STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

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

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JUL 30 2014

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

RE: Review of Detection Monitoring Report for Bridgeton Landfill and Assessment Monitoring Plan, Permit Number 0118912, St. Louis County

Dear Mr. Power:

The Missouri Department of Natural Resources' Solid Waste Management Program (SWMP) has reviewed the October 2013 semi-annual groundwater report for the Bridgeton Landfill titled "Detection Monitoring Program Groundwater Statistical Analysis Semi-Annual Report October 2013 Sampling Event", received on January 3, 2014, along with the Assessment Monitoring Plan (AMP) for the Bridgeton Landfill titled "Assessment Monitoring Plan – Wells 104-SS and 104-SD", dated December 17, 2013, and received on December 18, 2013. In completing our review, we also considered data from similarly titled reports for the April 2013, November 2012, May 2012, November 2011, May 2011, and November 2010 sampling events.

The groundwater monitoring reports and the AMP were prepared and submitted by Herst and Associates on behalf of Republic Services, Inc. The groundwater monitoring and statistical analysis reporting was performed using intra-well prediction limit calculations.

The following general comments and specific comments are related to the review and analysis of the reports:

GENERAL COMMENTS:

1. The sampling event data identifies statistically significant evidence of contamination that is impacting the quality of groundwater under and/or surrounding the Bridgeton Landfill. As a result, it is imperative that not only the AMP characterization continue forward, but timely actions be taken to develop and implement final corrective measure(s). Bridgeton Landfill will need to conduct both the continued characterization assessment and development of corrective measures under a parallel process as is technically feasible.

2. During our review, we identified statistically significant increases (SSI) in certain constituents found in Appendix I Constituents for Detection Monitoring that are detailed below in the Specific Comments Section. Effective immediately, Bridgeton Landfill is required to monitor groundwater on a quarterly basis (i.e., August, November, February, and May) until such time as notified by the department that increased sampling is no longer necessary. (10 CSR 80-3.010 (11)(C)4.D.)

3. When concentrations of any constituents listed in Appendix II are above the groundwater protection standards, Bridgeton Landfill is required to provide the department a report assessing potential corrective measures, characterize the nature and extent of the release and continue assessment monitoring per the groundwater quality assessment plan and implement a corrective action program. Bridgeton Landfill must immediately initiate an assessment of corrective measures for the constituents which are detailed below in the Specific Comments Section and submit a report describing the assessment of corrective measures to the SWMP within 90 days of this letter. (10 CSR 80-3.010(11)(C)6.(I) and 10 CSR 80-3.010(12))

4. Should additional constituents listed in Appendix II be identified in future assessment sampling events as being above the groundwater protection standards, those additional constituents will need to be added to the corrective action plan. Bridgeton Landfill must then immediately initiate an assessment of corrective measures and submit to the SWMP within 90 days a report describing such assessment. (10 CSR 80-3.010(11)(C)6.(I) and 10 CSR 80-3.010(12))

5. With the requirement for a corrective action plan, Bridgeton Landfill will need to develop and submit along with the corrective action plan a cost estimate worksheet and establish applicable financial assurance.

SPECIFIC COMMENTS:

The following comments are related to the semi-annual monitoring events:

1. The April and October 2013 sampling events confirmed all of the volatile organic compound (VOC) detections in monitoring wells 104-SS and 104-SD that were detected in the 2012 monitoring events. Both monitoring wells 104-SS and 104-SD are located on the opposite side of the landfill from PM Resources, a company known as a contamination source. The contaminants released into the environment by PM Resources include benzene, toluene, ethylbenzene, and xylenes along with some of their volatile breakdown components. It is not likely PM Resources is a source for the VOC detections in monitoring wells 104-SS or 104-SD. As there are no other known or nearby potential sources, the Bridgeton Landfill is the likely source of the ongoing VOC detections in 104-SS and 104-SD.

Note: The trace detection of vinyl chloride in monitoring well 110-SS was not confirmed, and the initial detection of chloroethane in monitoring well 104-SS was not confirmed.

2. The May 2012 sampling event detected new VOCs including benzene and toluene in monitoring well 104-SD which monitors the Salem formation. Benzene was detected at a concentration of 57 ppb, which exceeds the federal Maximum Contaminant Level (MCL) of 5 ppb. The November 2012 sampling event confirmed the detections in monitoring well 104-SD with benzene being detected at 350 ppb, as well as several additional VOCs being detected including: 1,4-dichlorobenzene, 1,2-dichloroethane, ethyl benzene and xylenes.

   During the November 2012 event wells used to monitor the St. Louis formations detected a trace level of vinyl chloride in well 110-SS (See Specific Comment #1 above), and multiple VOCs, including benzene at 1,100 ppb and detections of: 1,4-dichlorobenzene, 1,2-dichloroethane, ethyl benzene, 4-methyl-2-pentanone, toluene and xylenes in monitoring well 104-SS.

3. The November 2010 through the November 2011 sampling events confirmed detections of VOCs chlorobenzene and 1,4-dichlorobenzene in monitoring well 114-AS. Monitoring well 114-AS is a shallow monitoring well upgradient of the landfill and downgradient of PM Resources. As noted in Specific Comment #1 above, PM Resources may be a source of the continued VOC detections in monitoring well 114-AS. These VOC detections were consistent with the historical VOC detections in monitoring well 114-AS.

   The following table is a list of the monitoring wells and constituent pairs that were detected above the federal MCLs:

Well	Constituent	Date	Units	Result	PQL	Federal MCL
104-SD	1,2-Dichloroethane	11/27/2012	ug/l	6.7	5	5
104-SS	1,2-Dichloroethane	11/27/2012	ug/l	20	5	5
104-SD	1,2-Dichloroethane	4/11/2013	ug/l	24	5	5
104-SS	1,2-Dichloroethane	4/11/2013	ug/l	43	5	5
104-SS	1,2-Dichloroethane	10/9/2013	ug/l	43	5	5
114-AS	Arsenic	5/11/2011	ug/l	130	5	10
114-AS	Arsenic	5/10/2012	ug/l	130	5	10
114-AS	Arsenic	11/18/2011	ug/l	110	5	10
114-AS	Arsenic	11/27/2012	ug/l	270	5	10
104-SD	Arsenic	4/11/2013	ug/l	27	5	10
114-AS	Arsenic	4/8/2013	ug/l	400	5	10
114-AS	Arsenic	10/8/2013	ug/l	200	5	10
104-SD	Benzene	5/11/2012	ug/l	57	5	5

104-SS	Benzene	11/27/2012	ug/l	1,100	50	5
104-SS	Benzene	4/11/2013	ug/l	2,400	100	5
114-AS	Benzene	4/8/2013	ug/l	8.9	5	5
104-SD	Benzene	10/7/2013	ug/l	920	10	5
104-SS	Benzene	10/9/2013	ug/l	2,200	50	5
104-SD	Toluene	4/11/2013	ug/l	1,800	100	1,000
104-SD	Xylenes	11/27/2012	ug/l	31	5	10
104-SS	Xylenes	11/27/2012	ug/l	48	5	10

The following comments are related to the Assessment Monitoring Plan.

4. Missouri Geological Survey (MGS) is being provided the well installation report to evaluate if placement of the six (6) new assessment monitoring wells and the two (2) background monitoring wells is adequate for monitoring the rate and extent of impacted groundwater. Should MGS have additional comments or recommendations regarding the placement of monitoring wells or installation, those will follow under separate cover.

5. 10 CSR 80-3.010(11)(C)6.D provides, in part, that a minimum of one (1) sample from each downgradient well at which Appendix II constituents were detected shall be collected and analyzed at each subsequent sampling event. For any new constituents detected during assessment monitoring (that were not detected during detection monitoring) in the downgradient wells, a minimum of four (4) statistically independent samples from each well (upgradient and downgradient) shall be collected and analyzed to establish background for the new constituents.

6. Section 4.1 of the proposed AMP will need to be corrected to include all of the Appendix II constituents along with the organic constituents that were detected during the split sampling event in November 2012. Specifically, the constituents 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-chlorobutane, isopropylbenzene, methyl-t-butyl ether (MTBE), p-isopropyltoluene, and tetrahydrofuran need to be included in the assessment constituents list, and Table 4-2 must then be updated to reflect their inclusion. Additionally, groundwater protection standards (GWPS) will need to be proposed for all constituents detected in the samples, and specific reference provided for the source of the GWPS that is proposed. Once all constituents detected have had GWPS proposed, SWMP will complete the AMP review.

7. Please make the corrections and submit a revised AMP for approval. The next monitoring event will be the first sampling event for the assessment monitoring wells and the wells will need to be sampled for Appendix II constituents. Upon approval, Bridgeton Landfill shall implement the AMP in order to characterize the background levels of the Appendix II constituents, determine the extent to which those constituents are detectable in the groundwater above those determined

background levels and/or above the groundwater protection standards and address all other applicable requirements in the regulation (10 CSR 80-3.010(11)(C)6.D through J).

According to the submitted data, the following table shows additional inorganic constituents that have exceeded the prediction limits and are trending upward.

Inorganics

Constituent	Well	Date	Result	MCL
Arsenic	104-SD	4/11/2013	27	10
Arsenic	114-AS	10/08/2013	200	10
Chromium	104-SD	10/08/2013	12	100
Barium	104-SD	4/11/2013	2,000	2,000
Chloride	106-SS	10/07/2013	24	n/a
Iron	104-SD	10/07/2013	8.2	n/a
Phosphorus	114-AS	10/08/2013	2	n/a

Additionally, the following table contains VOCs that have statistically significant increases (SSI), but have not yet exceeded the MCL.

Well	Constituent	Date	Units	Result	PQL	Federal
104-SS	1,4 dichlorobenzene	11/27/2012	ug/l	8.2	5	
104-SS	1,4 dichlorobenzene	4/11/2013	ug/l	6.3	5	
104-SS	1,4 dichlorobenzene	10/9/2013	ug/l	7.5	5	
114-AS	1,4 dichlorobenzene	4/11/2013	ug/l	5.4	5	
114-AS	1,4 dichlorobenzene	10/8/2013	ug/l	6.3	5	
104-SS	2-Hexanone	4/11/2013	ug/l	72	10	
104-SS	2-Hexanone	10/9/2013	ug/l	52	10	
104-SS	4-Methyl-2-pentanone	11/27/2012	ug/l	63	10	
104-SS	4-Methyl-2-pentanone	4/11/2013	ug/l	220	10	
104-SS	4-Methyl-2-pentanone	10/9/2013	ug/l	210	10	
104-SD	Acetone	4/11/2013	ug/l	59	10	
104-SD	Acetone	10/7/2013	ug/l	3,000	100	
114-AS	Chlorobenzene	11/27/2012	ug/l	42	5	
104-AS	Chlorobenzene	4/11/2013	ug/l	86	5	
114-AS	Chlorobenzene	10/8/2013	ug/l	69	5	
104-SD	Ethylbenzene	11/27/2012	ug/l	11	5	700
104-SD	Ethylbenzene	4/11/2013	ug/l	24	5	700
104-SD	Ethylbenzene	10/7/2013	ug/l	18	5	700
104-SS	Ethylbenzene	10/9/2013	ug/l	35	5	700
104-SD	Methyl ethyl ketone	4/11/2013	ug/l	37	10	
104-SD	Methyl ethyl ketone	10/7/2013	ug/l	1,900	100	
104-SS	Toluene	11/27/2012	ug/l	78	5	1,000
104-SS	Toluene	4/11/2013	ug/l	140	100	1,000
104-SS	Toluene	10/9/2013	ug/l	150	50	1,000
104-SD	Toluene	5/11/2012	ug/l	5.5	5	1,000
104-SD	Toluene	11/27/2012	ug/l	140	10	1,000
104-SD	Toluene	10/7/2013	ug/l	250	10	1,000
104-SD	Xylenes	11/27/2012	ug/l	31	5	10,000
104-SD	Xylenes	4/11/2013	ug/l	58	5	10,000
104-SD	Xylenes	10/7/2013	ug/l	42	5	10,000
104-SS	Xylenes	11/27/2012	ug/l	48	5	10,000
104-SS	Xylenes	4/11/2013	ug/l	66	5	10,000
104-SS	Xylenes	10/9/2013	ug/l	78	5	10,000

The following comment is related to timely development of a corrective measures assessment:

8. The April and October 2013 sampling events have confirmed the presence of 1,2-dichloroethane, arsenic, and benzene in monitoring wells 104-SS and 104-SD that were previously detected in the 2012 monitoring events. Benzene in particular has shown a rapid increase in concentration well in excess of the MCL. Therefore, Bridgeton Landfill must comply with the corrective action requirements for the constituents 1,2-dichloroethane, arsenic, and benzene. (10 CSR 80-3.010(11)(C)6.(I) and 10 CSR 80-3.010(12))

If you should have any questions about this letter or the assessment monitoring activities, please contact Ms. Connie Rozycki at 573-526-3940 or P.O. Box 176, Jefferson City, MO 65102-0176.

Sincerely,

SOLID WASTE MANAGEMENT PROGRAM

Charlene S. Fitch

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

CSF:crl

c: Mr. Andrew Wyatt, Herst & Associates
Mr. Larry Lehman, Chief, Compliance/Enforcement Section SWMP
St. Louis Regional Office via Electronic Shared File