monitoring well in the North Quarry.	<1,000 ppm	No	No additional actions required. Continue monitoring per the First Agreed Order (Case No. 13SL-CC01088).
<b>Temperature (°F)</b>			
Any reportable temperature in a <i>TMP</i> at the sentry line <sup>3</sup> or in the North Quarry.	>200°F	YES	Temperature result shall be repeatable within 8 hours. DNR and the fire authority shall be notified within 48 hours. Should any temperature exceed 200°F in a <i>TMP</i> , the isolation break shall be constructed.
Any reportable temperature in a <i>gas well</i> located within the North Quarry.	>180°F	YES	Temperature result shall be repeatable within 8 hours. DNR and the fire authority shall be notified within 48 hours. Should any temperature exceed 180°F in a <i>gas well</i> , the isolation break shall be constructed.
<b>Combination of CO + °F</b>			
Any reportable temperature in a <i>TMP</i> or <i>gas well</i> at or past the sentry line exceeding 195°F and any gas well in the North Quarry exceeding 1,500 ppm CO.	>195°F + >1,500 ppm	YES	Temperature result shall be repeatable within 8 hours. DNR and the fire authority shall be notified within 48 hours. Should any temperature exceed 195°F in a <i>gas well</i> in the North Quarry and CO is detected above 1,500 ppm at the sentry line or North Quarry, the isolation break shall be constructed.
Any reportable temperature in a <i>TMP</i> less than 195°F or <i>gas well</i> located within the North Quarry or sentry line with CO less than 1,000 ppm.	<195°F + <1,500 ppm	No	Temperature(s) shall be collected weekly. Continue monitoring per the First Agreed Order (Case No. 13SL-CC01088).

<sup>1</sup> These criteria are in addition to the First Agreed Order of Preliminary Injunction (Case No. 13SL-CC01088) between the State of Missouri and the Bridgeton Sanitary Landfill, LLC.

<sup>2</sup> The temperature and CO levels for this matrix are for the establishment of a trigger value and not for the confirmation of a smoldering event.

<sup>3</sup> The sentry line for this matrix is currently defined as TMP-1 through TMP-4 on the Well Layout Plan by SCS Engineers, date 1/10/2013.

2. Republic Services must provide an immediate verbal notification to the department should a triggering event occur and written notice must then be provided within 48 hours. For business hours call the SWMP Engineering Section Chief or Program Director at (573) 751-5401 and for afterhours, call the 24-hour Spill Line at (573) 634-2436. This notice is required to allow the department to participate in subsequent confirmatory re-sampling at our option or complete independent sampling. Validation of a temperature triggering event is required within 8 hours and carbon monoxide re-sampling must occur within 8 hours of receipt of a report indicating a trigger has been exceeded. The report on the re-sampling must be expedited with receipt within 48 hours, unless another timeframe has been agreed upon with the department.

### **Trigger Lines**

1. Trigger Line 1, which is formed by an arc connecting TMP-6, -14, -13 and -5 is acceptable for triggering installation of a new row of enhanced GIWs and the North Phase 1 Enhanced Gas Collection and Control System (GCCS) installation including the EVOH capping system. A triggering event at Trigger Line 1 will be any temperature > 200° F at any of the TMPs in this line.
2. Although an engineering based explanation for placement of the new TMPs as detailed in Figure 4 of the Plan - Part 1 was provided based on the geology of the landfill, the department finds placement of the new TMP line at approximately half-way through the North Quarry to be unacceptable. The new TMPs must be located closer proximity to the existing TMP line formed by TMP-1, -2, -3 and -4.
3. The department questions placement of Trigger Line 2 at the existing line formed by TMP-1, -2, -3 and -4 which is located at the northern end of the "neck" between the two quarries. Upon installation of the new TMPs closer to the existing line of TMP-1, -2, -3 and -4, the new line of TMPs will serve as Trigger Line 2. A triggering event at Trigger Line 2 will be any temperature > 200° F at any of the TMPs in the new TMP line. This new Trigger Line 2 does away with the need for a separate Trigger Line 3, as the new Trigger Line 2 serves as the triggering point for installation of the remaining enhanced GCCS including the second part of the North Quarry cap and requires construction of the isolation break.

### **Enhanced Gas Collection and Control System (Including Capping of North Quarry)**

1. The department understands that Republic Services' submission of the July 27<sup>th</sup> Plan-Part 2 and a subsequent filing on July 30<sup>th</sup> related to the GCCS will include an evaluation and explain the planned enhancements and whether additional vertical gas extraction wells will be installed in the North Quarry. The department remains concerned that overdrawing of the GCCS at the facility is problematic as it may introduce oxygen into

the waste mass that could result in additional Subsurface Oxidation (SSO) events. From our discussions regarding the department's July 3, 2013 letter on the GCCS, the department understands that Republic Services is closely watching this system and taking action, where needed. These actions have included de-watering and maintenance of gas extraction wells in the North Quarry with a focus on limiting oxygen intrusion into the waste mass.

2. Due to the continuing SSE and periodic pillowing of the interim cap, the department requests Republic Services provide an analysis of the facility's current flare capacity and a determination of whether or not the current system has the ability to handle additional landfill gas should the SSE move into the North Quarry.
3. In order to address public nuisance issues, the department has the right to require installation of the North Quarry cap sooner should odors again increase and be attributable to landfill fugitive emissions coming from the existing earthen cap.
4. Due to the continuing nature of the SSE, Republic Services must provide an evaluation of the current on-site soil resources and the logistical plans that are in place to ensure timely application of those soils to an SSE outbreak, if one were to occur.

### **Construction Timeframes**

1. The construction timeframes provided in the Plan - Part 1 and discussed during our meetings fail to provide for an adequate factor of safety to complete all contingent construction activities prior to the area potentially being affected by an expanding SSE. From discussions, the department understands the elapsed times for the different construction activities were intended to be cumulative rather than aggregated. In the next submission, please clearly identify the total number of days from start to finish for each listed project. It is the department's expectation that upon approval of the Plan contracts will be established to ensure that contingency actions can be timely implemented. Please provide justification and the assumptions used for determining the total number of days for completion of projects. Due to the unknown waste materials and velocity at which the SSE could travel through the North Quarry, the time frames must include a factor of safety that takes into account a shortened implementation time. As such, a SSE progression rate of no less than two (2) feet per day (based on observations of movement through the South Quarry) must be used.
2. Based upon the construction time frame provided and the proposed location of GIW Line 3, the department is concerned whether there is adequate time for installation. Please provide verification and the calculations and assumptions used to show the proposed installation timeframe is achievable. If not, Republic Services will need to install GIW Line 3 now.

### **Gas Interceptor Wells**

1. The department understands from Republic Services' statements during our meetings that proposed GIW Line 3 will build upon the established zone of influence from the existing two rows of GIWs and build on their heat and pressure removal capacity.
2. Should the existing two rows of GIWs fail, installation of another similar line of GIWs without additional measures is unapprovable by the department. If Republic Services proposes a third row of GIWs in this series, the GIW line must be enhanced with engineering components such as inert gas injection or a cooling system to actively remove the heat.
3. The enhancements must include evaluation of the GIW spacing and depth for adequate radius of influence. This evaluation must be submitted as part of the resubmittal.
4. During our meetings, Republic Services mentioned other possible enhancements, such as liquid injection. If Republic Services is still considering these options as viable, the department is open to their submission for consideration.

### **Temperature Monitoring Probes**

1. During our meetings, the department discussed the current TMP locations and the need for adequate coverage in the neck for timely detection of SSE movement. Due to the varying topography of the quarry walls, Republic Services needs to install TMPs to ensure full coverage from the east side of the neck to the west side.
2. Appendix F refers to a procedure for checking resistivity to determine accuracy of temperature readings. Is the resistivity of these TMPs verified prior to installation? Is the resistivity then re-verified after TMP installation? Please provide a copy of the quality assurance and quality control procedures related to the thermocouple resistivity as part of the resubmittal.
3. On page 13 of the Plan - Part 1, Appendix F is said to contain the "procedures for reading and verifying TMP temperature readings." Appendix F did not contain detailed procedures for collection of temperature data.

### **Isolation Barrier**

1. Due to its proposed general location, no portion of the isolation barrier required to be included in Part 2 of the Plan may be implemented until an evaluation of the barrier's final location is approved by the department and the U.S. Environmental Protection Agency. Therefore, such an evaluation must be submitted as a section of Part 2 and must

detail how the proposed location between the North Quarry and West Lake Landfill Operable Unit 1, Area 1 is suitable for construction of such an isolation barrier and that resulting excavated materials will be properly managed.

2. To determine the presence or absence of any radiologically impacted material within the proposed excavation lines, the plan must incorporate sufficient sampling/monitoring to ensure identification of such radiologically impacted material and must include a waste characterization component, i.e. types of waste present and quantities. Based on our discussions, Republic Services will be including work plan as part of its Part 2 submission to confirm geotechnical subsurface conditions in the area as well as to determine the presence of any radiologically impacted material.

### **Isolated SSO-North Quarry**

1. The department understands from our meetings that Section 5 of the Plan - Part 1 includes procedures for managing a localized SSO should one occur in the North Quarry. The procedures need to be clarified and timelines for contingent actions included.
2. The department must be immediately notified whenever a localized SSO is suspected in the North Quarry by Bridgeton Landfill. For business hours call the SWMP Engineering Section Chief or Program Director at (573) 751-5401 and for afterhours, call the 24-hour Spill Line at (573) 634-2436. The department shall be provided an opportunity to observe confirmatory sampling, co-sample, and/or complete independent sampling.
3. Any triggering of sentry criteria in Table 1 for temperature and/or CO in the North Quarry shall require Republic Services to immediately provide verbal notification to the department and a written notice to the department within 48 hours. For business hours, call the SWMP Engineering Section Chief or Program Director at (573) 751-5401 and for afterhours, call the 24-hour Spill Line at (573) 634-2436. If such triggering is verified, construction of the isolation break must begin immediately.

### **Monitoring**

1. Per Section 4.2 of the Plan - Part 1, Lab Gas Quality data must be submitted monthly so that timely detection of SSE movement can be made.
2. Page 19 of the Plan states if any GEW exhibits well head temperature > 160 °F monthly CO testing will be performed on the gas well. Due to the need for early detection of SSE movement, this limit must be lowered to 145 °F for wells in the North Quarry. Additional GEWs within the North Quarry that have temperatures greater than 145 °F shall be monitored and reported weekly until the temperatures drop below 140 °F.

Mr. Brian Power  
Bridgeton Sanitary Landfill, LLC  
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**Leachate Collection System**

1. An evaluation of the enhanced Leachate Collection System must be submitted to provide assurance that the infrastructure, storage, and pre-treatment and treatment capacities of the proposed upgraded system are sufficient to handle the increased leachate generation should the SSE reach the North Quarry. This evaluation must consider the existing non-functioning leachate collection sumps, e.g. LCS -1, -3 and -4 and the additional liquid they will produce once fully operational.
2. Please note, during our meetings, Republic Services indicated the department should anticipate receiving a construction plan for installation of four 1 million gallon leachate storage tanks by July 25<sup>th</sup>, followed by a leachate system evaluation and then a leachate pretreatment plan by September 1, 2013.

Please resubmit a revised Plan - Part 1 signed and sealed by a professional engineer registered in the state Missouri within 20 days of receipt of this comment letter per Section 11 of the First Agreed Order. If the revised Plan - Part 1 is submitted using an FTP site, please also provide an original, sealed document sent to the department at P.O. Box 176, Jefferson City, Missouri 65102-0176.

If you have any questions or comments regarding this letter, please contact me or our program director Mr. Chris Nagel at (573) 526-3940.

Sincerely,

SOLID WASTE MANAGEMENT PROGRAM



Charlene S. Fitch, P.E.  
Chief, Engineering Section

CSF:brjpbm

- c: Peter Carey, P.E., P.J. Carey & Associates, P.C  
Michael Beaudoin, P.E., Civil & Environmental Consultants, Inc.  
Mr. Ronald Hammerschmidt, U.S. Environmental Protection Agency, Region VII  
Mr. Joseph Bindbeutel, Attorney General's Office  
Mr. Jonathan Garoutte, Department of Health and Senior Services  
Ms. Laura Yates, St. Louis County Department of Health  
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Mr. Larry Lehman, Chief, Compliance/Enforcement Section, SWMP  
Ms. Brenda Ardrey, Chief, Operations Section, SWMP  
St. Louis Regional Office via Electronic Shared File