

December Monthly Compliance Report

Solid Waste Permit #221
Bristol Integrated Solid Waste Management Facility
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SCS ENGINEERS

02218208.05 | 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) outlining steps taken towards the actions that VDEQ has requested the City perform. This report covers the Solid Waste Permit (SWP) #221 Landfill during the month of December.

1.0 SURFACE EMISSIONS MONITORING

On October 12, 2022, SCS performed surface emissions monitoring 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 Monthly Compliance Report for the SWP #221 Landfill and in a letter outlining the results submitted to VDEQ on October 28, 2022.

SCS understands that the Solid Waste Permit #221 Landfill is subject to annual surface emissions monitoring (SEM) and therefore no SEM was performed this month.

2.0 GAS COLLECTION

On December 8, 2022, SCS Field Services (SCS-FS) visited the landfill and performed monitoring of the landfill gas wells. The results of that monitoring were submitted to VDEQ on January 4, 2023 and are included in Appendix A. This data will be used to optimize the wellfield and address oxygen intrusion along with the activities described in the rest of Section 2.

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 #221 landfill. Additional details about that plan were included along with a copy of the plan in the November Monthly Compliance Report for the SWP #221 Landfill

Appendix A

December Monthly Wellhead Monitoring Data

January 4, 2023
File No. 07220028.00 Task 6**SENT VIA EMAIL on January 4, 2023**

MEMORANDUM

TO: Jonathan Chapman, VDEQ – SWRO

FROM: Mike Gibbons, SCS Field Services

SUBJECT: Monthly Landfill Gas System Wellhead Monitoring Data
for December, 2022 Landfill Permit Areas 221 and 498
Bristol Integrated Solid Waste Management Facility, Bristol, Virginia

SCS Field Services is submitting this data on behalf of the City of Bristol per DEQ request for monthly landfill gas (LFG) wellhead monitoring data for Solid Waste Permit Areas #221 and #498 for the month of December, 2022.

Area 221

There are currently 15 vertical extraction wells in the SWP #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 #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. There is no historical evidence of elevated temperatures in SWP #221. Also, the #221 Landfill Area is not believed to be a significant source of fugitive LFG emissions or odors.

Adjustments are made during wellhead monitoring to optimize gas quality and applied vacuum on the Area 221 wells. All Area 221 are under vacuum. During the December monitoring, slight adjustments were noted at the following wells GW-01, -02, -03, -04, -05, -06, -08, -09, -10, -11, -12, -13, -14, and -15 in response to high methane at the wellhead. The average gas composition in the Area 221 wells is shown in Table 1. Methane and carbon dioxide concentrations increased over the previous month while oxygen concentration decreased, which is likely attributed to the corresponding reduction in applied vacuum.

Table 1. Monthly Average Wellhead LFG Composition – Area 221 Wells

Month	Average CH ₄ (% Vol)	Average CO ₂ (% Vol)	Average O ₂ (% Vol)	Average Pressure (inches w.c.)
October '22	40.0	29.2	6.4	-14.9
November '22	47.4	33.7	3.3	-11.9
December '22	58.7	39.6	0.3	-2.7

Area 498

The SWP #498 Landfill is approximately 12.0 acres and is located south of the SWP #221 Landfill and east of the SWP #588 Landfill. As of September 2022, mining in Permit #498 has concluded. The majority of the SWP #498 Landfill does not have an active LFG collection system, due to mining operations which have occurred since waste placement was completed. The current system includes four vertical wells (GW-19, GW-20, GW-21, and GW-22) and a condensate trap (CT-1) at the low point. Field reconnaissance efforts in September/October 2022 identified that the header pipe serving the four wells had been severed, blocked, or otherwise compromised. The buried wastes in SWP #498 Landfill Area are greater than 25 years old, thus, the rate and quantity of decomposition gas production has declined significantly compared to the rate and quantity of LFG generated in more recently buried wastes. Accordingly, the methane concentration tends to be substantially lower, the oxygen and nitrogen concentrations tend to be substantially greater, and the quantity of LFG collected declines substantially compared to the years immediately after waste placement. Furthermore, much of the organic wastes in the upper layer have likely decomposed aerobically (i.e., were composted) because of the mining operations. There is no historical evidence of elevated temperatures in SWP #498; however, the methane-to-carbon dioxide ratio measured in the wellheads can sometimes be less than 1 due to the fact that the wastes are becoming biochemically stabilized (meaning organic wastes have been more fully decomposed) and the rate of methanogenesis has declined. Also, the #498 Landfill Area is not believed to be a significant source of odors.

Extraction well GW-19 in Area 498 was monitored and adjusted to control migration. Work is planned to restore vacuum to the remaining wells in Area 498 by excavating the existed header piping and repairing or replacing it as needed. Extraction wells GW-16, -17, -18, and -23 are perimeter migration control wells affiliated with Permit #498. These wells were monitored and adjusted as needed to control migration.



Bristol Virginia Landfill - Permit 221 and 498 Well Data - 12/01/2022 to 12/31/2022

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)	Flow (scfm)	System Pressure ("H2O)	Comments
01	12/8/2022 11:41	60.0	40.0	0.0	0.0	-3.6	-3.6	57.5	126.1	-3.6	Opened Valve 1/2 to 1 Turn
02	12/8/2022 11:33	56.0	37.0	1.1	5.9	-1.7	-4.0	64.2	134.5	-3.2	Opened Valve 1/2 to 1 Turn
03	12/8/2022 11:16	56.6	40.6	0.6	2.2	-0.6	-2.7	58.4	121.9	-3.6	Opened Valve 1/2 to 1 Turn
04	12/8/2022 11:03	58.9	41.1	0.0	0.0	-2.3	-2.3	58.2	125.7	-3.8	Opened Valve 1/2 to 1 Turn
05	12/8/2022 10:57	58.3	41.7	0.0	0.0	-3.9	-3.9	56.4	125.3	-3.8	Opened Valve 1/2 to 1 Turn
06	12/8/2022 12:19	57.4	35.0	1.5	6.1	-3.1	-3.0	61.4	127.3	-3.4	Opened Valve 1/2 Turn or Less
07	12/8/2022 12:15	58.4	41.1	0.0	0.5	-2.1	-2.1	61.6	134.9	-3.4	No Change
08	12/8/2022 12:12	60.5	39.5	0.0	0.0	-1.4	-1.4	61.8	126.4	-3.5	Opened Valve 1/2 to 1 Turn
09	12/8/2022 12:03	59.7	40.3	0.0	0.0	-3.1	-3.0	68.8	124.8	-3.4	Opened Valve 1/2 to 1 Turn
09	12/8/2022 12:04	59.6	40.4	0.0	0.0	-3.4	-3.4	62.6	125.4	-3.4	No Change
10	12/8/2022 11:59	57.6	42.4	0.0	0.0	-1.6	-2.1	63.7	145.2	-3.6	Opened Valve 1/2 to 1 Turn
11	12/8/2022 11:51	59.5	40.2	0.3	0.0	-4.4	-4.5	63.9	140.3	-3.2	Opened Valve 1/2 to 1 Turn
12	12/8/2022 11:45	55.5	37.1	1.4	6.0	-4.2	-4.2	57.8	136.2	-4.2	Opened Valve 1/2 to 1 Turn
13	12/8/2022 11:11	57.2	40.2	0.1	2.5	-3.5	-3.6	56.8	125.6	-3.7	Opened Valve 1/2 to 1 Turn
14	12/8/2022 12:09	63.3	36.7	0.0	0.0	-0.2	-0.2	71.5	127.2	-3.5	Opened Valve 1/2 to 1 Turn
15	12/8/2022 11:55	60.0	40.0	0.0	0.0	-4.3	-4.8	58.0	143.9	-4.8	Opened Valve 1/2 to 1 Turn
Average Permit 221		58.7	39.6	0.3	1.5	-2.7					
GW19	12/20/2022 12:03	0.3	6.0	19.0	74.7	-17.7	-17.8	52.7	0.0	-23.1	Opened Valve 1/2 to 1 Turn
Average Permit 498		0.3	6.0	19.0	74.7	-17.7					
16	12/8/2022 12:33	52.4	37.4	0.0	10.2	-6.8	-6.1	60.8	124.7	-8.3	No Change
17	12/8/2022 12:35	58.2	41.6	0.0	0.2	-7.7	-8.2	61.7	128.8	-8.8	Increased Flow/Vacuum
18	12/8/2022 12:43	52.9	39.9	0.0	7.2	-5.3	-5.9	60.4	123.7	-9.7	Opened Valve 1/2 to 1 Turn
23	12/8/2022 12:24	0.4	0.5	20.9	78.2	-0.3	-0.2	53.1	122.9	-3.9	Increased Flow/Vacuum
Average Perimeter Migration Control Wells		41.0	29.9	5.2	24.0	-5.0					

