December 2023
Monthly Compliance Report

Solid Waste Permit No. 221
Bristol Integrated Solid Waste Management Facility
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SCS ENGINEERS

02218208.05-30 | January 10, 2023

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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 December.

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 December 13, 2023, SCS performed surface emissions monitoring (SEM) on the landfill. The monitoring was performed in accordance with the site-specific GCCS Design Plan, the facility's Title V Permit, the requirements of 40 CFR 63.1960(c) and (d), 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface. The frequency for performing surface emissions monitoring at the Closed Landfill is on an annual basis in accordance with the Facility's approved GCCS Design Plan.

The monitoring route included all applicable areas of the Permit No. 221 landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint outside of the active filling area.

During the monitoring event no exceedances were detected on the serpentine route or at pipe penetrations. A letter outlining the results will be submitted to VDEQ at a later date.

Table 1 summarizes the results of the monitoring event.

Table 1. Summary of December Surface Emissions Monitoring

Description	December 13, 2023
Number of Points Sampled	85
Number of Points in Serpentine Route	70
Number of Points at Surface Cover Penetrations	15
Number of Exceedances	0
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	0

SCS anticipates that the 2024 Annual SEM Event will be performed in conjunction with the SWP No. 498 and SWP No. 588 Fourth Quarter Monitoring Event, which will likely be scheduled to be performed during the month of December 2024.

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 average gas composition in the SWP No. 221 wells is shown in Table 2.

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 2. Monthly Average Wellhead LFG Composition – SWP No. 221 Wells

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
December 2023	22.0	16.1	12.8	-18.9

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 December 15, 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 3, 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

December Monthly Wellhead Monitoring Data

Bristol Virginia Landfill - Permit 221 Well Data - 10/01/2023 to 12/31/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	System Pressure ("H20)	Comments
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
01	12/15/2023 09:04	1.2	0.9	21.0	76.8	-17.5	-17.5	47.7	-17.7	
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	
02	12/15/2023 09:12	50.9	35.1	2.5	11.5	-21.0	-21.1	32.0	-20.9	
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	
03	12/15/2023 09:16	4.3	9.0	16.3	70.3	-18.1	-18.1	33.5	-19.7	
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	
04	12/15/2023 09:19	20.9	24.0	7.8	47.2	-19.5	-19.6	56.2	-21.1	
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
05	12/15/2023 09:32	0.4	0.4	21.6	77.6	-20.7	-20.8	56.1	-21.0	
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
06	12/15/2023 08:31	48.9	31.3	4.3	15.5	-14.5	-14.5	47.7	-20.8	
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
07	12/15/2023 08:34	20.7	16.4	13.4	49.5	-20.5	-20.5	52.7	-21.0	
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
08	12/15/2023 08:37	54.8	34.6	1.4	9.2	-21.0	-21.2	52.4	-17.4	
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
09	12/15/2023 08:44	21.7	16.0	13.6	48.7	-18.2	-18.2	48.9	-20.9	
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
10	12/15/2023 08:47	30.2	24.3	9.8	35.7	-20.9	-20.9	52.3	-20.9	
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	
11	12/15/2023 08:54	0.0	0.3	21.6	78.1	-21.2	-21.2	44.8	-21.2	

Bristol Virginia Landfill - Permit 221 Well Data - 10/01/2023 to 12/31/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	System Pressure ("H20)	Comments
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
12	12/15/2023 09:00	0.0	0.0	21.8	78.2	-20.6	-20.7	41.1	-20.6	
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
13	12/15/2023 09:25	8.2	6.6	18.2	67.1	-7.7	-7.7	49.2	-20.7	
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	84.2	-21.9	
14	12/15/2023 08:39	57.5	35.0	0.8	6.7	-20.9	-20.9	52.1	-20.8	
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	
15	12/15/2023 08:51	10.2	7.8	17.8	64.2	-20.6	-20.6	48.6	-20.9