

November 2023 Monthly Compliance Report

Solid Waste Permit No. 221
Bristol Integrated Solid Waste Management Facility
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INTRODUCTION

On behalf of the City of Bristol, Virginia (City), SCS Engineers (SCS) has prepared this report to the Virginia Department of Environmental Quality (VDEQ). This report covers the Solid Waste Permit (SWP) No. 221 Landfill during the month of November.

The following sections outline actions completed towards the applicable items in Appendix B of the Consent Decree. The sections have been numbered to align with the numbering in Appendix B.

2.0 COVER INTEGRITY AND EXPOSED WASTES

As outlined in Appendix B of the Consent Decree, cover integrity of the SWP No. 221 Landfill will be managed primarily through ongoing surface emissions monitoring in accordance with Federal and State regulations.

2.3 SURFACE EMISSIONS MONITORING

On October 12, 2022, SCS performed surface emissions monitoring (SEM) on the landfill. During the monitoring event no exceedances were detected on the serpentine route or at pipe penetrations. Details of the surface emissions monitoring were included in the October 2022 Monthly Compliance Report for the SWP No. 221 Landfill and in a letter outlining the results submitted to VDEQ on October 28, 2022.

The 2023 Annual SEM Event will be performed in conjunction with the SWP No. 498 and SWP No. 588 Fourth Quarter Monitoring Event, which is scheduled to be performed during the month of December 2023.

3.0 GAS COLLECTION

The City has taken steps to optimize gas collection and minimize air intrusion as outlined in the sections below.

3.1 SYSTEM OPTIMIZATION

There are currently 15 vertical extraction wells in the SWP No. 221 Landfill Area (Well Nos. 1 – 15). In waste disposal units where the age of the buried wastes is greater than 40 years, as is the case at SWP No. 221 Landfill, the rate and quantity of decomposition gas production declines significantly compared to the rate and quantity of LFG generated in more recently buried wastes. However, some of these devices will show normal methane ranges and are tuned accordingly. There is no historical evidence of elevated temperatures in the SWP No. 221 Landfill. Also, the No. 221 Landfill Area is not believed to be a significant source of fugitive LFG emissions or odors.

Each month, adjustments are made during routine wellfield monitoring to optimize gas quality and applied vacuum on the Area 221 wells. The Phase 1 Landfill Gas Project in Area 588 concluded in October 2023. As a result, Area 221 has seen consistent vacuum being applied to its extraction wells. However, the average available pressure at the time of November's tuning event has increased significantly from the previous month. During the November monitoring event, adjustments were made as necessary to tune the 1-inch wellheads on all extraction wells in Area 221. The average gas composition in the Area 221 wells is shown in Table 1. Average methane

content for the Area 221 wells has increased slightly. Oxygen has decreased slightly for the month following November’s monthly tuning event. The rise in average methane content with a decrease in oxygen would indicate more effective landfill gas collection in this area.

To accommodate the additional landfill gas infrastructure in SWP No. 588, the vacuum setpoint at the Parnel flare skid was increased from -25”wc to -30”wc on June 14, 2023. Upon delivery of the supplemental PEI flare skid in August 2023, the vacuum setpoint at the Parnel flare was reduced to the original -25”wc setpoint. These setpoint change affects all extraction devices that are under vacuum within the three areas within Bristol ISWMF including the Area 221 Landfill. SCS will continue to adjust the affected devices until the results are consistent with previous months. The average vacuum for all devices in Area 221 was -20.7”wc for November, an increase from October.

Landfill gas constituent concentrations in the SWP No. 221 Landfill wells are sensitive to subtle changes in applied vacuum from wellhead control valve adjustments. There are occasionally substantial fluctuations in the LFG composition quality (high methane and low nitrogen versus exhibiting lower methane and higher nitrogen) that coincide with modest (less than 5 percent) changes in the applied vacuum. Gas composition and a summary of adjustments made to individual wells are listed in Appendix A.

Table 1. Monthly Average Wellhead LFG Composition – SWP No. 221 Well

Month	Average CH ₄ (% Vol)	Average CO ₂ (% Vol)	Average O ₂ (% Vol)	Average Pressure (inches w.c.)
November 2022	47.4	33.7	3.3	-11.9
December 2022	58.7	39.6	0.3	-2.7
January 2023	39.8	27.0	6.0	-20.6
February 2023	42.5	28.1	7.2	-15.6
March 2023	53.5	33.6	2.9	-20.4
April 2023	56.7	35.2	1.2	-20.7
May 2023	52.9	35.4	1.8	-18.8
June 2023	57.4	38.3	0.4	-17.4
July 2023	57.5	37.7	0.3	-5.2
August 2023	52.4	35.4	1.3	-16.8
September 2023	16.5	12.9	15.6	-6.4
October 2023	21.6	15.1	12.6	-4.9
November 2023	36.2	26.5	7.1	-20.7

3.2 OPTIMIZATION PLAN AND REPORTING

3.2.1 Optimization Plan

On December 1, 2022, on behalf of the City, SCS submitted a plan that provides for means and methods for optimizing the performance of the existing gas extraction system in the Solid Waste Permit No. 221 landfill. Additional details about that plan were included along with a copy of the plan in the November 2022 Monthly Compliance Report for the SWP No. 221 Landfill.

3.2.2 Optimization Actions

During the month of January 2023 actions were taken to implement the submitted Optimization Plan. The actions taken at the SWP No. 221 Landfill in accordance with the plan were summarized in the January 2023 Monthly Compliance Report for the SWP No. 221 Landfill. SCS prepared a report that detailed the results of each of these activities and the report was submitted to VDEQ on February 1, 2023.

3.2.3 Monthly Wellhead Monitoring

On November 2, 2023 and November 17, 2023, SCS Field Services (SCS-FS) visited the landfill and performed monitoring of the landfill gas wells. The results of the monthly monitoring were submitted to VDEQ on December 6, 2023 and are included in Appendix A. The results of the monthly monitoring also include comments regarding observations and adjustments made by the field technician.

Appendix A

November Monthly Wellhead Monitoring Data

Bristol Virginia Landfill - Permit 221 Well Data - 09/01/2023 to 11/30/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H2O)	Temp (F)	System Pressure ("H2O)	Comments
01	9/8/2023 08:50	12.5	12.4	19.3	55.8	-6.1	-6.1	73.5	-6.5	Valve Adjustment:No Change
01	9/26/2023 10:16	0.0	0.0	19.9	80.1	-8.1	-8.1	80.6	-8.0	Valve Adjustment:No Change
01	9/29/2023 11:06	0.1	0.0	19.9	80.0	-7.7	-7.4	84.6	-8.0	Valve Adjustment:Closed Valve > 1 turn
01	10/9/2023 09:51	2.8	3.2	21.1	72.9	-4.9		62.9	-5.5	Valve Adjustment:Closed valve 1/2 to 1 turn
01	11/2/2023 15:31	0.3	0.8	20.3	78.6	-22.2	-22.2	77.2	-22.2	Valve Adjustment:Closed valve 1/2 to 1 turn
02	9/8/2023 08:52	0.1	0.4	20.4	79.2	-6.1	-6.1	69.5	-6.7	
02	9/26/2023 10:07	0.0	0.0	19.9	80.0	-8.1	-8.1	65.8	-8.1	Valve Adjustment:No Change
02	9/29/2023 11:09	0.1	0.0	19.9	80.0	-7.7	-7.7	74.7	-8.0	Valve Adjustment:Closed Valve > 1 turn
02	10/9/2023 09:54	4.2	2.5	20.1	73.2	-5.5	-5.2	56.5	-5.6	Valve Adjustment:Closed valve 1/2 to 1 turn
02	11/2/2023 15:41	60.6	39.4	0.0	0.0	-22.4	-22.4	74.7	-22.3	
03	9/8/2023 08:55	5.7	3.1	18.8	72.4	-6.1	-6.1	68.1	-6.4	Valve Adjustment:No Change
03	9/26/2023 10:01	0.0	0.0	20.0	79.9	-8.1	-8.1	70.9	-8.0	Valve Adjustment:No Change
03	9/29/2023 11:11	0.1	0.0	19.8	80.1	-7.8	-7.1	77.5	-8.0	Valve Adjustment:Closed Valve > 1 turn
03	10/9/2023 09:56	6.4	4.1	19.2	70.4	-3.2	-3.2	54.7	-5.6	Valve Adjustment:Closed valve 1/2 to 1 turn
03	11/2/2023 15:47	41.1	41.2	0.0	17.7	-17.5	-18.7	81.3	-22.3	
04	9/8/2023 08:57	38.9	31.1	5.9	24.1	-6.1	-6.1	80.3	-6.4	Valve Adjustment:No Change
04	9/26/2023 09:58	0.1	0.0	20.0	79.9	-8.1	-8.1	83.1	-8.0	Valve Adjustment:No Change
04	9/29/2023 11:16	1.0	0.3	19.5	79.3	-7.8	-2.6	87.6	-8.0	Valve Adjustment:Closed Valve > 1 turn
04	10/9/2023 09:58	16.2	12.8	16.4	54.6	-0.3	-0.3	63.8	-5.6	
04	11/2/2023 15:50	41.3	42.2	0.0	16.5	-16.5	-20.7	67.5	-22.0	
05	9/8/2023 08:59	20.0	20.1	18.4	41.6	-6.1	-6.1	78.3	-6.4	Valve Adjustment:No Change
05	9/26/2023 09:54	0.1	0.2	19.9	79.8	-8.1	-8.1	78.6	-8.1	Valve Adjustment:No Change
05	9/29/2023 11:19	0.3	0.1	19.8	79.9	-7.8	-7.3	86.8	-8.0	Valve Adjustment:Closed Valve > 1 turn
05	10/9/2023 10:00	0.3	1.0	21.3	77.4	-5.2	-5.2	61.6	-5.9	Valve Adjustment:Closed valve 1/2 to 1 turn
05	11/2/2023 15:58	54.2	42.6	0.3	2.8	-20.5	-21.6	73.6	-22.1	Valve Adjustment:Opened Valve 1/2 to 1 turn
06	9/8/2023 09:10	0.0	0.1	20.4	79.6	-6.1	-6.1	77.3	-6.4	Valve Adjustment:No Change
06	9/26/2023 09:50	0.3	0.4	19.8	79.6	-8.1	-8.1	74.2	-7.9	
06	9/29/2023 10:38	1.3	0.9	19.6	78.2	-8.1	-7.7	85.1	-8.0	Valve Adjustment:Closed Valve > 1 turn
06	10/9/2023 10:04	37.6	20.1	0.6	41.7	6.0	5.9	62.7	-6.3	
06	10/30/2023 09:57	53.5	35.2	1.9	9.4	-20.2	-20.1	64.1	-20.0	
06	11/2/2023 16:05	8.2	6.0	17.8	68.1	-21.8	-21.2	69.4	-22.0	Valve Adjustment:Closed valve 1/2 to 1 turn
07	9/8/2023 08:28	28.8	21.9	10.0	39.2	-5.8	-5.8	70.4	-6.3	Valve Adjustment:No Change
07	9/26/2023 10:37	1.0	0.4	19.5	79.1	-7.7	-7.7	87.5	-8.0	Valve Adjustment:No Change
07	9/29/2023 10:42	58.9	38.7	0.2	2.2	-7.8	-7.8	86.9	-7.7	Valve Adjustment:Valve completely open



Bristol Virginia Landfill - Permit 221 Well Data - 09/01/2023 to 11/30/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H2O)	Temp (F)	System Pressure ("H2O)	Comments
07	10/9/2023 09:12	1.9	2.8	20.5	74.8	-5.3	-5.2	62.0	-5.6	Valve Adjustment:Closed valve 1/2 to 1 turn
07	11/2/2023 15:07	59.6	39.1	0.4	1.0	-21.3	-21.5	79.1	-22.3	Valve Adjustment:No Change
08	9/8/2023 08:32	0.1	0.3	20.6	79.1	-5.8	-5.8	69.3	-6.2	Valve Adjustment:No Change
08	9/26/2023 10:30	4.5	2.2	18.6	74.7	-7.9	-7.8	86.8	-7.7	Valve Adjustment:No Change
08	9/29/2023 10:45	0.4	0.7	19.8	79.1	-8.0	-6.4	88.0	-8.0	Valve Adjustment:Closed Valve > 1 turn
08	10/9/2023 09:15	12.5	8.7	17.1	61.7	-4.3	-4.1	57.4	-5.6	Valve Adjustment:Closed valve 1/2 to 1 turn
08	11/2/2023 15:09	45.6	29.0	4.7	20.7	-22.3	-22.2	69.0	-22.2	Valve Adjustment:No Change
09	9/8/2023 08:36	0.0	0.1	20.7	79.3	-5.8	-5.8	69.8	-6.2	Valve Adjustment:No Change
09	9/26/2023 10:27	0.0	0.0	19.8	80.2	-8.0	-8.0	87.1	-8.1	Valve Adjustment:No Change
09	9/29/2023 10:50	0.1	0.1	20.0	79.8	-8.1	-3.5	86.2	-8.0	Valve Adjustment:Closed Valve > 1 turn
09	10/9/2023 09:18	45.2	26.1	0.5	28.2	10.0	10.0	63.1	-5.6	
09	10/30/2023 10:00	52.7	36.5	1.5	9.4	-20.2	-20.2	65.3	-20.0	
09	11/2/2023 15:14	8.9	5.8	17.3	68.0	-22.2	-17.9	71.1	-22.3	Valve Adjustment:Closed Valve > 1 turn
10	9/8/2023 08:41	0.1	0.0	20.7	79.3	-5.8	-5.8	70.4	-6.4	
10	9/26/2023 10:23	0.0	0.0	19.8	80.2	-8.1	-8.0	85.5	-8.1	Valve Adjustment:No Change
10	9/29/2023 10:53	0.1	0.2	20.1	79.7	-8.0	-7.1	84.2	-8.0	Valve Adjustment:Closed Valve > 1 turn
10	10/9/2023 09:20	44.1	36.3	1.7	17.9	-4.8	-4.8	60.3	-5.6	
10	11/2/2023 15:18	55.9	42.0	0.5	1.6	-30.4	-22.2	73.1	-22.3	Valve Adjustment:Opened Valve 1/2 to 1 turn
11	9/8/2023 08:46	39.3	32.2	14.3	14.2	-5.8	-5.9	74.7	-6.4	Valve Adjustment:No Change
11	9/26/2023 10:13	0.0	0.0	19.9	80.0	-8.0	-8.1	76.0	-8.0	Valve Adjustment:No Change
11	9/29/2023 11:00	0.2	0.2	19.9	79.7	-7.8	-7.7	82.7	-8.0	Valve Adjustment:Closed Valve > 1 turn
11	10/9/2023 09:27	22.0	14.8	12.4	50.8	-5.5	-5.5	58.3	-5.6	
11	11/2/2023 15:27	59.0	41.0	0.0	0.0	-22.3	-22.2	69.9	-22.3	
12	9/8/2023 08:44	51.0	36.8	2.0	10.2	-6.1	-6.1	71.9	-6.3	Valve Adjustment:No Change
12	9/26/2023 10:19	0.0	0.0	19.9	80.1	-8.1	-8.1	80.3	-8.1	Valve Adjustment:No Change
12	9/29/2023 11:03	0.1	0.0	19.9	79.9	-7.9	-7.7	80.4	-8.0	Valve Adjustment:Closed Valve > 1 turn
12	10/9/2023 09:23	0.2	0.6	21.2	78.0	-5.2	-5.2	57.1	-5.6	
12	11/2/2023 15:24	24.9	17.7	11.6	45.9	-21.9	-19.5	72.7	-22.3	Valve Adjustment:Closed valve 1/2 to 1 turn
13	9/8/2023 09:00	1.1	2.5	20.2	76.3	-6.1	-6.1	76.8	-6.7	Valve Adjustment:No Change
13	9/26/2023 10:04	0.1	0.0	19.9	80.0	-8.1	-8.1	74.0	-8.1	Valve Adjustment:No Change
13	9/29/2023 11:23	0.1	0.0	20.0	79.9	-7.8	-7.4	80.7	-8.3	Valve Adjustment:Closed Valve > 1 turn
13	10/9/2023 10:03	10.5	8.0	17.7	63.8	-4.9	-5.0	60.9	-5.9	
13	11/2/2023 15:54	12.0	11.1	15.0	61.9	-4.6	-4.5	65.0	-22.0	Valve Adjustment:Closed valve 1/2 to 1 turn
14	9/8/2023 09:02	0.1	0.2	20.4	79.2	-6.1	-6.1	78.2	-6.4	Valve Adjustment:No Change



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14	9/26/2023 10:33	0.0	0.0	19.8	80.1	-7.8	-7.7	88.7	-8.0	Valve Adjustment:No Change
14	9/29/2023 11:27	59.6	35.8	0.2	4.4	-8.0	-8.0	83.1	-8.0	Valve Adjustment:No Change
14	10/9/2023 09:32	27.9	20.2	10.1	41.7	-5.3	-5.5	68.7	-5.3	
14	11/17/2023 11:19	64.5	35.4	0.1	0.0	-21.7	-21.9	84.5	-21.9	
15	9/8/2023 08:48	49.5	32.9	1.2	16.5	-6.1	-6.1	72.8	-6.4	Valve Adjustment:No Change
15	9/26/2023 10:10	0.0	0.0	19.9	80.1	-7.8	-7.8	71.4	-7.8	Valve Adjustment:No Change
15	9/29/2023 10:57	54.8	36.5	1.7	6.9	-8.0	-7.8	85.8	-8.0	Valve Adjustment:Valve completely open
15	10/9/2023 09:29	29.7	23.2	10.5	36.7	-5.2	-5.5	61.1	-5.5	
15	11/2/2023 15:36	6.4	4.3	18.4	71.0	-22.2	-22.2	72.9	-22.2	

