September 2023
Monthly Compliance Report

Solid Waste Permit No. 221
Bristol Integrated Solid Waste Management Facility
2655 Valley Drive
Bristol, VA 24201
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SCS ENGINEERS

02218208.05-30 | October 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 September.

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, likely to occur in November.

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 wellfield monitoring to optimize gas quality and applied vacuum on the Area 221 wells. As construction efforts continue in Area 588, multiple tie-ins and infrastructure relocations continue to occur in September. These construction and modification events can cause the overall system vacuum to increase and decrease throughout the month. Following the construction challenges in August, the average available pressure at the time of September's tuning event had decreased from the previous month. During the September 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 decreased significantly whereas oxygen has increased for the month following September's monthly tuning event.

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. This 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 -6.4"wc for September, a noticeable decrease from August.

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

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 September 8, 2023; September 26, 2023; and September 29, 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 October 4, 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

September Monthly Wellhead Monitoring Data

Bristol Virginia Landfill - Permit 221 Well Data - 07/01/2023 to 09/30/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	System Pressure ("H20)	Comments
01	7/5/2023 09:53	58.0	38.4	0.1	3.6	-5.1	-5.1	85.3	-5.4	Valve completely open
01	8/1/2023 10:51	58.1	39.9	0.0	2.0	-16.9	-16.9	85.8	-17.2	
01	9/8/2023 08:50	12.5	12.4	19.3	55.8	-6.1	-6.1	73.5	-6.5	
01	9/26/2023 10:16	0.0	0.0	19.9	80.1	-8.1	-8.1	80.6	-8.0	
01	9/29/2023 11:06	0.1	0.0	19.9	80.0	-7.7	-7.4	84.6	-8.0	Closed Valve > 1 turn
02	7/5/2023 09:57	58.3	37.9	0.0	3.9	-5.4	-5.4	86.1	-5.5	Valve completely open
02	8/1/2023 10:56	53.8	31.8	1.0	13.4	-16.8	-16.7	84.6	-17.1	
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	
02	9/29/2023 11:09	0.1	0.0	19.9	80.0	-7.7	-7.7	74.7	-8.0	Closed Valve > 1 turn
03	7/5/2023 09:58	58.2	38.5	0.0	3.2	-5.4	-5.2	86.4	-5.6	
03	8/1/2023 11:05	51.5	31.5	2.5	14.4	-16.7	-16.6	86.1	-17.0	
03	9/8/2023 08:55	5.7	3.1	18.8	72.4	-6.1	-6.1	68.1	-6.4	
03	9/26/2023 10:01	0.0	0.0	20.0	79.9	-8.1	-8.1	70.9	-8.0	
03	9/29/2023 11:11	0.1	0.0	19.8	80.1	-7.8	-7.1	77.5	-8.0	Closed Valve > 1 turn
04	7/5/2023 10:00	56.2	39.7	0.1	4.1	-5.3	-5.4	89.1	-5.5	
04	8/1/2023 11:07	48.8	34.3	5.9	11.0	-16.7	-16.7	89.7	-17.1	
04	9/8/2023 08:57	38.9	31.1	5.9	24.1	-6.1	-6.1	80.3	-6.4	
04	9/26/2023 09:58	0.1	0.0	20.0	79.9	-8.1	-8.1	83.1	-8.0	
04	9/29/2023 11:16	1.0	0.3	19.5	79.3	-7.8	-2.6	87.6	-8.0	Closed Valve > 1 turn
05	7/5/2023 09:37	57.2	39.5	0.0	3.2	-5.4	-5.4	86.9	-5.7	Valve completely open
05	8/1/2023 11:09	53.8	37.0	0.1	9.1	-16.7	-16.9	86.3	-17.1	
05	9/8/2023 08:59	20.0	20.1	18.4	41.6	-6.1	-6.1	78.3	-6.4	
05	9/26/2023 09:54	0.1	0.2	19.9	79.8	-8.1	-8.1	78.6	-8.1	
05	9/29/2023 11:19	0.3	0.1	19.8	79.9	-7.8	-7.3	86.8	-8.0	Closed Valve > 1 turn
06	7/5/2023 09:39	57.2	38.5	0.0	4.3	-5.4	-5.4	87.4	-5.7	Valve completely open
06	8/1/2023 11:14	58.4	37.6	4.0	0.0	-16.7	-16.7	85.9	-16.9	
06	9/8/2023 09:10	0.0	0.1	20.4	79.6	-6.1	-6.1	77.3	-6.4	
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	Closed Valve > 1 turn
07	7/5/2023 09:41	60.1	36.7	0.0	3.3	-5.1	-5.3	88.2	-5.7	Valve completely open

Bristol Virginia Landfill - Permit 221 Well Data - 07/01/2023 to 09/30/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	System Pressure ("H20)	Comments
07	8/1/2023 10:21	20.6	14.5	1.0	63.9	-15.9	-15.9	79.8	-16.9	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	
07	9/26/2023 10:37	1.0	0.4	19.5	79.1	-7.7	-7.7	87.5	-8.0	
07	9/29/2023 10:42	58.9	38.7	0.2	2.2	-7.8	-7.8	86.9	-7.7	Valve completely open
08	7/5/2023 09:44	61.1	37.8	0.0	1.2	-5.4	-5.4	86.1	-5.7	Valve completely open
08	8/1/2023 10:26	53.3	32.3	0.2	14.2	-16.9	-16.7	89.6	-17.0	
08	9/8/2023 08:32	0.1	0.3	20.6	79.1	-5.8	-5.8	69.3	-6.2	
08	9/26/2023 10:30	4.5	2.2	18.6	74.7	-7.9	-7.8	86.8	-7.7	
08	9/29/2023 10:45	0.4	0.7	19.8	79.1	-8.0	-6.4	88.0	-8.0	Closed Valve > 1 turn
09	7/5/2023 09:46	60.0	37.4	0.0	2.6	-5.4	-5.4	80.5	-5.7	Valve completely open
09	8/1/2023 10:32	56.4	36.1	0.1	7.4	-17.2	-17.2	83.2	-17.3	
09	9/8/2023 08:36	0.0	0.1	20.7	79.3	-5.8	-5.8	69.8	-6.2	
09	9/26/2023 10:27	0.0	0.0	19.8	80.2	-8.0	-8.0	87.1	-8.1	
09	9/29/2023 10:50	0.1	0.1	20.0	79.8	-8.1	-3.5	86.2	-8.0	Closed Valve > 1 turn
10	7/5/2023 09:48	57.9	39.2	0.0	2.9	-5.4		82.9	-5.7	Valve completely open
10	7/5/2023 12:46	46.2	22.3	0.3	31.1	-5.1	-5.1	93.1	-5.4	
10	8/1/2023 10:38	56.5	41.8	0.0	1.7	-16.7	-16.9	85.2	-16.9	
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	
10	9/29/2023 10:53	0.1	0.2	20.1	79.7	-8.0	-7.1	84.2	-8.0	Closed Valve > 1 turn
11	7/5/2023 09:50	58.0	40.2	0.0	1.8	-4.8	-5.0	85.5	-5.5	Valve completely open
11	8/1/2023 10:46	44.7	33.7	4.1	17.6	-16.9	-16.8	85.0	-17.1	
11	9/8/2023 08:46	39.3	32.2	14.3	14.2	-5.8	-5.9	74.7	-6.4	
11	9/26/2023 10:13	0.0	0.0	19.9	80.0	-8.0	-8.1	76.0	-8.0	
11	9/29/2023 11:00	0.2	0.2	19.9	79.7	-7.8	-7.7	82.7	-8.0	Closed Valve > 1 turn
12	7/5/2023 09:51	58.6	39.7	1.8	0.0	-5.1	-5.1	84.8	-5.4	Valve completely open
12	8/1/2023 10:41	58.0	41.0	0.0	0.9	-17.1	-17.1	84.5	-17.2	
12	9/8/2023 08:44	51.0	36.8	2.0	10.2	-6.1	-6.1	71.9	-6.3	
12	9/26/2023 10:19	0.0	0.0	19.9	80.1	-8.1	-8.1	80.3	-8.1	
12	9/29/2023 11:03	0.1	0.0	19.9	79.9	-7.9	-7.7	80.4	-8.0	Closed Valve > 1 turn
13	7/5/2023 10:01	56.5	39.8	1.4	2.3	-5.4	-5.4	86.7	-5.6	

Bristol Virginia Landfill - Permit 221 Well Data - 07/01/2023 to 09/30/2023

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H20)	Temp (F)	System Pressure ("H20)	Comments
13	8/1/2023 11:11	55.4	40.6	0.0	4.0	-16.6	-16.7	83.7	-17.0	
13	9/8/2023 09:00	1.1	2.5	20.2	76.3	-6.1	-6.1	76.8	-6.7	
13	9/26/2023 10:04	0.1	0.0	19.9	80.0	-8.1	-8.1	74.0	-8.1	
13	9/29/2023 11:23	0.1	0.0	20.0	79.9	-7.8	-7.4	80.7	-8.3	Closed Valve > 1 turn
14	7/5/2023 10:03	57.0	39.3	0.1	3.6	-5.4	-5.4	87.7	-5.5	Valve completely open
14	8/1/2023 11:13	59.7	38.6	0.0	1.6	-16.7	-16.9	88.2	-16.9	
14	9/8/2023 09:02	0.1	0.2	20.4	79.2	-6.1	-6.1	78.2	-6.4	
14	9/26/2023 10:33	0.0	0.0	19.8	80.1	-7.8	-7.7	88.7	-8.0	
14	9/29/2023 11:27	59.6	35.8	0.2	4.4	-8.0	-8.0	83.1	-8.0	
15	7/5/2023 09:54	59.0	38.7	1.2	1.2	-5.4	-5.1	88.4	-5.4	Valve completely open
15	8/1/2023 10:54	57.2	39.7	0.0	3.1	-16.9	-16.9	86.6	-17.3	
15	9/8/2023 08:48	49.5	32.9	1.2	16.5	-6.1	-6.1	72.8	-6.4	
15	9/26/2023 10:10	0.0	0.0	19.9	80.1	-7.8	-7.8	71.4	-7.8	
15	9/29/2023 10:57	54.8	36.5	1.7	6.9	-8.0	-7.8	85.8	-8.0	Valve completely open