

December 2023 Monthly Compliance Report

Solid Waste Permit No. 498
Bristol Integrated Solid Waste Management Facility
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INTRODUCTION

On behalf of the City of Bristol, Virginia (City), SCS Engineers has prepared this report to the Virginia Department of Environmental Quality (VDEQ) in accordance with item 8 in Appendix B of the Consent Decree between the City and VDEQ. This report provides updates regarding the progress towards completion of the items outlined in Appendix B of the Consent Decree between the City and VDEQ. The following sections outline progress during the month of December 2023 related to Solid Waste Permit (SWP) No. 498.

1.0 LEACHATE PUMP STATION

The City completed repairs to the pumps and addressed other concerns related to the leachate pump station. The steps taken by the City are outlined in the following sections.

1.1 FLOATING MATERIAL

On July 6, 2022 SCS received the results of samples taken from the Solid Waste Permit 498 Wet Well on May 25, 2022. Based on SCS' review of the data, the data indicated the liquid is non-hazardous. SCS submitted a letter to the City on July 7, 2022 with SCS' review of the data and the underlying lab analysis. A copy of this letter was included in the October 2022 Monthly Compliance Report for the SWP No. 498 Landfill.

As described in the October 2022 Monthly Compliance Report for the SWP No. 498 Landfill, the floating material in the wet well was resolved.

1.2 PUMP REPLACEMENT

The City contracted with Buchanan Pump Service (Buchanan) to complete repairs to the pumps and infrastructure at the SWP No. 498 pump station. Buchanan completed repairs and replacement of the pumps at the SWP No. 498 pump station.

1.3 ALARM/NOTIFICATION SYSTEM

The alarm system at the SWP No. 498 Landfill pump station is currently functional and sending alerts to landfill staff via text message.

2.0 COVER INTEGRITY AND EXPOSED WASTES

The sections below describe steps taken by the City to address cover integrity and exposed wastes.

2.1 ALTERNATE DAILY COVER

During the month of December conventional daily cover (6 inches of soil) and alternate daily cover (ADC) tarps were used in areas where waste was disturbed as part of construction efforts described in Section 4.2.

2.2 INTERMEDIATE COVER

Placement of intermediate soil cover on the SWP No. 498 landfill is complete. Soil placement and thickness verification was documented in the April 2023 Compliance Report for the SWP No. 498 Landfill. The City will continue to monitor the intermediate cover integrity on a regular basis until final cover has been installed. The intermediate cover was disturbed during the month of November as part of the construction described in Section 4.2. Intermediate cover disturbed as part of construction will be replaced as part of final cover system installation.

2.3 SURFACE EMISSIONS MONITORING

On December 13, 2023, SCS performed the fourth quarter 2023 surface emissions monitoring event 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 monitoring route included all applicable areas of the Permit No. 498 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.

VDEQ will be copied on a letter outlining the results 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	68
Number of Points in Serpentine Route	64
Number of Points at Surface Cover Penetrations	4
Number of Exceedances	0
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	0

SCS anticipates performing the first quarter SEM Event during the month of February 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

The SWP No. 498 Landfill is approximately 12.0 acres and is located south of the SWP No. 221 Landfill and east of the SWP No. 588 Landfill. The majority of the SWP No. 498 Landfill does not have an active LFG collection system; however installation of a comprehensive active LFG collection system is in process as described in Section 4.2. The current system includes three vertical wells (EW-19, EW-20, and EW-21) and a condensate trap (CT-1) at the low point.

To accommodate the Area 498 Final Closure and LFGCCS Plan, on November 1, 2023 all wells and isolation valves were shut so that excavation could begin. The corresponding vacuum lateral piping was removed. Routine extraction well monitoring was unable to be completed for the month of December due to these devices being offline for ongoing construction. Additional information regarding the Area 498 Closure and LFGCCS Plan can be found in section 4.1.

The buried waste in SWP No. 498 Landfill Area is 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. Wells EW-16, EW-17, EW-18, and EW-23 are outside the waste footprint, but at times show normal methane concentrations and are tuned accordingly each month. Wells EW-19, EW-20, EW-21, and EW-22 are within the waste footprint and exhibit gas concentrations that are consistent with older landfill gas. These collectors show low methane concentrations, as well as low flow, and are kept under minimal vacuum.

There is no historical evidence of elevated temperatures in Area 498; however, the methane-to-carbon dioxide ratio measured in the wellheads in the waste is less than 1 because organic fraction is more fully decomposed and the rate of methanogenesis has declined. Also, the SWP No. 498 Landfill is not believed to be a significant source of odors. The average gas composition in the SWP No. 498 wells is shown in Table 1.

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.)
September 2023	5.5	6.1	14.7	-4.2
October 2023	22.8	20.9	10.2	-4.3
November 2023	11.8	15.2	11.4	-13.6
December 2023 ¹	2.8	2.6	20.1	-15.8

¹ Wells within waste offline due to final cap construction

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 SWP No. 498 landfill. Additional details about that plan were included along with a copy of the plan in the November Monthly Compliance Report for the SWP No. 498 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. 498 Landfill in accordance with the plan were summarized in the January 2023 Monthly Compliance Report for the SWP No. 498 Landfill.

3.2.3 Monthly Wellhead Monitoring

On December 15, 2023, SCS-FS visited the landfill and performed monitoring of the landfill gas wells. The results of the monthly monitoring were submitted to VDEQ on January 3, 2024 and are included in Appendix A. The results of the monthly monitoring also include comments regarding observations and adjustments made by the field technician.

4.0 GRADING, GEOMETRIC CONFIGURATION AND GAS EXPANSION

The City took the steps outlined in the sections below to grade the surface of the SWP No. 498 landfill to an appropriate geometric configuration to allow for final closure.

4.1 CLOSURE AND LFGCCS PLAN

SCS prepared plans on the City's behalf for closing and installing final cover on the Solid Waste Permit No. 498 landfill. The plans also include a comprehensive gas collection and control system and comprehensive stormwater management plan. These drawings along with supporting information to facilitate a modification to the facility's Solid Waste Permit were submitted on January 31, 2023 and February 24, 2023.

SCS revised the permit modification based on the letter received from VDEQ on March 10, 2023. The revised permit modification drawings and documents were submitted to VDEQ on July 11, 2023, and draft Solid Waste Permit modules were received from VDEQ on July 31, 2023. SCS submitted additional permit modification documents on September 25, 2023. The documents included a revised closure plan, CQA plan, technical specifications, and comments for the draft permit modules.

The permit modification package includes the addition of supplemental LFG monitoring network probes along the eastern perimeter of the SWP No. 498 landfill. Additionally, the permit modification drawings propose expanding the existing stormwater basin adjacent to the northeast corner of the landfill, and a new outlet structure is proposed to control the discharge from the basin.

As discussed with VDEQ, SCS submitted revised permit documents to incorporate into the solid waste permit the use of AGRU MicroDrain Liner and the associated AGRUTex geotextile as an approved equivalent option for the conventional final cover geomembrane and drainage geocomposite. SCS prepared new and revised specifications and hydraulic analyses (United States Environmental Protection Agency Hydraulic Evaluation of Landfill Performance Model) to support this effort.

The public notice for the permit modification was published in the Bristol Herald Courier on Monday November 18, 2023. The public notice period extended until December 20, 2023. Hard copy documents were made available to the public at the Bristol, Virginia City Hall. SCS has received comments issued by other regulatory agencies and is reviewing those comments.

4.2 FINAL COVER AND LFGCCS INSTALLATION

The drawings described in Section 4.1 were used as the basis of bid drawings for procurement of a contractor to complete final cover and LFGCCS installation. The drawings used for the purposes of bidding, procurement and construction of the final closure, gas collection system, and stormwater controls generally conform to the layout and details in the permit modification drawings.

The City and Baker's Construction Services, Inc. (BCS) signed the construction contract and the notice to proceed was issued on October 17, 2023. BCS mobilized to the site in late October and construction is currently ongoing. Construction so far has included the installation of erosion and sediment control measures, earthwork to establish the geomembrane deployment grade, excavation of the expanded stormwater basin, ongoing installation of the stormwater sewer system, and installation of new landfill gas system horizontal collectors. SCS CQA personnel are mobilized to the site to monitor BCS's progress.

Construction efforts during December focused on grading of the stormwater pond, installation of the stormwater sewer system, installation of landfill gas horizontal collectors and drainage pits, and preparation of a new borrow area for the erosion control and vegetative cover soil layers. Landfill gas installation, including a horizontal collector tie-in to drainage pit riser (left) and an installed horizontal collector with geotextile (right), is shown in Figure 1.

Figure 1. Landfill Gas Installation Progress - SWP No. 498 Landfill



5.0 LEACHATE SEEPS AND PONDING

The sections below outline the steps taken by the City to address leachate seeps and ponding.

5.1 PERIODIC INSPECTIONS

The City initiated a process of tracking precipitation events that have the potential to create ponding and leachate seeps. After major precipitation events, City personnel inspect the landfill for ponding and leachate seeps. Locations of ponding and seeps will be marked in the field.

The City performed inspections as appropriate during the month of December. Inspection forms will be scanned and stored on the landfill computer server in a folder designated for the purpose of

storing environmental records. Completed inspection forms are available for VDEQ to review upon request.

5.2 COMPLETION OF WORK ACTIVITIES

During the month of April 2023, the City completed work activities which eliminated areas of ponding and accomplished leachate seep repairs. These details about these activities were included in the April 2023 Compliance Report for the SWP No. 498 Landfill. Currently ponding and seeps are managed by the earthwork contractor responsible for installing final cover and LFGCCS.

6.0 STORMWATER DRAINAGE AND MANAGEMENT

The sections below outline the steps by the City to improve stormwater management and drainage.

6.1 STORMWATER MANAGEMENT PLAN

As noted in Section 4.1 the plans that SCS prepared for Closure of SWP No. 498 included measures to address stormwater management. Following the installation of the final cover system, stormwater diversion berms and downchutes will be installed. Stormwater will be conveyed to perimeter channels and a stormwater sewer system which primarily discharge to the stormwater pond located at the northeast corner of the landfill.

The existing stormwater pond positioned near the northeast corner of the landfill has been expanded to provide additional storage volume, and a new stormwater outlet structure is being installed. The stormwater pond will discharge via the existing 42-in reinforced concrete pipe (outfall SW-1). Stormwater modeling included with the permit modification documents demonstrates compliance with channel and flood protection criteria.

Construction progress during December included finishing the stormwater basin excavation and installing the stormwater sewer system. Figure 2 shows the installation of drop inlet 2 with the connected 36" diameter stormwater sewer (left) and the stormwater sewer outlet with headwall (right).

Figure 2. Installation of the Stormwater Sewer System - SWP No. 498 Landfill



6.2 CLEANOUT OF STORMWATER DIVERSION CHANNEL/TRENCH BERM

Clean-out of the stormwater diversion channel/trench berm was completed in February 2023. The clean-out of the stormwater diversion channel/trench berm was discussed in the February 2023 Monthly Compliance Report for the SWP No. 498 Landfill. On March 15, 2023 SCS submitted a letter to VDEQ verifying completion of the stormwater diversion channel/trench berm clean-out. A copy of that letter and supporting documentation were included in the March 2023 Monthly Compliance Report for the SWP No. 498 Landfill.

7.0 SELF-INSPECTION AND RECORDKEEPING

SCS prepared two self-inspection log templates, the Stormwater Management Inspection Log and the Daily Landfill Inspection Log. SCS provided updated self-inspection logs for SWP 498 to the City and VDEQ and completed self-inspection training with facility staff on November 30, 2022.

7.1 UPDATED SELF-INSPECTION LOGS

Copies of updated self-inspection log templates were submitted to VDEQ on November 30, 2022. Details about this log and the intended inspection process were detailed in the November 2022 Monthly Compliance Report for the SWP No. 498 Landfill. Copies of the log templates are also included in that report.

7.2 FACILITY TRAINING

On November 30, 2022, SCS personnel met members of the Facility staff to complete self-inspection training. A summary of this training and a record of attendees was included in the November Monthly Compliance Report for the SWP No. 498 Landfill.

7.3 SELF-INSPECTION AND RECORDKEEPING ASSIGNMENTS

Completed inspections will be held on-site at the facility office available for review by VDEQ upon request. Currently, self-inspections are being completed by Jonathan Hayes. Dave Cochran will serve as the primary alternate for inspections with the other members of the staff trained on inspection procedures filling in as needed. Inspection forms will be scanned and stored on the landfill computer server in a folder designated for the purpose of storing environmental records.

Appendix A

December Monthly Wellhead Monitoring Data

Bristol Virginia Landfill - Permit 498 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 ("H2O)	Temp (F)	System Pressure ("H2O)	Comments
16	10/9/2023 10:06	58.5	40.9	0.6	0.0	-6.3	-6.0	60.3	-6.3	
16	11/1/2023 07:44	19.4	24.6	5.4	50.5	-18.9	-18.9	35.2	-19.0	Valve Adjustment:No Change
16	12/15/2023 09:36	0.7	1.1	20.9	77.4	-20.9	-20.9	51.4	-21.0	
17	10/9/2023 10:07	27.0	31.1	16.7	25.1	-6.3	-6.3	58.6	-6.6	
17	11/1/2023 07:46	36.6	34.0	3.8	25.6	-18.9	-18.9	30.5	-18.8	Valve Adjustment:No Change
17	12/15/2023 09:41	0.2	0.2	21.6	78.1	-20.9	-20.9	52.7	-20.9	
18	10/9/2023 09:09	52.5	43.8	0.2	3.5	-5.2	-5.4	62.3	-5.6	
18	11/1/2023 07:49	18.0	20.5	13.0	48.5	-18.2	-18.9	46.6	-18.2	Valve Adjustment:No Change
18	12/15/2023 09:45	10.4	9.0	16.1	64.6	-20.4	-20.3	59.7	-20.9	
19	10/9/2023 08:55	0.0	0.2	20.8	78.9	-5.9	-5.9	54.7	-6.4	
19	11/1/2023 07:53	2.4	13.3	7.5	76.8	-19.1	-19.2	40.3	-19.3	Valve Adjustment:No Change
19	12/2023									Disconnected for construction
20	10/9/2023 08:59	8.6	10.3	11.9	69.3	-5.9	-5.9	58.7	-6.3	
20	11/1/2023 08:01	2.0	5.6	16.1	76.3	-19.2	-19.4	54.7	-19.9	Valve Adjustment:No Change
20	12/2023									Disconnected for construction
21	10/30/2023 08:20	5.6	9.3	12.7	72.4	-1.0	-0.9	87.2	-18.3	
21	11/1/2023 08:07	3.8	8.2	13.5	74.6	-0.9	-0.7	75.7	-14.8	
21	12/2023									Disconnected for construction
23	10/9/2023 10:10	7.6	10.8	8.1	73.5	0.0	0.0	66.1	0.1	
23	11/2/2023 16:14	0.0	0.1	20.5	79.4	-0.1	-0.2	56.3	-0.5	
23	12/15/2023 10:31	0.0	0.3	21.7	78.0	-0.8	-0.8	45.8	-2.8	

