January 2025
Monthly Compliance Report

Solid Waste Permit No. 588
Bristol Integrated Solid Waste Management Facility
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SCS ENGINEERS

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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.iii in Appendix A of the Consent Decree between the City and VDEQ. This report provides updates regarding the progress towards completion of the items outlined in Appendix A of the Consent Decree between the City and VDEQ. The following sections outline progress during the month of January 2025 related to Solid Waste Permit (SWP) No. 588.

1.0 GAS COLLECTION

The following sections describe the steps the City, in collaboration with its consultants and contractors, has taken to improve the operation, monitoring, and performance of the facility's landfill gas collection and control system (GCCS).

1.1 SURFACE AND LEACHATE COLLECTION EMISSIONS

1.1.1 Surface Emissions

SCS performed surface emissions monitoring on January 7, 2025; January 17, 2025; January 23, 2025; and January 30, 2025. These weekly surface emissions monitoring (SEM) events were performed in accordance with Item 1.i in Appendix A of the Consent Decree between the City and VDEQ. SCS also performs quarterly SEM at the landfill in accordance with regulatory requirements.

The details and results of the SEM are included in Appendix A. A summary of the outcomes is provided in Table 1.

Table 1. Summary of January Surface Emissions Monitoring

Description	January 7, 2025	January 17, 2025	January 23, 2025	January 30, 2025
Number of Points Sampled	167	167	167	167
Number of Points in Serpentine Route	100	100	100	100
Number of Points at Surface Cover Penetrations	67	67	67	67
Number of Exceedances	3	3	3	6
Number of Serpentine Exceedances	0	0	0	2
Number of Pipe Penetration Exceedances	3	3	3	4

In response to the SEM results, the City and the City's operations, monitoring, and maintenance contractor, SCS Field Services O&M (SCS-OMM or SCS-FS) took the following actions:

- In response to a pipe penetration exceedance in the month of December at EW-73, SCS-OMM adjusted vacuum at EW-73 during the week of January 5, 2025. Monitoring of EW-73 did not result in an exceedance during a follow-up event.

- In response to a pipe penetration exceedance at EW-75, SCS-OMM increased the vacuum at EW-75.

- In response to a pipe penetration exceedance at EW-76, SCS-OMM will increase vacuum at EW-76 during the week of February 2, 2025.

- In response to an exceedance at exceedance at EW-77, the City began staging additional cover soil near the extraction well. Monitoring of EW-77 did not result in an exceedance during a follow-up event on January 30, 2025.

- In response to a pipe penetration exceedance at EW-80, SCS-OMM increased vacuum at EW-80

- In response to a pipe penetration exceedance at EW-86, SCS-OMM increased vacuum at EW-86

- In response to a pipe penetration exceedance at EW-90, SCS-OMM adjusted vacuum at EW-90 during the week of January 19, 2025. SCS-OMM plans to increase vacuum at EW-90 again during the week of February 2, 2025.

- In response to a pipe penetration exceedance at EW-95, SCS-OMM increased vacuum at that well. SCS-OMM plans to increase vacuum at this well again during the week of February 2, 2025.

- In response to a pipe penetration exceedance at EW-97, SCS-OMM adjusted vacuum at EW-97 during the week of January 19, 2025. Monitoring of this well during a follow-up event did not result in an exceedance.

1.1.2 Monitoring of Leachate Collection Components

SCS Field Services (SCS-FS) visited the Bristol Landfill on January 28, 2025, and performed monitoring of the leachate, witness zone, northern cleanouts, and gradient control clean-outs at the southern end of the landfill. The results of that monitoring are included in Table 2.

Table 2. Leachate Cleanout Pipe Monitoring Results

Description	ID#	Record Date	CH4 (% by Vol)	CO2 (% by Vol)	O2 (% by Vol)	Balance Gas (% by Vol)	Initial Temp (°F)	Adj Temp (°F)	Initial Static Pressure (in H2O)	Adj Static Pressure (in H2O)	System Pressure (in H2O)
Southern Cleanouts Gradient West	LC01	1/28/2025 3:33:08 PM	48.7	51.3	0.0	0.0	57.7	57.5	-11.30	-11.26	-14.61
Southern Cleanouts Gradient East	LC02	1/28/2025 3:35:49 PM	41.3	58.4	0.0	0.3	56.1	56.1	-11.74	-11.74	-15.30
Southern Cleanouts Leachate Center	LC03	1/28/2025 3:38:29 PM	9.3	10.4	17.3	63.0	50.7	50.8	-14.31	-14.16	-14.01
Southern Cleanouts Witness East	LC04	1/28/2025 3:41:33 PM	1.0	1.2	20.9	76.9	52.4	52.5	-9.80	-9.80	-15.30

Description	ID#	Record Date	CH4 (% by Vol)	CO2 (% by Vol)	O2 (% by Vol)	Balance Gas (% by Vol)	Initial Temp (°F)	Adj Temp (°F)	Initial Static Pressure (in H2O)	Adj Static Pressure (in H2O)	System Pressure (in H2O)
Southern Cleanouts Leachate West	LC05	1/28/2025 3:44:29 PM	43.0	57.0	0.0	0.0	64.0	63.9	-12.36	-12.45	-14.72
Southern Cleanouts Gradient Center West	LC06	1/28/2025 3:47:42 PM	35.2	27.9	7.4	29.6	57.0	57.1	-14.20	-14.32	-14.92
Southern Cleanouts Leachate East	LC08	1/28/2025 3:50:59 PM	39.5	56.1	0.5	3.9	53.7	53.4	-10.97	-10.82	-14.94
Southern Cleanouts Gradient Center East	LC09	1/28/2025 3:54:07 PM	9.7	8.0	17.3	65.0	55.0	55.2	-9.73	-9.80	-14.44
Southern Cleanouts Leachate West	LC10	1/28/2025 3:56:58 PM	0.0	0.4	21.4	78.3	53.5	53.2	-5.22	-5.17	-8.69
Northern Cleanouts Leachate East	NC01	1/28/2025 3:10:00 PM	0.0	0.5	21.8	77.8	47.8	47.7	-5.97	-6.08	0.37
Northern Cleanouts Leachate Center	NC02	1/28/2025 3:11:10 PM	0.0	0.3	21.8	78.0	46.9	46.8	-6.08	-6.02	0.37
Northern Cleanouts Leachate West	NC03	1/28/2025 3:12:32 PM	0.0	0.3	21.8	77.9	46.6	46.6	-6.08	-6.08	0.37
Northern Cleanouts Witness East	NC04	1/28/2025 3:14:12 PM	0.0	0.2	22.0	77.9	47.1	47.2	-7.77	-7.74	0.37
Northern Cleanouts Witness Center	NC05	1/28/2025 3:16:07 PM	0.0	0.1	22.0	77.9	46.3	46.3	-7.77	-7.77	0.37
Northern Cleanouts Witness West	NC06	1/28/2025 3:17:37 PM	0.0	0.1	22.0	77.9	46.5	46.5	-7.49	-7.47	0.36
Northern Cleanouts Gradient East	NC07	1/28/2025 3:19:51 PM	13.1	10.4	1.9	74.6	46.9	46.8	-11.26	-11.27	0.21
Northern Cleanouts Gradient Center East	NC08	1/28/2025 3:21:47 PM	5.7	4.4	13.4	76.6	46.8	46.7	-11.30	-11.29	0.34
Northern Cleanouts Gradient Center West	NC09	1/28/2025 3:23:29 PM	2.5	1.8	18.0	77.7	46.8	46.9	-11.28	-11.28	0.36
Northern Cleanouts Gradient West	NC10	1/28/2025 3:25:03 PM	0.0	0.1	21.9	78.0	48.0	47.9	-11.30	-11.30	0.34

1.2 EXISTING GAS EXTRACTION SYSTEM PERFORMANCE

SCS and SCS-FS have been coordinating with the City to improve the performance of the existing gas system. Specific actions taken to maintain and improve the system are detailed in the following sections of this report.

Additional actions taken by SCS-FS include the following:

- Adjustments to LFGCCS
- Maintenance of air lines and pressurized air infrastructure
- Maintenance of wellhead and other gas collection infrastructure
- Removal of liquids from landfill gas headers

1.3 REMOTE MONITORING SYSTEM

In the Fall of 2022, SCS Remote Monitoring & Control (SCS-RMC) installed 25 industrial internet of things (IIoT) temperature sensors in the landfill gas wellheads. The purpose of the sensors is to record and transmit wellhead gas temperatures via cellular connection to a database managed by

SCS-RMC. Since the initial installation, some sensors have been relocated and additional sensors have been added to the network. There are currently 59 wellhead temperature sensors operating within the wellfield.

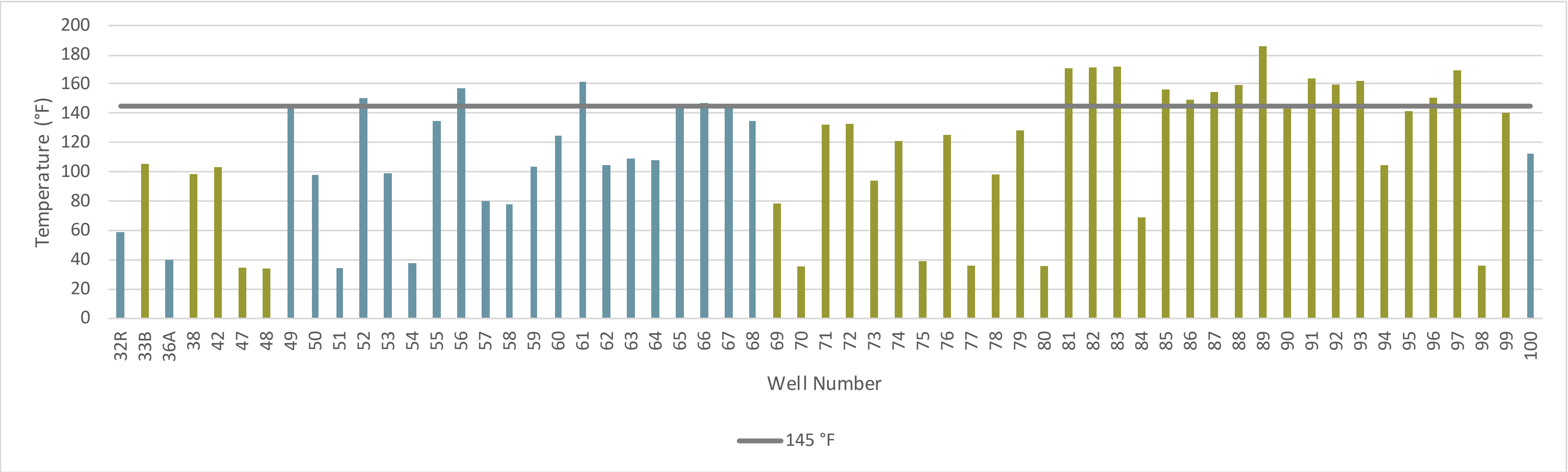
The City is providing the minimum, maximum, and average daily temperature recorded by each sensor to VDEQ on a daily basis via email. Minimum, maximum, and average daily temperatures recorded by the remote monitoring system during the month of January are included in Appendix C. In addition, SCS previously prepared semi-monthly status updates to satisfy the conditions of compliance provision no. 2 of the Environmental Protection Agency (EPA) Region III letter, Approval of Higher Operating Temperature Values for Landfill Gas Wells and Submission of Gas Treatment Alternatives at the Bristol Virginia Integrated Solid Waste Management Facility, dated August 23, 2021. On August 2, 2023, VDEQ requested that such updates be included in the monthly compliance reports. Accordingly, this section is a summary of temperature monitoring activities during the monthly monitoring period of January 2025.

1.3.1 Automated Wellhead Temperature Measurements

SCS reviewed the automated hourly temperature measurements from January 2025, and observed the following:

- **Wells with new sensors:** The City contracted with SCS to increase the number of wells with automated wellhead temperature sensors in November of 2024. Many of these wells on which sensors were added were located in portions of the landfill known to exhibit higher temperatures. The higher temperatures in this region of the landfill are reflected in higher monthly average temperatures. The wells with sensors installed in November 2024 are shown in green in Figure 1 , while wells with older sensors are shown in blue.

Figure 1. Monthly Average Automated Wellhead Temperatures[1]



[1] 145 °F is the NESHAP AAAA compliance threshold for well temperature, included here for reference.

1.3.2 Comparison with Manual Temperature Measurements

Per the approval issued by VDEQ on August 2, 2023, the Facility ceased dedicated daily manual temperature measurements in the Permit No. 588 Landfill. In lieu of these measurements, the City compares instantaneous hourly automated temperature measurements with temperatures measured at each wellhead using a handheld sensor during monthly compliance monitoring. These comparisons are shown in Figure 2, with the ±8°F deviation thresholds as prescribed in the VDEQ approval. Wellheads with measurements outside of the ±8°F deviation thresholds are presented in Table 2.

Temperatures outside the ±8°F deviation lines were observed at EW-32R, 33B, 54, 58, 64, 71, 72, 74, 79, 81, 82, 83, 87, 91, 92, 96, and 97 and 100.

The disparity between automated and manual temperature measurements at EW-58, 64, and 100 has persisted for several months. The City, SCS, and SCS-RMC are coordinating a test to assess the functionality of these three existing sensors (EW-58, EW-64, and EW100).

Due to LFG flows at EW-32R and EW-54 being under 10 cubic feet per minute (cfm) during manual temperature checks, and the temperature variance being close to the ±8°F threshold, SCS believes low LFG flow affected the automated sensor, allowing ambient temperature to influence the measurement and cause the discrepancy.

The remaining wells with temperature measurements outside the ±8°F threshold in January 2025 had sensors newly installed in November 2024. All of these had automated temperature measurements higher than the manual temperature measurements in December and in January. SCS has initiated discussions with SCS-RMC and SCS-FS on a troubleshooting process for these sensors. Many of these wells have stainless steel wellheads, which have sample ports that are more difficult to use and prevent manual sampling probes from reaching fully into the gas stream. This causes the manual reading to be influenced by ambient temperatures and results in a lower result than the automated reading. SCS-OMM is in the process of modifying the wellheads to accommodate a new sample port that allows from more precise measurements using a handheld instrument. Stainless steel wellheads are more challenging to modify which has delayed modifications to address the discrepancy. Temperature measurements taken by SCS-OMM on some of the initially modified wellheads indicates that temperature measurements are within the ±8°F deviation threshold.

Figure 2. Automated vs. Manual Temperature Measurements

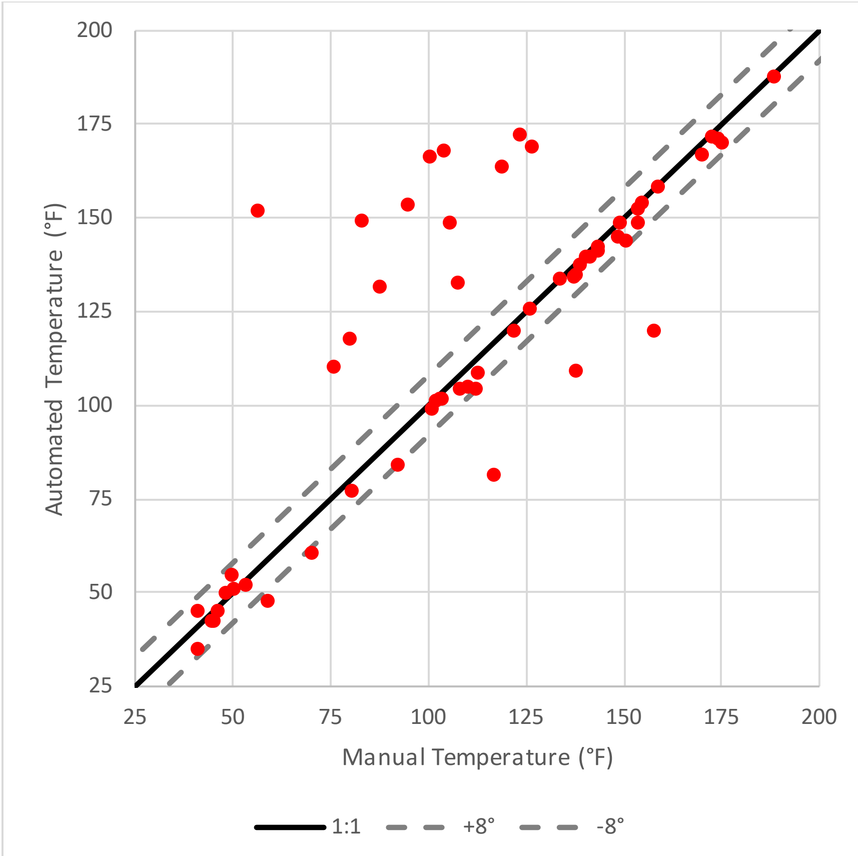


Table 3. Wells Outside ±8°F Deviation Goal

Well ID	Manual Temperature (°F)	Automated Temperature (°F)	Deviation (°F)
EW-32R	69.7	60.8	-8.89
EW-33B	75.3	110.6	35.3
EW-54	58.5	48.0	-10.5
EW-58	116.3	81.8	-34.5
EW-64	137.4	109.4	-28.0
EW-71	107.5	133.3	25.8
EW-72	87.5	132.2	44.7
EW-74	79.6	118.0	38.4
EW-79	82.9	149.4	66.5
EW-81	103.7	168.2	64.5
EW-82	126.2	169.5	43.3
EW-83	56.2	152.3	96.1
EW-87	94.3	153.7	59.4
EW-91	118.3	164.2	45.9

Well ID	Manual Temperature (°F)	Automated Temperature (°F)	Deviation (°F)
EW-92	100.1	166.8	66.7
EW-96	105.4	149.2	43.8
EW-97	123.1	172.3	49.2
EW-100	157.6	120.2	-37.4

1.3.3 Monthly Regulatory Wellhead Temperature Measurements

Routine monthly temperature monitoring was conducted on January 14, 2025 to comply with 40 CFR 60.36f(a)(5). Table 3 provides the status of exceedances recorded during this monitoring period.

Table 4. January Temperature Exceedance Summary

Well ID	Initial Exceedance Date	Most Recent Reading or Compliant Reading	Duration of Exceedance	Status as of 2/1/2025
EW-55	10/22/24	1/8/25 138.3°F	78 days	Resolved, 75-Day Notification Submitted
EW-56	11/4/24	1/24/25 159.8°F	81 days	Resolved, HOV Approved, 75-Day Notification Submitted
EW-60	12/30/24	1/2/25 133.2°F	4 days	Resolved within 15-day timeline
EW-65	11/13/24	1/24/25 150.6°F	72 days	Resolved, HOV Approved
EW-68	12/30/24	1/2/25 141.7°F	4 days	Resolved within 15-day timeline
EW-89	10/22/24	1/24/25 182.0°F	94 days	Resolved, HOV Approved, 75-Day Notification Submitted
EW-93	11/18/24	1/2/25 141.8°F	45 days	Resolved within 60-day timeline
EW-93	1/27/25	1/30/25 151.6°F	4 days	Resolved within 15-day timeline
EW-94	11/4/24	1/2/25 71.0°F	59 days	Resolved within 60-day timeline
EW-95	12/30/24	1/2/25 143.8°F	4 days	Resolved within 15-day timeline

1.3.4 LFG Sampling

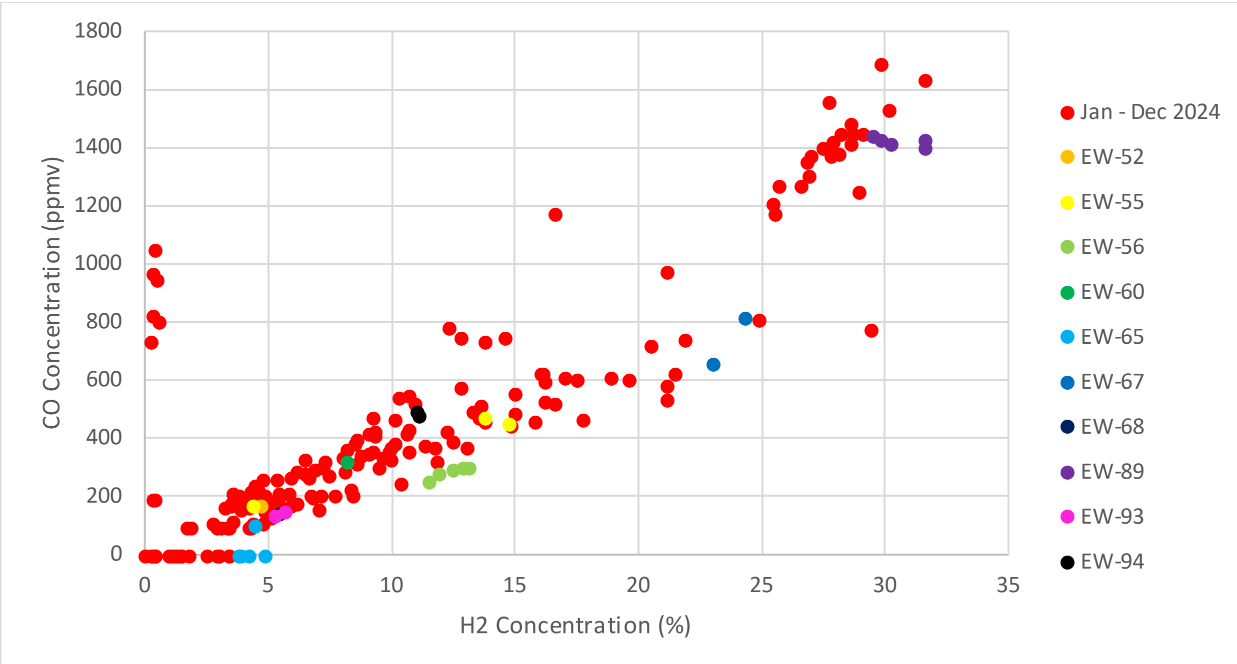
SCS collected weekly LFG samples from wells with temperature exceedances lasting more than seven days using 1.5-L Summa canisters. The samples were sent to Enthalpy Analytical for lab analysis of carbon monoxide (CO) and hydrogen (H_2) content. As of February 1, 2025, the City has received lab results for sampling on December 20, 2024, December 26, 2024, January 2, 2025, January 8, 2025, and January 16, 2025 to fulfill the requirement in 40 CFR 63.1961(a)(5). Lab results are summarized in Table 4.

Table 5. LFG Wellhead Sampling Summary

Sample Date		12/20/24	12/26/24	1/2/25	1/8/25	1/16/25
EW-52	CO (ppmv)	170				
	H2 (Vol. %)	4.67				
EW-55	CO (ppmv)	454	469	170		
	H2 (Vol. %)	14.7	13.8	4.35		
EW-56	CO (ppmv)	249	282	300	297	295
	H2 (Vol. %)	11.5	11.9	13.1	12.9	12.5
EW-60	CO (ppmv)	322				
	H2 (Vol. %)	8.17				
EW-65	CO (ppmv)	ND	98.5	ND	ND	ND
	H2 (Vol. %)	4.85	4.44	4.19	3.85	3.80
EW-67	CO (ppmv)	656	817			
	H2 (Vol. %)	23.0	24.3			
EW-68	CO (ppmv)	142				
	H2 (Vol. %)	5.45				
EW-89	CO (ppmv)	1440	1430	1410	1400	1430
	H2 (Vol. %)	29.5	29.8	30.2	31.6	31.6
EW-93	CO (ppmv)	132	145			
	H2 (Vol. %)	5.27	5.67			
EW-94	CO (ppmv)	476	492			
	H2 (Vol. %)	11.1	11.0			

The presence of hydrogen in the samples collected during this monitoring period indicates that combustion reactions are unlikely. As shown in Figure 3, the carbon monoxide and hydrogen data collected during this period appear to be consistent with the data collected previously in 2024.

Figure 3. CO vs H_2 Concentration from gas wells in January 2025 with historical trend



2.0 SIDEWALL ODOR MITIGATION

On the City's behalf, SCS designed and constructed a system to control fugitive emissions emanating from the quarry sidewalls.

2.1 PERIMETER GAS COLLECTION SYSTEM

Refer to the April 2023 Monthly Compliance Report for the SWP No. 588 Landfill, for information about the perimeter gas extraction wells.

2.2 SIDEWALL ODOR MITIGATION SYSTEM

Refer to the October 2022 Monthly Compliance Report for the SWP No. 588 Landfill, for information about the design of the sidewall odor mitigation system.

2.3 PILOT SYSTEM CONSTRUCTION

Refer to the February 2023 Monthly Compliance Report for the SWP No. 588 Landfill, for information about the design of the construction of the pilot sidewall odor mitigation system.

2.4 FULL SYSTEM CONSTRUCTION

Operation of the sidewall odor mitigation system is monitored on a monthly basis. During the month of January 2025, SCS-FS collected monitoring data at each wellhead under vacuum. A summary of system averages during each monitoring event is shown in Table 6.

Table 6. System Averages of Sidewall Wellhead Gas Composition

Record Date	Average CH_4 [%]	Average CO_2 [%]	Average O_2 [%]	Average Bal Gas [%]
1/8/2025	1.4	2.8	21.3	74.6
1/28/2025	3.2	5.3	19.2	72.4

The sidewall system average gas composition indicates lower methane content than other components in the LFGCCS. These gas composition measurements indicate that the SOMS is collecting a mixture of LFG escaping the sidewall and ambient air.

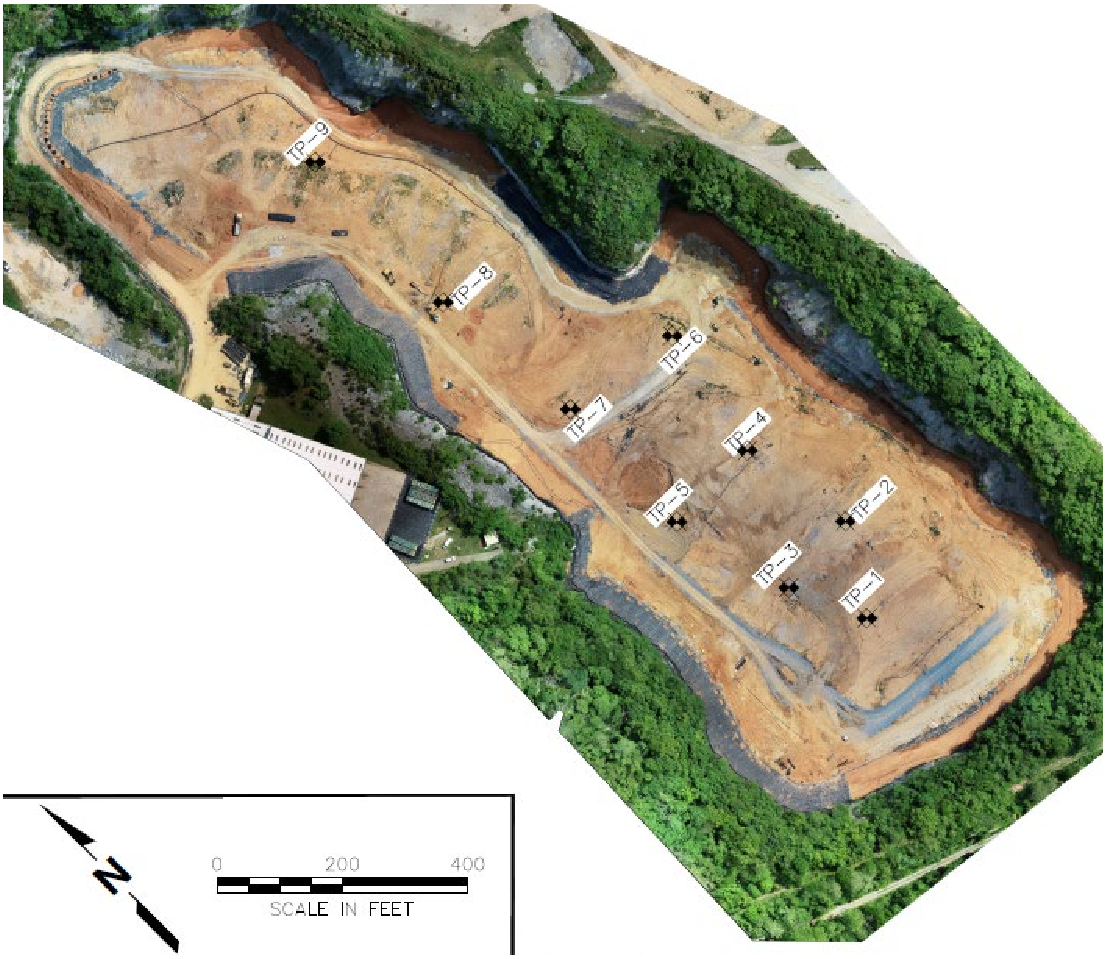
3.0 WASTE TEMPERATURE MONITORING

SCS designed a monitoring system to collect temperature data throughout the waste mass. The steps taken by the City to implement this system are described in the following sections.

3.1 SUMMARY OF WASTE TEMPERATURE MONITORING

Installation of the in-situ Landfill Temperature Monitoring System began in October of 2022 and installation of replacement sensors was completed in February of 2023. Details of construction progress can be found in the monthly compliance reports for the SWP No. 588 Landfill. The locations of the temperature probes are shown in Figure 4.

Figure 4. Temperature Monitoring Probe Locations



SCS began collecting temperature data daily on February 15, 2023. TP-4 stopped recording late on November 20, 2024 due to a sensor failure. SCS-RMC attempted to replace the sensors within the TP-4 steel casing. SCS-RMC's technician was unable to remove the failed sensors indicating an obstruction within the casing. With the old sensor still in place, there was insufficient room to install new sensors. SCS suspects that below grade differential settlement and movement within the waste mass damaged the casing. TP-4 cannot be used for in-waste temperature going forward.

Average daily temperatures recorded by the sensors for the month of January are included in Appendix D. Each week the average temperatures from a select day of that week are downloaded and compared to temperatures recorded during the previous week. Average daily temperatures recorded on select days during the month of January are shown in Appendix B. The average temperatures recorded for March 2023, March 2024, December 2024, and January 2025 are shown in Figures 5 through 12 on the following pages.

Overall, these data indicate that temperatures within the landfill are generally stable and are typical of those observed at elevated temperature landfills (ETLFs). The temperatures recorded are substantially lower than those associated with landfill fires or other combustion processes, which can exceed 1000°F, which is further evidence that the elevated temperatures are due to sources other than combustion.

3.1.1 Operational Challenges

TP-3 began having sensor reading issues at the 150-foot depth at the end of October 2024. These issues continued through December 2024. Thus, no data are reported at 150 ft depth for December 2024 in Fig. 7. Sensor readings resumed at the 25-foot depth in early December; however, sensor reading issues arose at the 125-foot and 175-foot depths in the latter half of December.

In January 2025, all sensors below the 75-foot level in TP-3 appeared erroneous at various intervals. There was no improvement to the temperature signals after replacing the thermocouple interface card at TP-3. This may indicate that the thermocouples are damaged. SCS is planning to evaluate if the thermocouples can be removed and replaced..

In late January measurements at the 75-foot level and 150-foot level in TP-2 indicate thermocouple failure. SCS is also planning to evaluate if these thermocouples can be removed and replaced.

3.1.2 Probes with Consistent Temperatures over Time

TP-1, TP-3, TP-6, TP-8, and TP-9 have exhibited relatively consistent monthly average temperatures over time (as shown in Figures 5, 6, 7, 8, and 9).

Figure 5. TP-1 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025

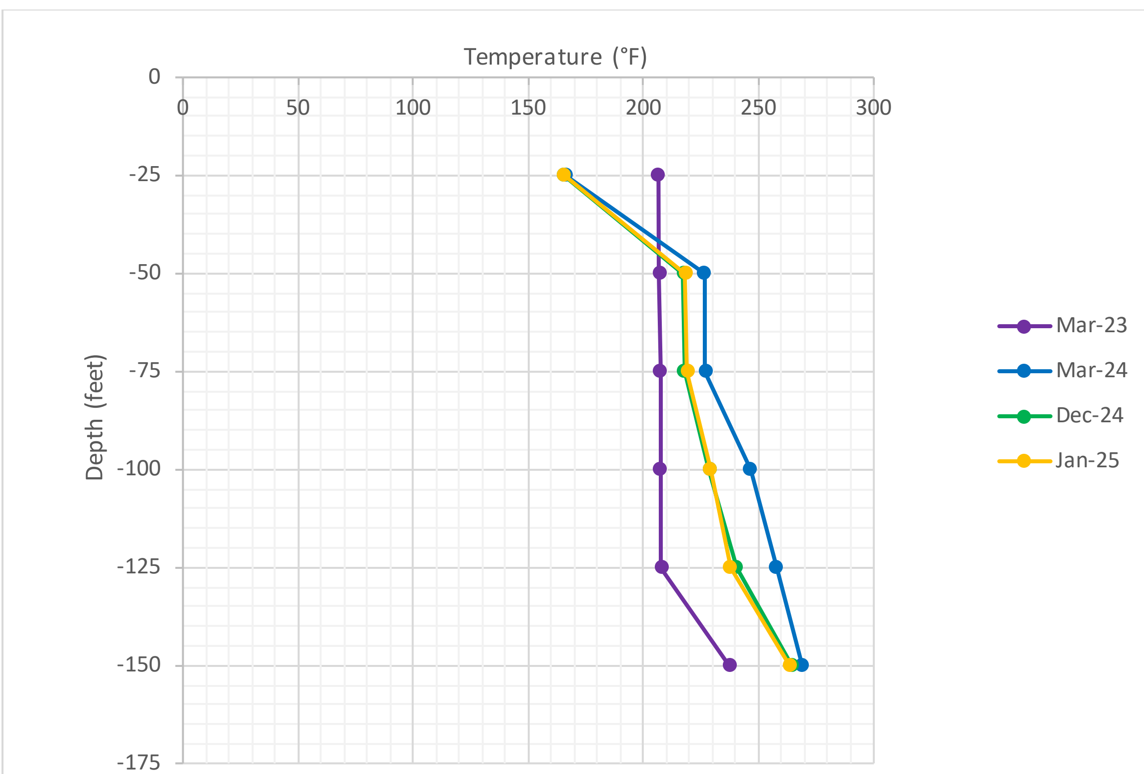


Figure 6. TP-3 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025

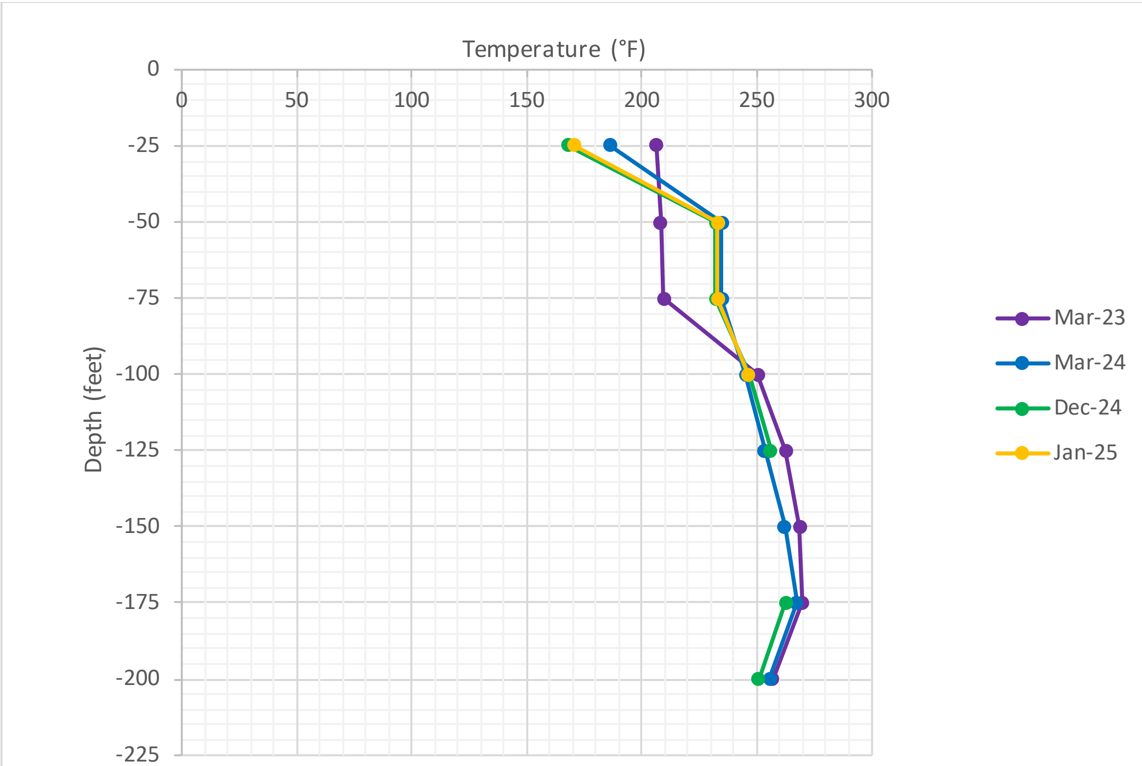


Figure 7. TP-6 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025

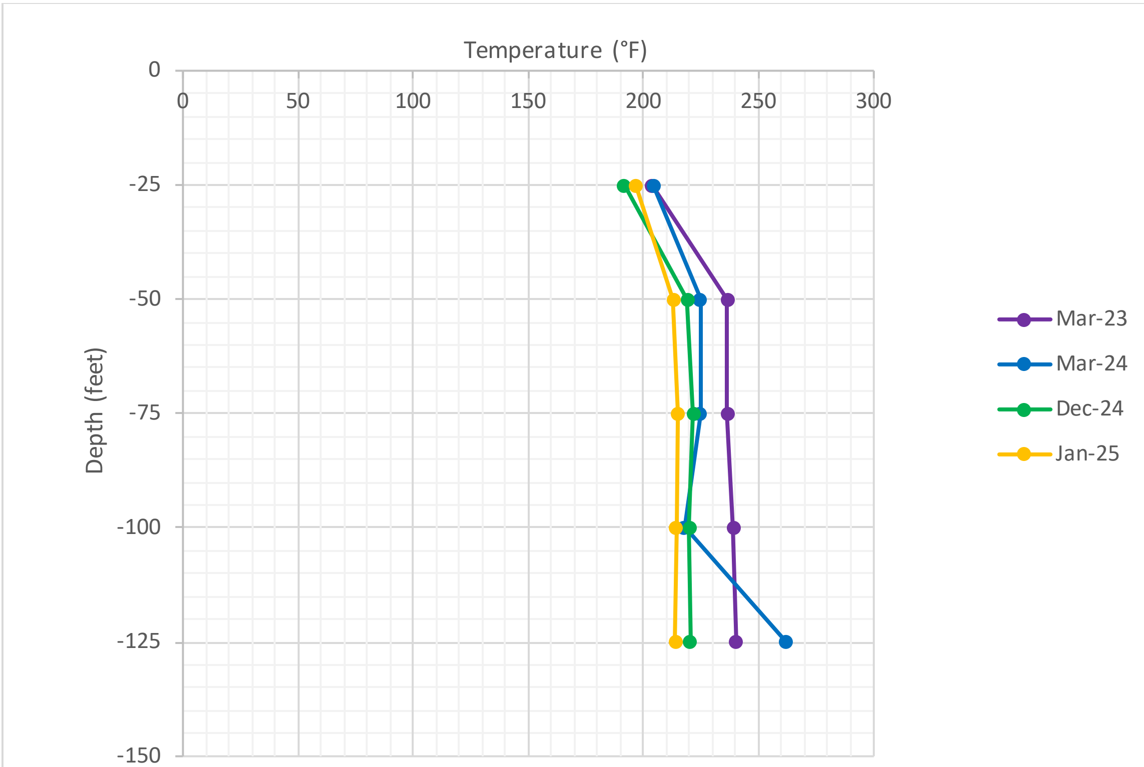


Figure 8. TP-8 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025

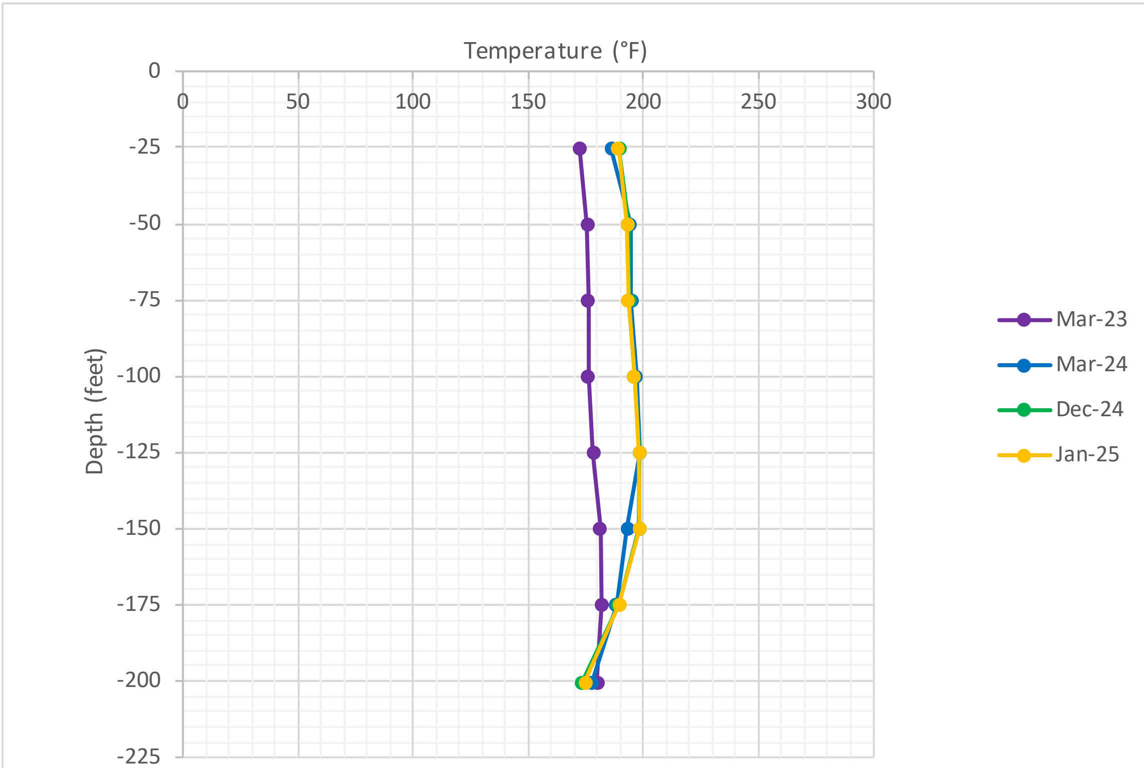
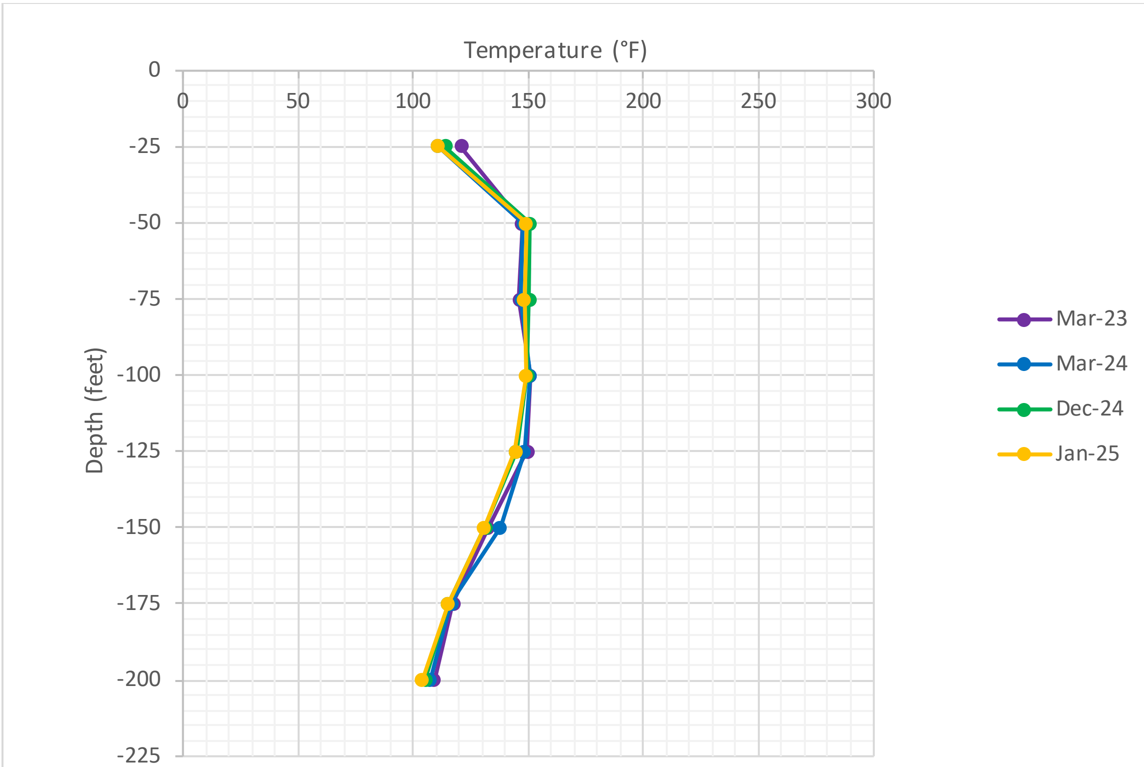


Figure 9. TP-9 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025



3.1.3 Probes with Changing Temperatures over Time

The temperatures at probes TP-2, TP-5, and TP-7 are more varied over time.

- TP-2: As previously noted in this section, the sensors located at the 75-foot and 150-foot depths are not currently providing accurate temperature measurements.
- TP-5: The curve shape of the temperature averages with depth in Winter and Spring months are similar to one another while the Summer and Fall months follow a different pattern. Changes in temperature trends with depth at TP-5 have been observed since its installation. April 2024 is provide for this temperature probe instead due to recording issues in March 2024.
- TP-7: There is no identifiable trend over time in the average temperatures in TP-7. Changes in temperature trends with depth at TP-7 have been observed since its installation. (see Figure 12).

Figure 10. TP-2 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025

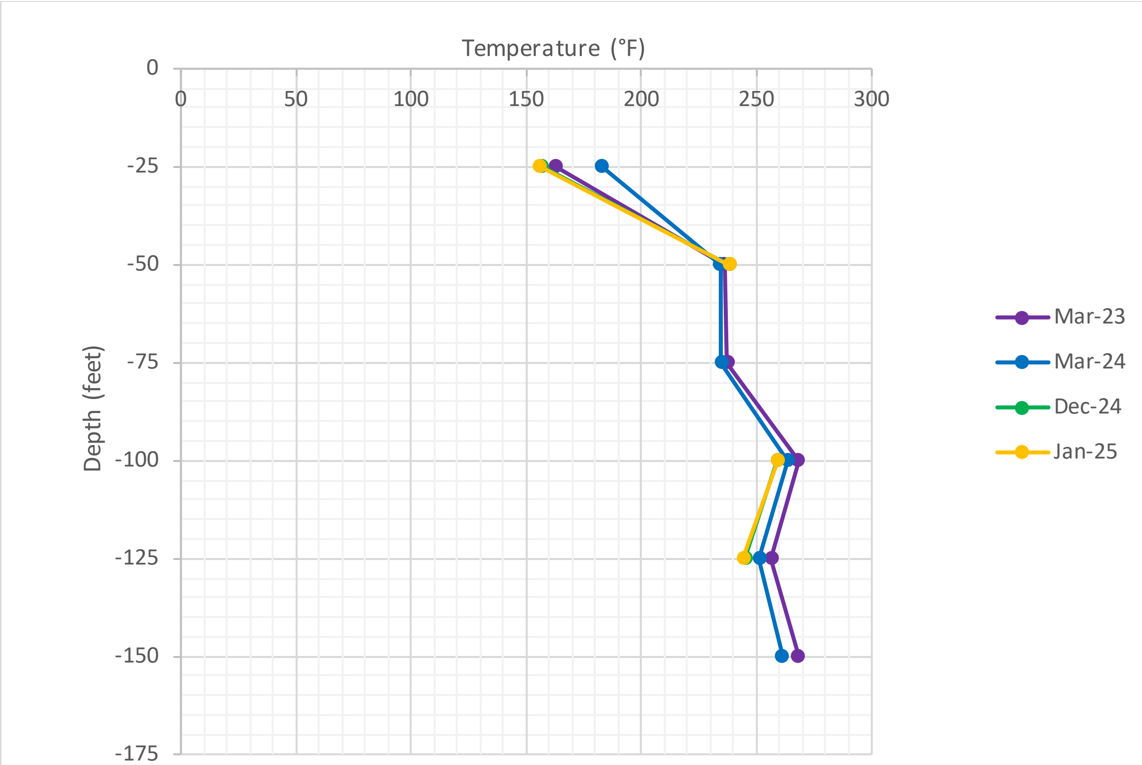


Figure 11. TP-5 Average Temperatures for the Months of March 2023, April 2024, December 2024, and January 2025

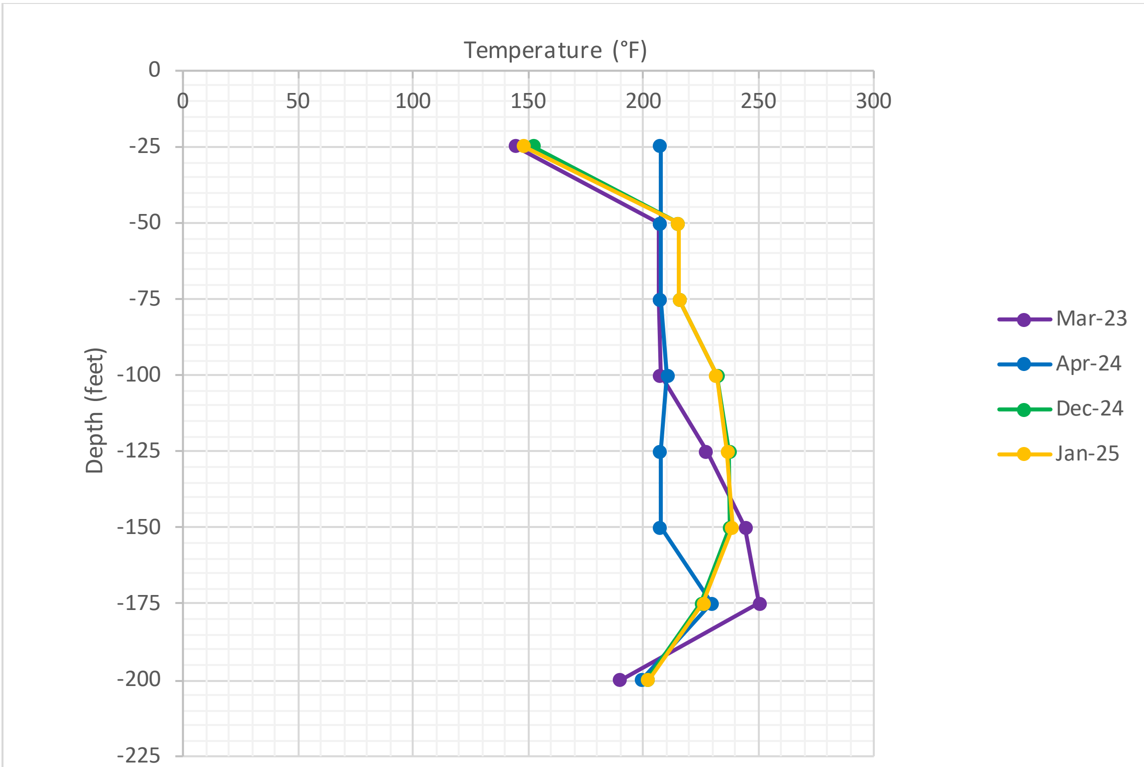
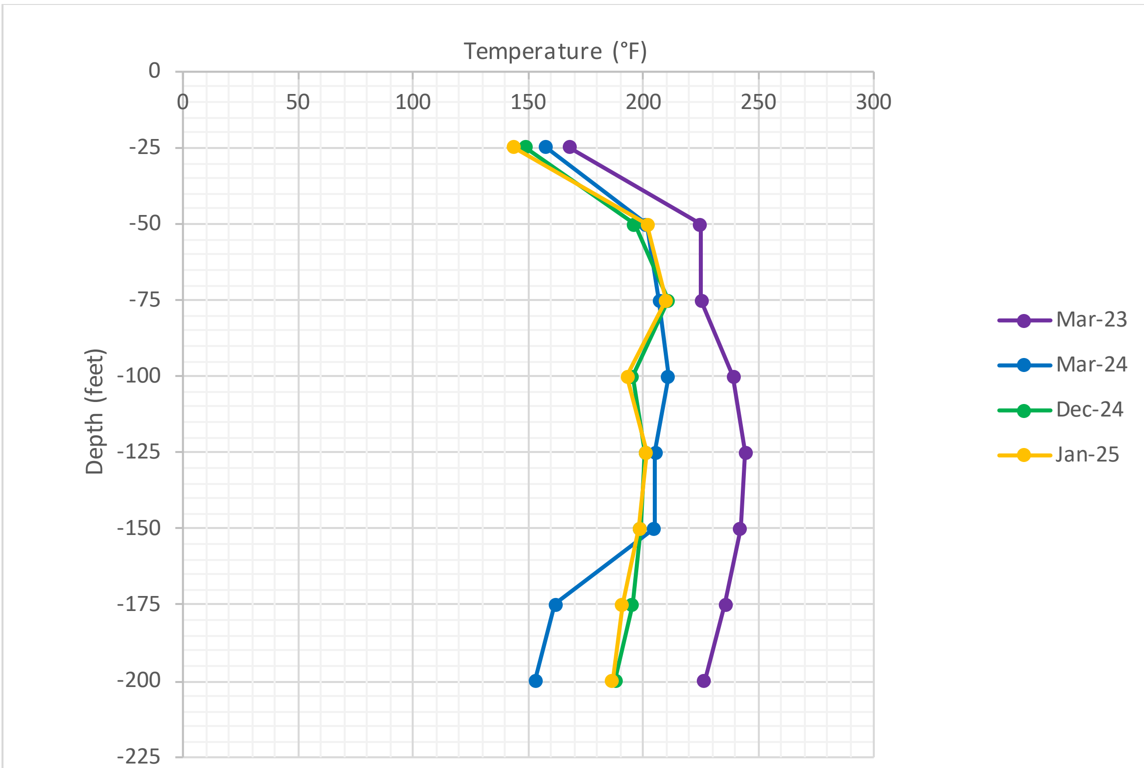


Figure 12. TP-7 Average Temperatures for the Months of March 2023, March 2024, December 2024, and January 2025



4.0 LEACHATE EXTRACTION AND MONITORING

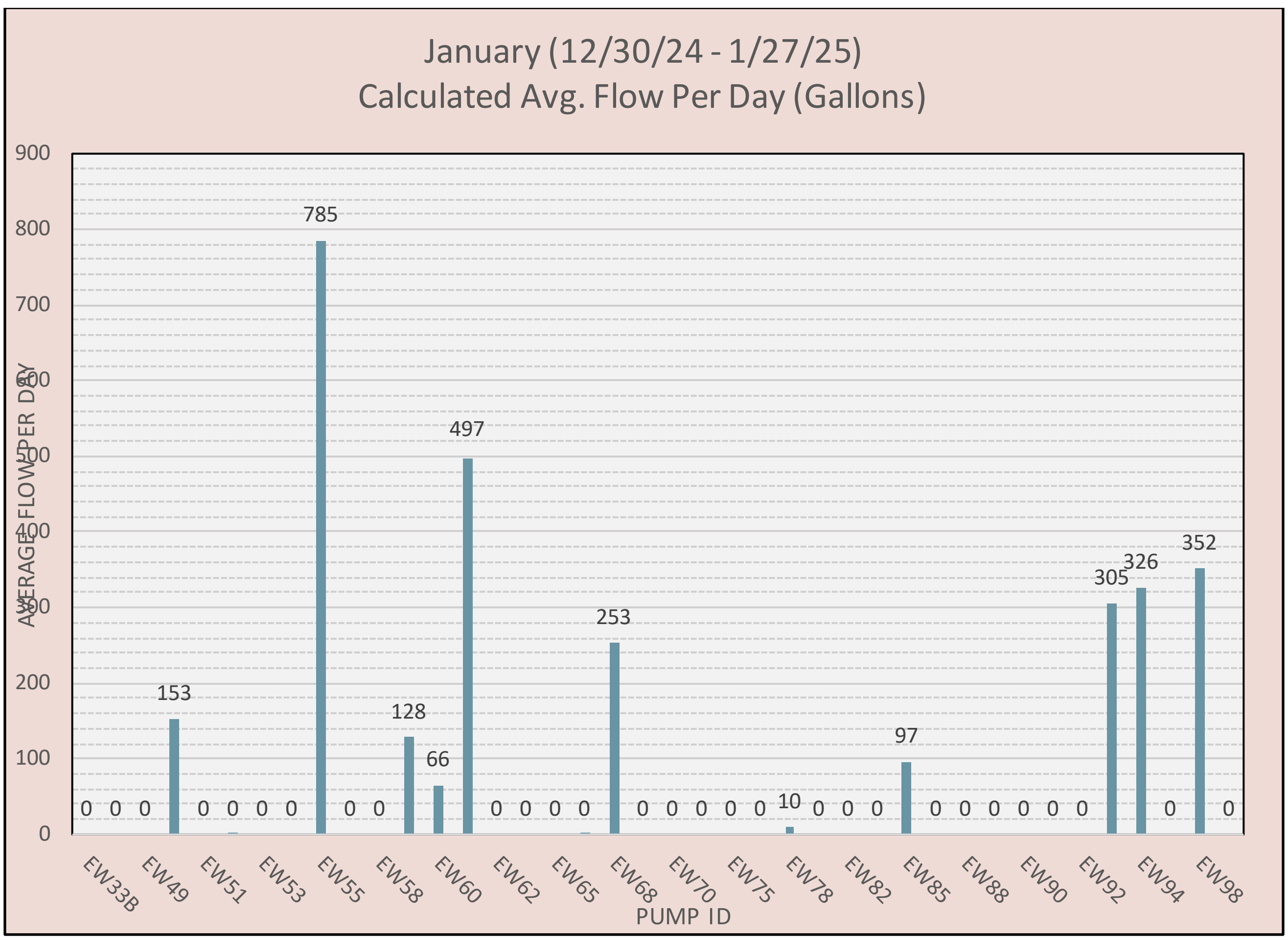
The City is taking steps to improve the extraction of leachate from the waste mass and collect analytical data on leachate characteristics. The following sections detail steps taken to achieve these goals. Refer to Appendix G for narrative sections without updates.

4.1 DEWATERING PUMP OPERATIONS AND MAINTENANCE

4.1.1 Stroke Counter Data Analysis

During the monthly liquid depth measurement event and during LFG monitoring, SCS collected stroke counter data from the pumps installed in the GCCS extraction wells. These stroke counts were collected from 40 wells from December 31, 2024 to January 27, 2025. The recorded stroke count data and estimates of the quantities of liquids removed from each well during January are included in Appendix G and are summarized in Figure 13.

Figure 13. Estimated December Dewatering Liquid Removal by Well



4.1.2 Status of LFG Liquids Pumps

The City and SCS understand that operations of dewatering pumps are critical to address issues related to heat, odors, and the efficient operation of the GCCS. The landfill conditions present a challenging environment for pump operations.

Daily pump checks and maintenance of spare pumps will continue in the coming month along with pump replacements as needed. The City, along with SCS-FS, have found that the best pumps for the landfill's current conditions are QED pumps designed for high temperature operation. The City received eight additional QED pumps in October 2024; some were installed in new wells and others were reserved to swap/replace existing pumps for cleaning. The additional pumps will help with the rotation of field pumps needing maintenance and replacement going forward.

SCS has prepared the summary below to outline the operating conditions and specific challenges associated with each pump.

<u>Wells with pumps working properly (See Figure 13 for calculated individual volumes of liquid removed)</u>

- EW- 50, EW-55, EW-59, EW-60, EW-61, EW-68, EW-85, EW-94, EW-98
- SCS understands that EW-33B operates based on observations of an audible stroking in the field. However, this pump has a short cycle that is not typically detected by a cycle counter. The pump operates for short periods making adjusting the stoke counter difficult. SCS-OMM will continue to monitor pump operations and attempt further adjustment to the stroke counter as resources allow.

<u>Wells that received replacement parts or other non-routine fixes</u>

- The stroke counter on the pump in EW-36A was recently replaced due to a malfunction of the old stroke counter. SCS, SCS-OMM, and the City will continue to review the stroke counter to assess the pump's performance.
- Based on a review of the stroke counter data, the pump in EW-52 pumped approximately 6 gallons of liquid during the month of January 2025. The pump was replaced on January 27, 2025. SCS, SCS-OMM, and the City will continue to monitor the pump to assess its performance.
- EW-70 was not able to be accessed for maintaining pumps or sampling LFG liquids in January (conditions surrounding the well at the time of liquids sampling are shown in Figure 14). The City placed stone adjacent to the well to facilitate access for pump maintenance and liquids sampling (conditions after these improvements were made are shown in Figure 15).

Figure 14. Conditions at EW-70 During Liquids Sampling Event

Figure 15. Conditions at EW-70 after Aggregate Installation

- The stroke counter on the pump in EW-78 was recently replaced due to a malfunction. The pump was replaced on January 24, 2025. SCS, SCS-OMM, and the City will continue to monitor the pump to assess its performance.

- EW-82 could not be accessed for maintenance or sampling LFG liquids in January as the area around the well was flooded (conditions surrounding the well at the time of liquids sampling are shown in Figure 16). The City placed stone adjacent to the well to facilitate access to the pump for maintenance and liquids sampling. Conditions after these improvements are shown in Figure 17.

Figure 16. Conditions at EW-82 During Liquids Sampling Event

Figure 17. Conditions at EW-82 after Aggregate Installation

- The pump in EW-93 was replaced on January 15, 2025. SCS, SCS-OMM, and the City will continue to monitor the pump to assess its performance.

Inaccessible Pumps/Wells

- The well casing at EW-49 needs to be cut down to perform maintenance on the pump. SCS-OMM has scheduled these activities for February 2025.

- When attempting to remove the pump in EW-51, SCS-OMM encountered an obstruction within the well that made removal difficult. SCS-OMM is coordinating with the City to bring a piece of heavy equipment to the well to extract and replace the pump. Pumps placed in EW-51 typically require maintenance on short intervals due to the build-up of solids on the pump. In interest of efficiency, SCS-OMM and the City are prioritizing fixes at other pumps that are more likely to extract liquid for longer before needing maintenance again. An example of typical solids build-up on and landfill gas liquids extraction pump in the SWP No. 588 Landfill is shown in Figure 18.

Figure 18. Solids on a Landfill Gas Liquids Extraction Pump

- During the LFG liquids sampling effort described in Section 4.2.1, an obstruction within the well casing of EW-53 prevented access to the pump. If the presence of an obstruction is confirmed, maintenance of the pump will no longer be possible for this well and no further liquid will be removed from it.

- When attempting to remove the pump in EW-57, SCS-OMM encountered an obstruction within the well that made removal difficult. SCS-OMM is coordinating with the City to bring a piece of heavy equipment to the well to extract and replace the pump.

- When attempting to remove the pump in EW-58, SCS-OMM encountered an obstruction that prevented the pump from being removed from the well even when utilizing heavy equipment to remove it. The pump itself now presents an obstruction that prevents the installation of another pump in the well.

- The casings of EW-81, EW-83, EW-91, and EW-92 extend too high above the existing ground level for a pump to be safely accessed. These are stainless steel wells that cannot be lowered through conventional means. SCS-OMM and the City are coordinating placement of additional soil around the wells to provide safe access.

- When attempting to remove the pump in EW-100, SCS-OMM encountered an obstruction that prevented the pump from being removed from the well even when utilizing heavy equipment. The pump itself now presents an obstruction that prevents the installation of another pump in the well.

<u>Other circumstances</u>

- The pumps in EW-54, EW-87, EW-88, and EW-90 are scheduled to be removed and inspected by SCS-OMM in February.

- The pump in EW-62 is offline due to a damaged airline. SCS-OMM will evaluate the extent of damage and will coordinate with the City to procure materials needed for the repair.

- Based on a review of the stroke counter data, the pump in EW-67 pumped approximately 8 gallons of liquid during the month of January 2025. SCS-FS has scheduled this pump to be pulled and inspected but noted that high forcemain pressure (believed to be caused by scaling) may be impeding function.

- Pumps in the EW-74 and EW-75 have historically had short maintenance intervals due to the build-up of solids on the pump. In the interest of efficiency, SCS-OMM and the City deferred action on these wells to prioritize maintenance efforts on extraction wells where expected to function for a longer period of time after maintenance. An example of typical solids build-up on and landfill gas liquids extraction pump in the SWP No. 588 Landfill is shown in Figure 19.

Figure 19. Solids on a Landfill Gas Liquids Extraction Pump

- The pump in EW-89 is a Jeneer pump that is scheduled to be removed and replaced with a QED by SCS-OMM in February.

In addition to the challenges associated with the individual pumps, SCS-OMM has observed high forcemain pressures and significant build-up of solids within the forcemain. An example of solids build-up within the forcemain is shown in Figure 20. This results in SCS-OMM dedicating substantial amounts of time to relieving air pressure on the system. The City is preparing bid documents for installation of additional cleanouts and air release valves in the wellfield to address the issue. Solicitation of bids for that project is scheduled for February 2025.

Figure 20. Solids in Landfill Gas Liquids Forcemain

4.2 SAMPLING AND ANALYSIS PLAN

4.2.1 Sample Collection

On January 8, 2025, SCS collected a leachate sample from one Dual Phase LFG extraction well (EW-85). Field measurements for dissolved oxygen, oxidation-reduction potential, pH, specific conductance, temperature, and turbidity were taken and recorded at the time of sample collection. The associated field logs are included in **Appendix F**. In January 2025, SCS' field staff were not able to collect samples from wells summarized in **Table 5**. Additional details about the condition of these wells and planned maintenance activities are included in Section 4.1.2.

Table 7. Summary Wells Unable to be Sampled for Leachate

Wells With Pumps	Wells Without Pumps
• Pump was not running at the time of monitoring for the following wells: EW-33B, EW-36A, EW-49, EW-50, EW-55, EW-59, EW-60, EW-61, EW-64, EW-65, EW-67, EW-68, EW-69, EW-78, EW-81, EW-83, EW-85. • Pump was disconnected or off at the time of monitoring for EW-51, EW-52, EW-53, EW-54, EW-57, EW-62, EW-87, EW-88, EW-89, EW-90, and EW-93. • EW-70 was surrounded by standing water such that the well could not be safely accessed. • EW-82 was surrounded by ice such that the well could not be safely accessed. • Pump was not running for EW-96 and well was too tall to safely measure the liquid level. • Pump was not running, and the liquid depth was not measured at the time of monitoring for EW-94.	• There was no pump at the time of the monitoring for the following wells: EW-58, EW-63, EW-71, EW-72, EW-73, EW-74, EW-86, EW-91, EW-95, EW-99, and EW-100. • There was no pump at the time of the monitoring for EW-75, EW-80, and EW-84 and the liquid level could not be gauged as well was not under vacuum thus unsafe to open for water level. • There is no pump and the well appeared dry at the time of monitoring for EW-56. • There was no pump at the time of the monitoring for EW-66, EW-77, EW-79, EW-92, and EW-97 and well was too tall to safely measure the liquid level. • There is no pump and the liquid depth was not measured at the time of monitoring for EW-76.

The samples were delivered to Enthalpy Analytical (Enthalpy) in Richmond, Virginia for analysis. Enthalpy's Virginia Division of Consolidated Laboratory Services (VELAP) certification is provided on the certificate of analysis (COA) included in **Appendix F**. The samples were analyzed for the parameters utilizing the analytical methods described in the Dual Phase Landfill Gas Extraction Well Leachate Monitoring Plan, December 1, 2022, prepared by SCS Engineers.

4.2.1 Quality Assurance and Quality Control

Field quality control (QC) involved the collection and analysis of trip blanks to verify that the sample collection and handling processes did not impair the quality of the samples. Trip blanks were prepared for VOC analysis via Solid Waste (SW)-846 Method 8260D. In conjunction with the preparation of the groundwater sample collection bottle set, laboratory personnel filled each trip blank sample bottle with distilled/deionized water and transported them with the empty bottle kits to SCS. Field personnel handled the trip blanks like a sample; they remained un-opened, were transported in the sample cooler, and were returned to the laboratory for analyses. A trip blank is used to indicate potential contamination due to the potential migration of VOCs from the air at the site or in the sample shipping containers, through the septum or around the lid of the sampling vials and into the sample.

Laboratory quality assurance/quality control (QA/QC) involves the routine collection and analysis of method reagent blanks, matrix spike (MS) and matrix spike duplicate (MSD) samples, and laboratory control samples (LCS). A summary of each of these is presented below:

- **Method Blank** – The method blank is deionized water subjected to the same reagents and manipulations to which site samples are subjected. Positive results in the method blanks may indicate either contamination of the chemical reagents or the glassware and implements used to store or prepare the sample and resulting solutions.

- **MS/MSD** – A MS is an aliquot of a field sample with a known concentration of target parameter added to it. An MSD is an intra-laboratory split sample spiked with a known concentration of target parameter. Spiking for each occurs prior to sample analysis. MS/MSD samples are collected for every batch of twenty or fewer samples. Matrix spike recoveries are used to indicate what effect the sample matrix may have on the reported concentration and/or the performance of the sample preparation and analysis.

- **LCS** – These samples consist of distilled/deionized water injected with the parameters of interest for single parameter methods and selected parameters for multi-parameter methods according to the appropriate analytical method. LCS samples are prepared and analyzed for each batch containing twenty or fewer samples. LCS recoveries are used to monitor analytical accuracy.

Surrogate recoveries are also measured as a part of laboratory QA/QC. Surrogates are organic compounds that are like the parameters of interest in chemical composition, extraction, and chromatography, but are not normally found in environmental samples. These compounds are inserted into blank, standards, samples, and spiked samples prior to analysis for organic parameters only. Percent recoveries are calculated for each surrogate. Spike recoveries at or below acceptance criteria indicate whether analytical results can be considered biased high or biased low.

No trip or method blank detects were identified for the January 2025 monitoring event. The laboratory analysis report for the January 2025 monitoring event trip blank is included in **Appendix F**. The January 2025 monitoring event laboratory QA/QC report, including the method blank results, is included in the COA in **Appendix F**.

4.2.2 Data Validation

To identify analytical data that may not represent valid results, data from the monitoring events were validated by the Laboratory and SCS in accordance with United States Environmental Protection Agency (EPA) guidance[2]. Data flagged with a “J” qualifier indicates the quantitation of the parameter is less than the laboratory’s limit of quantitation but greater than the laboratory’s limit of detection (LOD); thus, the concentration is considered estimated. Samples with parameter detections less than five times that of the trip blank, field blank, and/or method blank detection but greater than the laboratory’s LOD are flagged with a “B” qualifier. Samples with common laboratory contaminant parameter detections less than 10 times that of the trip blank, field blank, and/or

[2] United States Environmental Protection Agency. Guidance for Data Usability in Risk Assessment (Part A-14). April 1992.
United States Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. National Functional Guidelines for Inorganic Superfund Methods Data Review. November 2020.
United States Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. National Functional Guidelines for Organic Superfund Methods Data Review. November 2020.

method/laboratory blank detection but greater than the laboratory's LOD are flagged with a "B" qualifier. Data with a "B" qualifier are considered not validated as the detection may be anomalous due to cross-contamination during sampling, transportation of samples, or laboratory analysis.

No leachate results were flagged with a "B" qualifier for the January 2025 monitoring event as no detections were identified in the trip or method blanks. The January 2025 detections flagged with a "J" qualifier are shown on **Table 6.**

4.2.3 Laboratory Analytical Results

The analytical results for the January 2025 leachate samples collected from extraction wells EW-85 are summarized in **Table 6.** The associated COA is included in **Appendix F.** Parameter results from January 2025 and previous monitoring events (November 2022 – December 2024) are presented on a table in **Appendix F.** Time-series plots of each VOC for the wells that have historically been sampled are included in **Appendix F.**

Table 8. Monthly LFG-EW Leachate Monitoring Event Summary

Well ID	EW-85	LOD	LOQ
Parameter	**January 2025 Concentration**		
Ammonia as N (mg/L)	**0.68**	0.005	0.01
Biological Oxygen Demand (mg/L)	**22900**	0.2	2
Chemical Oxygen Demand (mg/L)	**36800**	5000	5000
Nitrate as N (mg/L)	ND	0.5	1.25
Nitrite as N (mg/L)	ND	0.25	1.25
Total Recoverable Phenolics (mg/L)	**34.4**	3	5
Total Kjeldahl Nitrogen (mg/L)	**1960**	40	100
SEMI-VOLATILE ORGANIC COMPOUND (ug/L)			
Anthracene	ND	100	200
TOTAL METALS (mg/L)			
Arsenic	**1.88**	0.01	0.05
Barium	**1.88**	0.01	0.05
Cadmium	**0.198**	0.004	0.01
Chromium	**0.00941**	0.003	0.01
Copper	**0.035 J**	0.01	0.01
Lead	ND	0.002	0.002
Mercury	**0.1047**	0.01	0.01
Nickel	ND	0.0085	0.01
Selenium	ND	0.0006	0.01
Silver	**0.789**	0.025	0.05
Zinc	ND	0.002	0.002
VOLATILE FATTY ACIDS (mg/L)			
Acetic Acid	**3500**	---	100
Butyric Acid	**1100**	---	100
Lactic Acid	**480**	---	100

Table 8. Monthly LFG-EW Leachate Monitoring Event Summary

Well ID	EW-85	LOD	LOQ
Parameter	January 2025 Concentration		
Propionic Acid	**1800**	---	100
Pyruvic Acid	ND	---	100
VOLATILE ORGANIC COMPOUNDS (ug/L)			
2-Butanone (MEK)	**17000**	1500	5000
Acetone	**65300**	3500	5000
Benzene	**588**	20	50
Ethylbenzene	**54.5**	20	50
Tetrahydrofuran	**11200**	500	500
Toluene	**36 J**	25	50
Xylenes, Total	**82 J**	50	150

--- = not available
J = Constituent was detected at a concentration above the laboratory's LOD but below the laboratory's LOQ. Concentration is estimated and not validated.
LOD = laboratory's Limit of Detection
LOQ = laboratory's Limit of Quantitation
mg/L = milligrams per liter
ND = Not Detected
ug/L = micrograms per liter

5.0 SETTLEMENT MONITORING AND MANAGEMENT

The City is taking steps to track and manage settlement occurring in the landfill. A summary of actions taken to quantify and manage settlement is included in the sections below. Refer to Appendix G for narrative sections without updates.

5.1 SETTLEMENT MONITORING AND MANAGEMENT PLAN

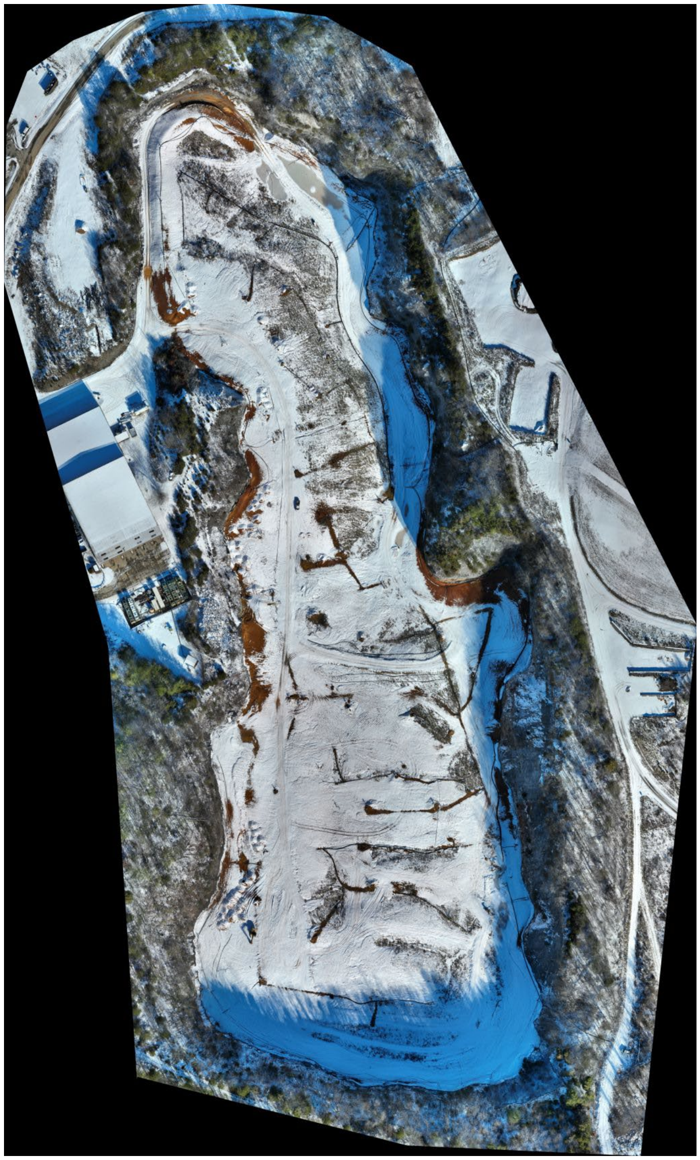
Information about the Settlement Monitoring and Management Plan for the SWP No. 588 Landfill and a copy of the plan can be found in the November 2022 Compliance Report for the SWP No. 588 Landfill.

5.2 MONTHLY SURVEYS

5.2.1 Topographic Data Collection

SCS collected topographic data of the Solid Waste Permit No. 588 Landfill using photogrammetric methods via an unmanned aerial vehicle (UAV or drone) on January 14, 2025. On this date there was snow present on the ground that impacted the collection of topographic data. The snow on the ground is depicted in Figure 21. The topographic data collected is shown on Sheet 4 in Appendix E.

Figure 21. Aerial Photo of the SWP No. 588 Landfill

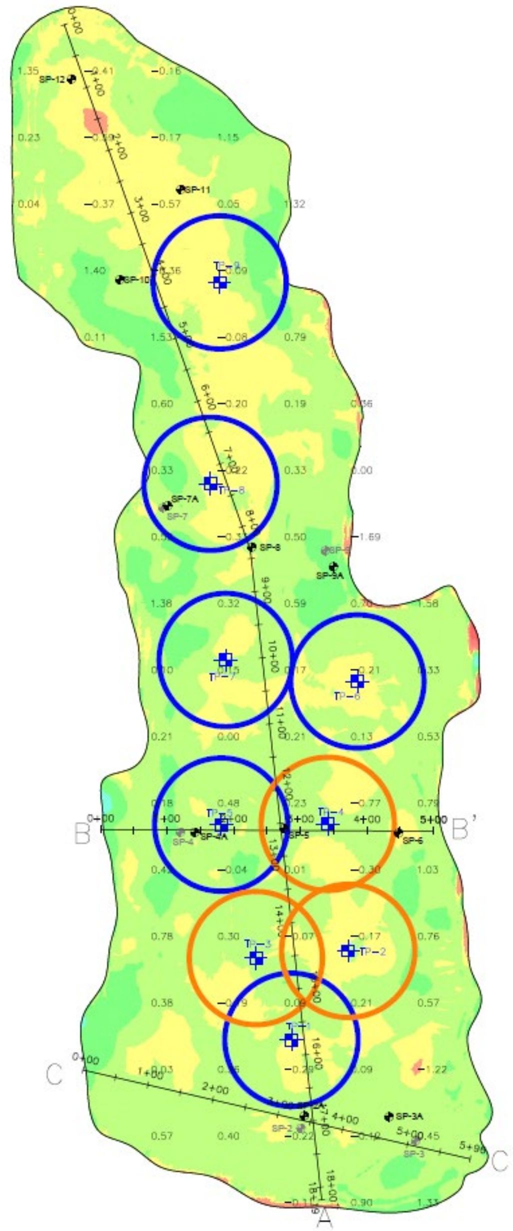


The topography within the landfill footprint was compared to topographic data collected by SCS using photogrammetric methods on December 13, 2024. A drawing depicting the December 13, 2024 topography is included as Sheet 3 in Appendix E.

Based on a comparison of the topographic data collected on those two dates, the data shows a fill of 11,200 cubic yards across the site. Fill may have been placed on the site to address differential settlement, surface emissions, and to provide access to LFG collection vertical wells. The fill value was also impacted by the presence of snow on the facility. During that same time period, calculations indicate a “cut” volume of approximately 2,100 cubic yards. Cut volumes are typically attributed to settlement. This resulted in a net volume increase of approximately 9,100 cubic yards.

A visual depiction of settlement and filling at the landfill during this time is depicted in Figure 22. Areas in yellow, orange, and red indicate where elevations decreased and areas in green indicate areas where elevations have increased. Darker colors indicate greater changes in elevation. This drawing is also included as Sheet 5 in Appendix E.

Figure 22. 1-Month Elevation Change Map



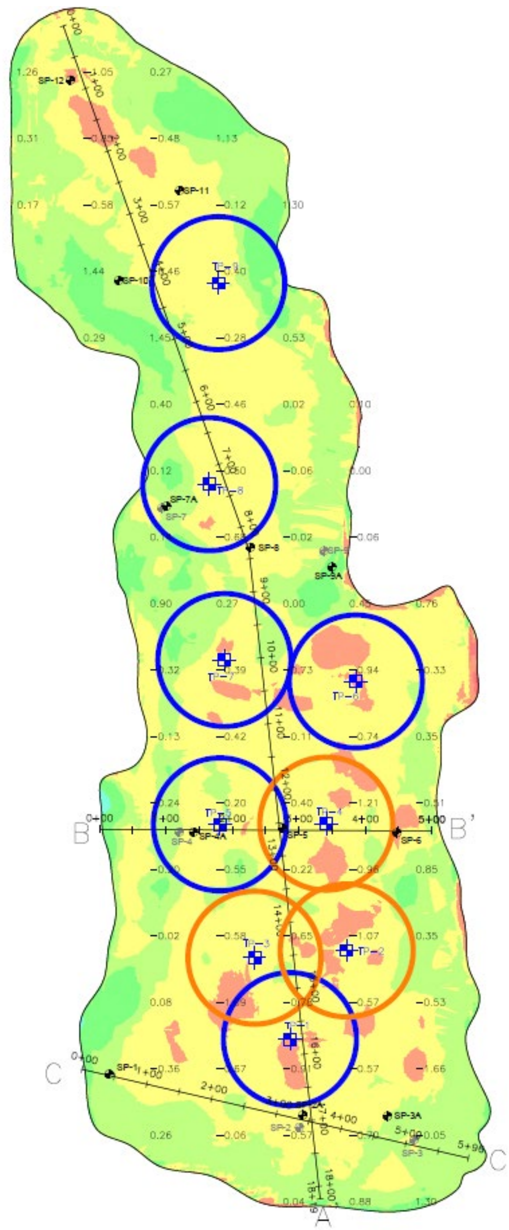
The locations of in-waste temperature monitoring probes are also shown on Figure 22, Figure 23, and Figure 24. The circles around the probes in each of these figures are indicative of the average borehole temperature. The circles shown are offset from the probes for clarity only and do not necessarily indicate temperatures measured at locations away from the probe. Probes with a blue circle around them typically have an average temperature less than 200°F across the full depth of the probe. Probes with an orange circle around them typically have an average temperature greater than 200°F and less than 250°F across the full depth of the probe. There were no probes measuring average temperatures greater than 250°F and less than 300°F during the month of January 2025.

SCS calculated the waste footprint for purposes of analysis to be 752,610 square feet. Based on that area and the net volume change, the average elevation increase between the flyover dates was 0.3 feet.

SCS also compared the topographic data collected in January to the topographic data collected on October 16, 2024. Based on a comparison of the topographic data collected on those two dates, settlement occurred that reduced the volume of waste in the landfill by approximately 8,700 cubic yards. During that same time period calculations indicate approximately 6,500 cubic yards of fill were placed on the landfill, for a net decrease in waste volume of 2,200 cubic yards.

A visual depiction of settlement and filling at the landfill during this time is depicted in Figure 23. Areas in orange/yellow indicate where elevations decreased and areas in green indicate areas where elevations have increased. Darker colors indicate greater changes in elevation. This drawing is also included as Sheet 6 in Appendix E.

Figure 23. 3-Month Elevation Change Map

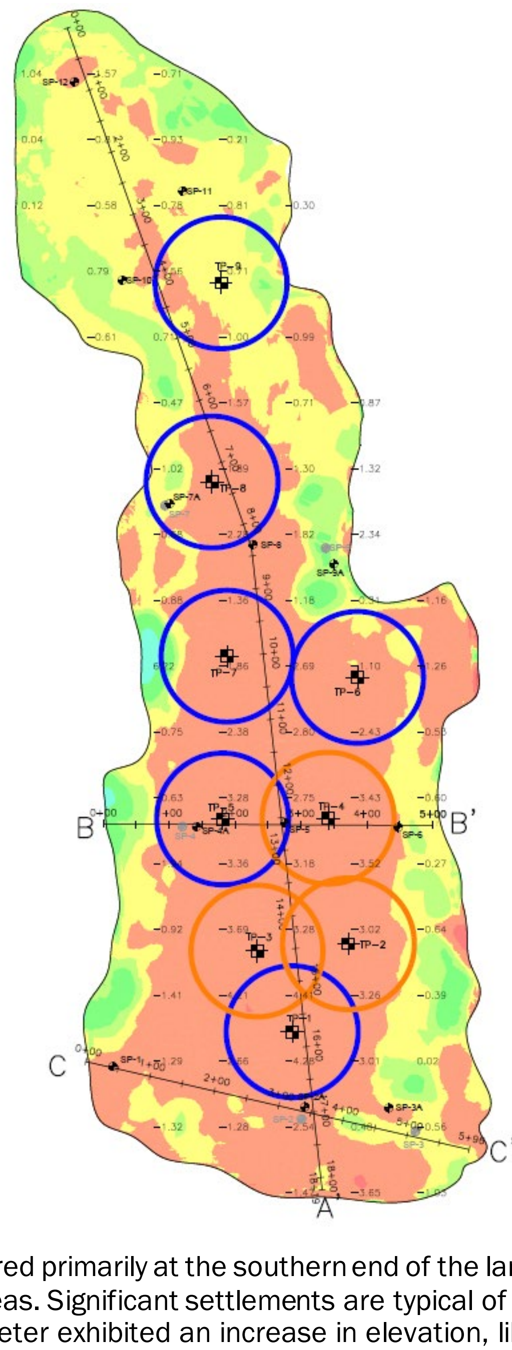


Based on the area of the landfill and the net volume change, the average elevation decrease was approximately 0.1 feet.

SCS also compared the topographic data collected in January 2025 to the drone topographic data collected on January 23, 2024 . Based on a comparison of the topographic data collected on those two dates, settlement occurred that reduced the volume of waste in the landfill by approximately 42,400 cubic yards. During that same time period approximately 3,400 cubic yards of construction-related fill were placed on the landfill. This fill was primarily soil placed as part of the sidewall odor mitigation system construction and ongoing maintenance (i.e. filling to compensate for settlement). This resulted in a net volume decrease of approximately 39,000 cubic yards.

A visual depiction of settlement and filling at the landfill during this time is depicted in Figure 24. Areas in red indicate where elevations decreased and areas in green indicate areas where elevations have increased. Darker colors indicate greater changes in elevation. This drawing is also included as Sheet 7 in Appendix E.

Figure 24. 1-Year Elevation Change Map



The largest settlement occurred primarily at the southern end of the landfill where the waste settled by 5 feet or more in some areas. Significant settlements are typical of elevated temperature landfill conditions. The landfill perimeter exhibited an increase in elevation, likely due to soil placement associated with construction and/or ongoing maintenance of the Sidewall Odor Mitigation System. There were variations in elevation associated with soil stockpiling operations.

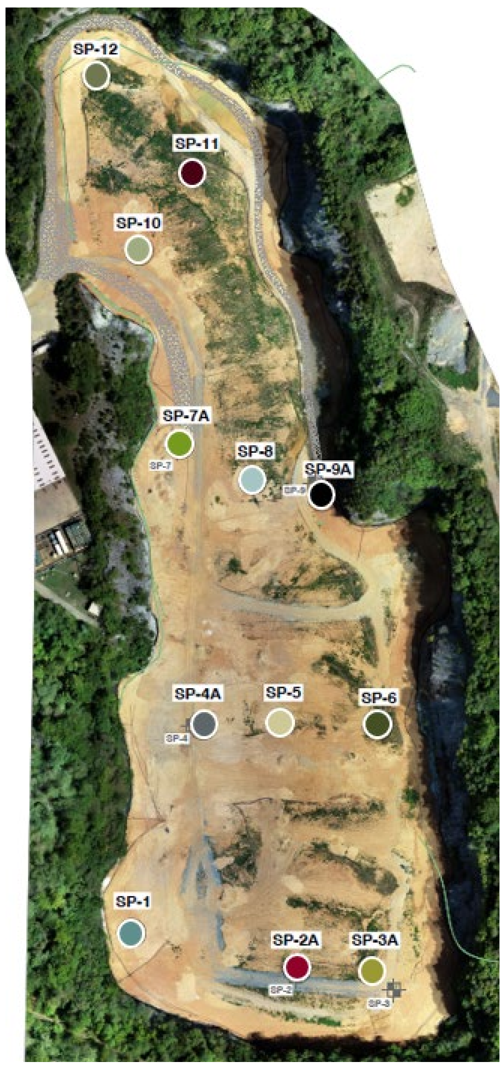
Based on the landfill area and the net volume change, the average elevation decrease was approximately 1.4 feet.

SCS will collect topographic data covering the landfill surface again in February using photogrammetric methods via UAV. This data will be compared to the data collected in February 2024, November 2024, and January 2025.

5.2.2 Settlement Plate Surveys

On November 7, 2022, SCS field services installed 12 settlement plates on the Solid Waste Permit No. 588 landfill. Five new settlement plates (SP-2A, SP-3A, SP-4A, SP-7A, and SP-9A) installed during June 2024 are intended to replace non-operational settlement plates.The settlement plate locations are depicted in Figure 25 and on Sheet 1 in Appendix E. The construction and installation of the settlement plates generally conforms to the design outline in the Settlement Monitoring and Management Plan.

Figure 25. Settlement Plate Locations



The locations of the settlement plates were surveyed on November 14, 2022. The settlement plates were surveyed again on December 13, 2022; January 3, 2023; February 6, 2023; March 8, 2023; April 3, 2023; May 11, 2023; June 5, 2023; July 10, 2023; August 17, 2023; September 11, 2023; October 11, 2023; November 6, 2023; December 12, 2023; January 11, 2024; February 6, 2024; March 13, 2024; April 9, 2024; May 8, 2024; June 4, 2024; July 10, 2024; July 31, 2024; September 10, 2024; October 28, 2024; November 26, 2024; December 23, 2024, and January 8, 2025. The surveyed coordinates[3] and elevation changes of the settlement plates are shown in Table 9.

Table 9. Elevation and Strain Data at Settlement Plate Locations

Settlement Plate	Northing	Easting	Elevation on Jan. 8, 2025	Elevation Change Since Dec. 23, 2024	Strain[4] Since Dec. 23, 2024	Elevation Change Since Installation	Strain/Year
SP-1	3397887.5	10,412,080.6	1,829.1	-0.1	-0.2%	-5.3	-4.8%
SP-2A	3,397,822.9	10,412,370.6	1,793.8	-0.3	-0.2%	-1.9	-4.6%
SP-3A	3,397,820.2	10,412,498.3	1,779.4	-0.1	-0.1%	-0.8	-3.4%
SP-4A	3,398,247.1	10,412,206.8	1,803.5	-0.2	-0.1%	-1.6	-2.8%
SP-5	3,398,255.8	10,412,339.5	1,789.2	-0.3	-0.1%	-11.6	-2.3%
SP-6	3,398,248.8	10,412,510.0	1,773.3	-0.1	-0.1%	-4.4	-1.3%
SP-7A	3,398,731.8	10,412,157.9	1,822.7	-0.1	-0.1%	-0.8	-2.0%
SP-8	3,398,678.2	10,412,290.9	1,800.3	-0.1	-0.1%	-7.1	-1.2%
SP-9A	3,398,644.3	10,412,416.2	1,788.3	-0.1	-0.1%	-0.4	-1.5%
SP-10	3,399,080.2	10,412,093.3	1,837.1	-0.1	0.0%	-3.1	-0.6%
SP-11	3,399,216.4	10,412,183.9	1,814.7	-0.1	0.0%	-1.7	-0.6%
SP-12	3,399,381.8	10,412,019.7	1,809.8	-0.1	-0.1%	-0.8	-1.6%

Prior to April 2024, the City's in-house surveyor read the settlement plate elevations. Starting April 2024, the settlement plate elevations were measured by FEI Civil Engineers and Land Surveyors.

Settlement Plates 1 and 2A demonstrated larger settlements than at other locations. Settlement Plates 1 and 2A are located in the southern end of the landfill. This area is the location of the gas wells and temperature probes exhibiting higher temperatures. These higher settlements values are typical of elevated temperature landfill conditions.

The change in elevation at Settlement Plates 10 and 11 was lower and more representative of typical settlement at municipal landfills with waste of similar depth.

The settlement observed at the rest of the settlement plates fell in between these two categories.

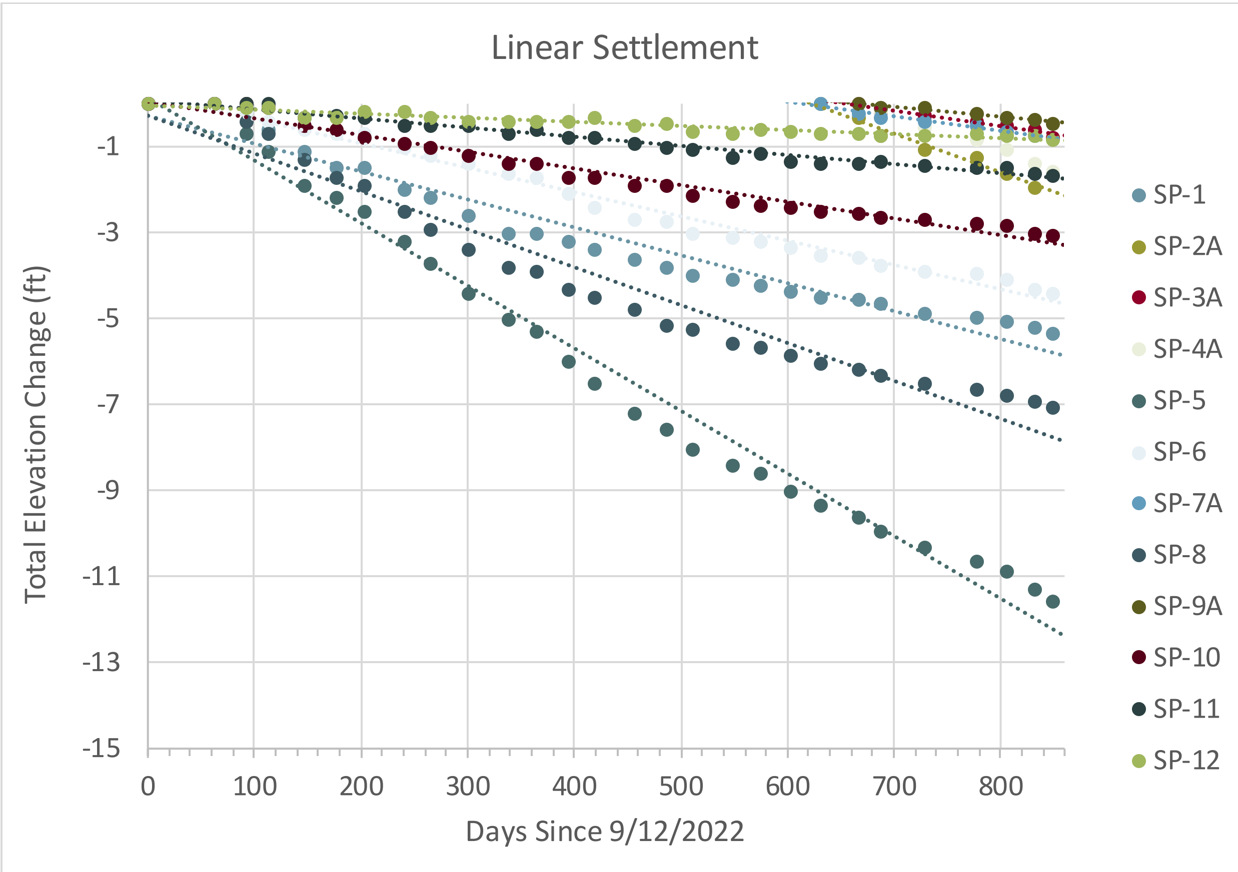
Figure 25 shows the changes in elevation of select settlement plates over time. Lines obtained by linear regression of elevation change on time are also shown on Fig. 26. For the purposes of

[3] Settlement plate locations and coordinates are based on a local coordinate system.

[4] Strain is defined as the change in elevation divided by the estimated waste depth.

recording data in this figure, times are reported in days since the landfill was required to stop accepting waste.

Figure 26. Elevation Change of Select Settlement Plates Over Time



The settlement plates will be surveyed again during February 2025. The elevations surveyed will be compared to the elevations surveyed the previous months.

6.0 INTERMEDIATE COVER AND EVOH COVER SYSTEM

The City has taken steps to provide intermediate and temporary cover of the wastes in the landfill. The section below and Section 6.0 of Appendix G outline the steps taken by the City and future plans related to temporary cover.

6.1 INTERMEDIATE COVER INSTALLATION

A summary of the intermediate cover installation can be found in the October 2022 Monthly Compliance Report for the SWP No. 588 Landfill.

6.2 EVOH COVER SYSTEM DESIGN

An amendment to the Consent Decree was issued on March 21, 2024 which requires an ethylene vinyl alcohol (EVOH) deployment no later than December 1, 2026. The amended Consent Decree also requires regular settlement assessments, and the EVOH deployment may occur earlier if settlement rates appear acceptable. The first of these assessments was submitted to VDEQ on April 11, 2024. The most recent assessment was submitted on January 13, 2025. The next assessment will be submitted on or before April 10, 2025.

6.3 EVOH COVER SYSTEM PROCUREMENT

Information about the procurement of materials for the EVOH cover system can be found in the January 2023 Monthly Compliance Report for the SWP No. 588 Landfill.

6.4 EVOH COVER SYSTEM INSTALLATION

As outlined in the amendment to the Consent Decree dated March 21, 2024, the deadline for EVOH Cover System installation has been extended. The City is conducting the assessments described in Section 6.2 to determine the appropriate time for installation.

7.0 STORMWATER MANAGEMENT

Information about the most recent stormwater management plans, basin location, plan implementation, long-term control, and stormwater monitoring for the SWP No. 588 Landfill can be found in the December 2023 Monthly Compliance Report for the SWP No. 588 Landfill.

8.0 MISCELLANEOUS

8.1 CEASE WASTE ACCEPTANCE

The City ceased acceptance of offsite waste at the Solid Waste Permit No. 588 landfill prior to September 12, 2022.

8.2 LONG-TERM PLAN

Refer to the December 2022 and March 2023 Monthly Compliance Reports for the SWP No. 588 Landfill for additional information about the development and implementation of the Monitoring, Maintenance, and Repair Plan.

8.3 MONTHLY COMPLIANCE REPORTS

As described in the introduction this report is intended to provide comprehensive updates regarding progress towards completion of each item described in Appendix A of the Consent Decree between the City and VDEQ.

8.4 COMMUNITY OUTREACH PROGRAM

The City's consultant leading community outreach, McGuireWoods Consulting, prepared a summary of the actions taken as part of their community outreach efforts. For the month of January 2025, those actions include:

- **Ongoing basis**: Five (5) posts on each the BristalVALandfill.org site and the existing City of Bristol Landfill Notifications and Information page covering important updates including:
  - Progress updates related to remediation efforts and normal maintenance activities at the Quarry Landfill
  - Updates at the quarry landfill included ongoing winterization actions to prevent frozen lines and other weather-related operational challenges; replacing pumps, field batteries, and a cracked air regulator; continuing to fine tune the Sidewall Odor Mitigation System in lieu of an uptick in odor complaints associated with the colder temperatures; and moving soil to address areas within the landfill that are experiencing settlement issues.
- **Weekly updates on landing page on Bristolvalandfill.org titled "Air Sampling and Air Monitoring" that includes a summary of the air sampling and monitoring being conducted by Bristol, VA around the quarry landfill.**
  - Website now includes weekly air monitoring reports starting from May 15, 2023 and running through December 14, 2024. More reports will be posted as the they are received.
- **E-mail communication sent to the list of members of the public signed up through the Bristol, VA website, the BristolVALandfill.org website, or at subsequent Open Houses to receive information via e-mail**
  - E-mails sent included weekly remediation progress update and links to website updates and latest news articles.

Appendix A

Surface Emissions Monitoring Summary

Quarterly SEM

SCS performed the Fourth Quarter surface emissions monitoring event on December 4, 2024. The results of the Quarterly SEM were summarized in the December 2024 Compliance Report for the SWP No. 588 Landfill. A report outlining the results and exceedance locations will be included in the Semi-Annual Report to be submitted to VDEQ prior to March 1, 2025.

The First Quarter 2025 SEM Event is scheduled to be completed by March 31, 2025.

Weekly SEM

In addition to the standard regulatory quarterly surface emissions monitoring, The monitoring in January generally conformed to the requirements of 40 CFR 63.1960(c) and (d), and 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 SEM route included the waste footprint of the Permit No. 588 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 applicable surface cover penetrations within the waste footprint.

The Facility submitted letters to VDEQ describing the results of the January monitoring events on January 15, 2025; January 22, 2025; January 29, 2025; and February 5, 2025. Copies of those letters are included in this Appendix.

Table A- 1

On November 18, 2024, the City submitted an Alternate Remedy Request for corrective actions for nine exceedance locations where an exceedance was recorded on at least three separate monitoring events throughout the Third Quarter 2024. Adjustments to vacuum, placement of additional cover soil, and well dewatering improvements (the corrective actions outlined in this request) have been successful at reducing methane concentrations below the regulatory threshold at all nine locations as of the January 30, 2025 monitoring event.

The Facility is also taking proactive steps to limit fugitive surface emissions including dewatering activities, additional cover soil placement, and LFG system maintenance and tuning to increase gas extraction.

Appendix B

In-Waste Temperatures on Select Days in January

Appendix B Figures

Figure B - 1 Average Temperatures Recorded by TP-1 on January 1, 2025

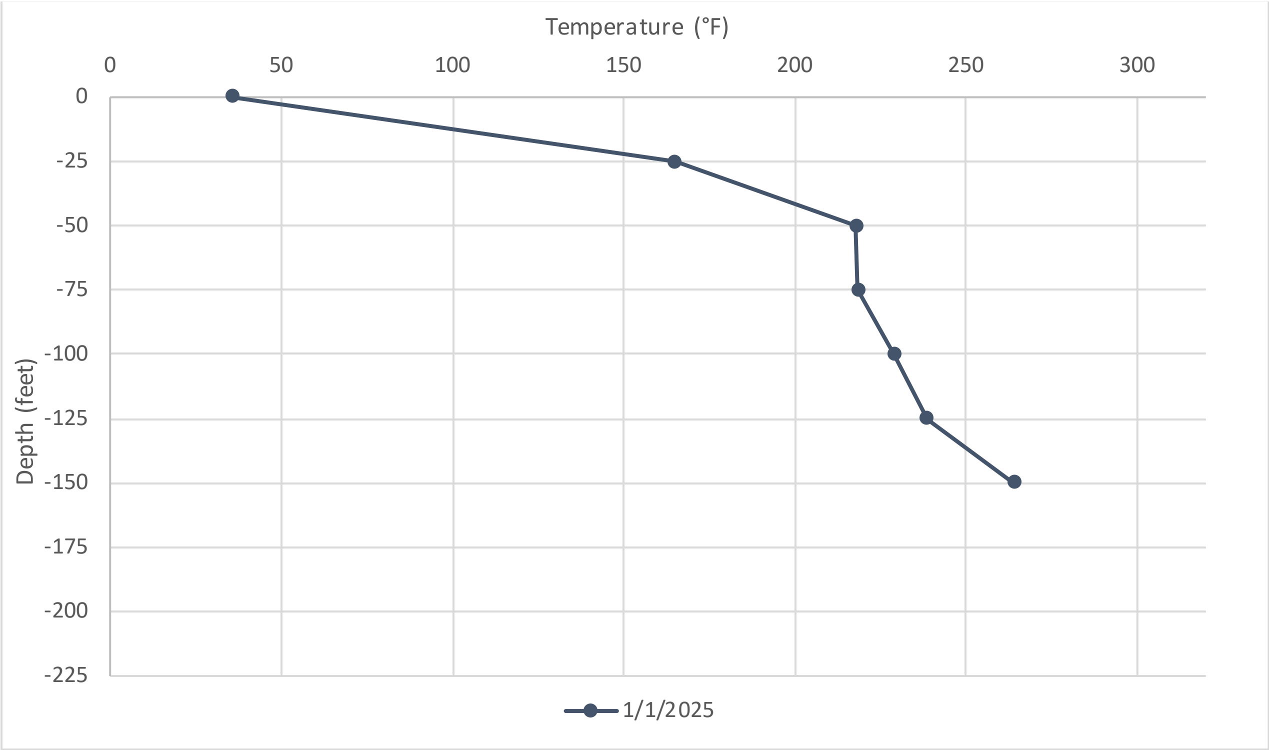


Figure B - 2 Average Temperatures Recorded by TP-1 on January 8, 2025

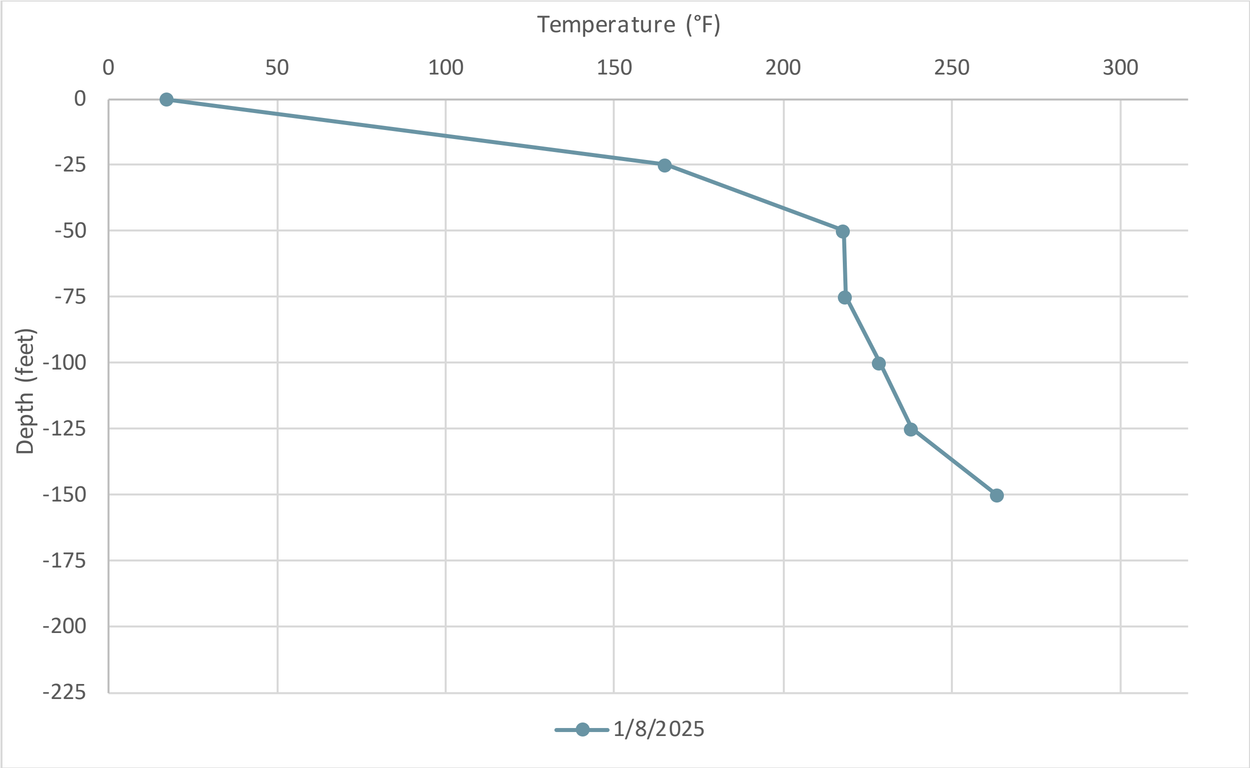


Figure B - 3 Average Temperatures Recorded by TP-1 on January 29, 2025

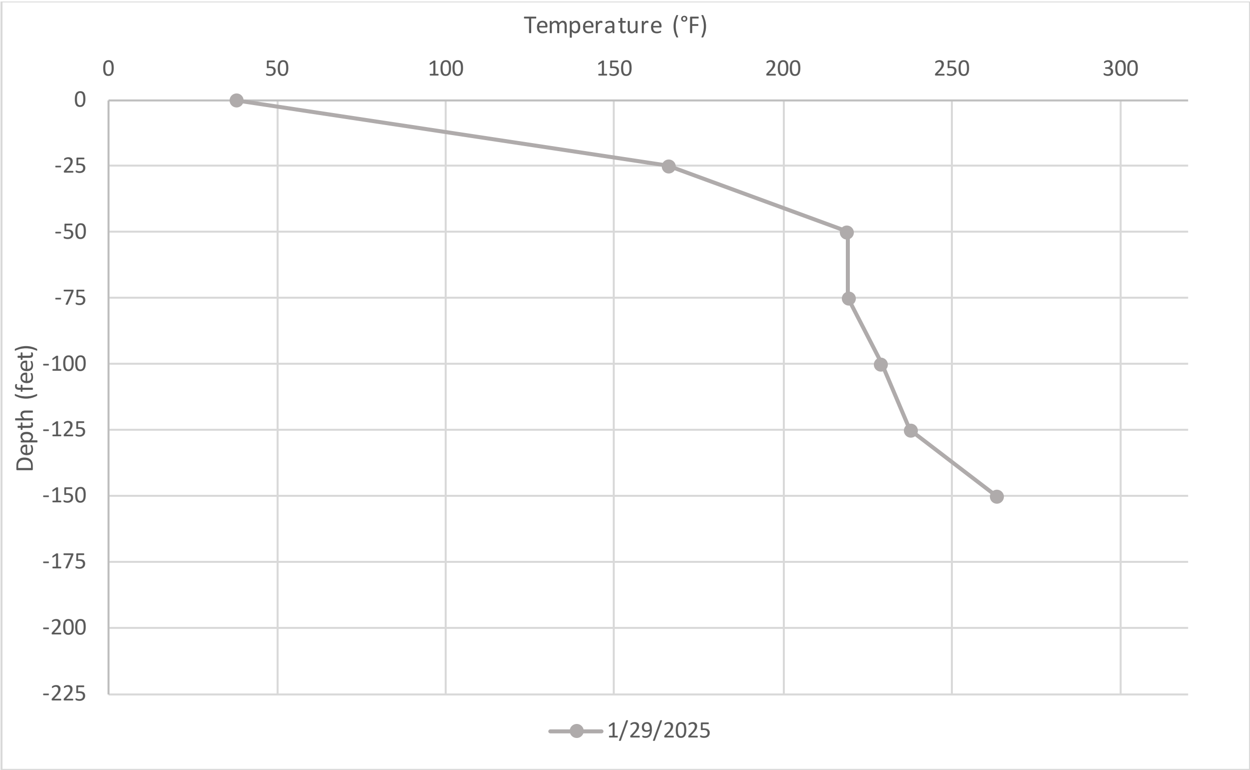


Figure B - 4 Average Temperatures Recorded by TP-2 on January 1, 2025

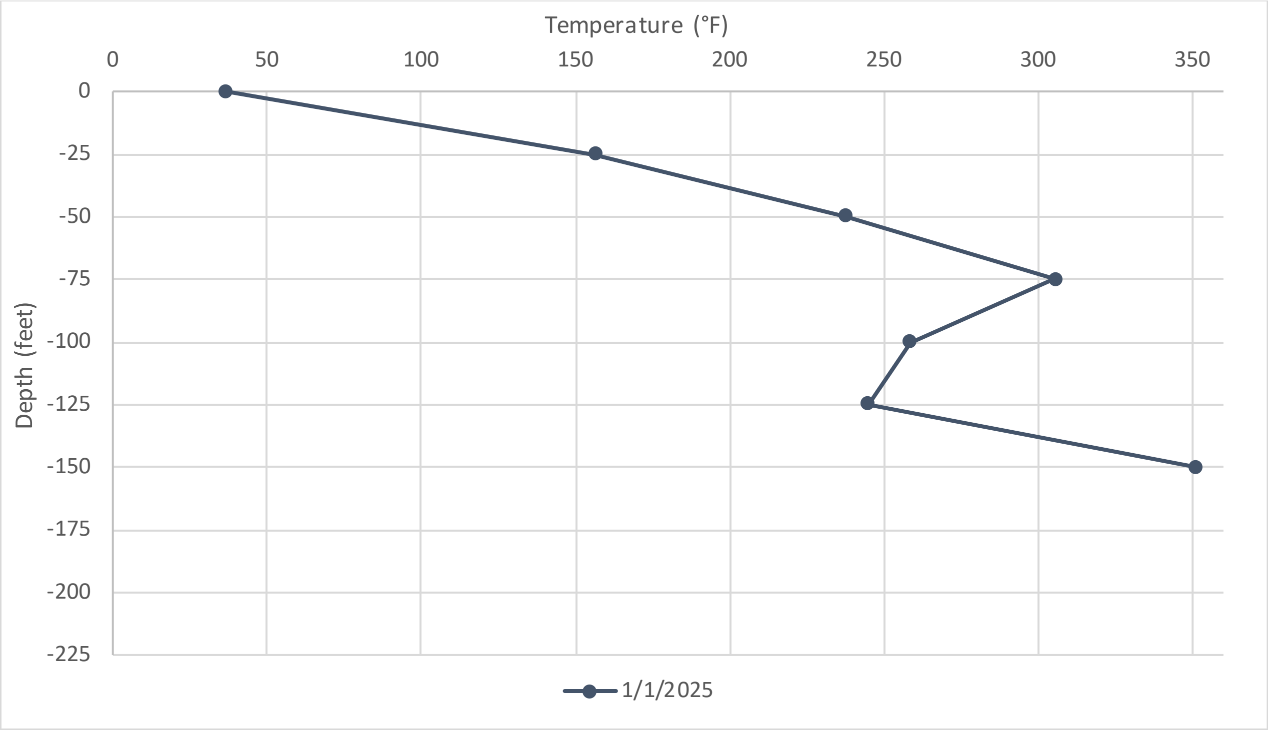


Figure B - 5 Average Temperatures Recorded by TP-3 on January 1, 2025

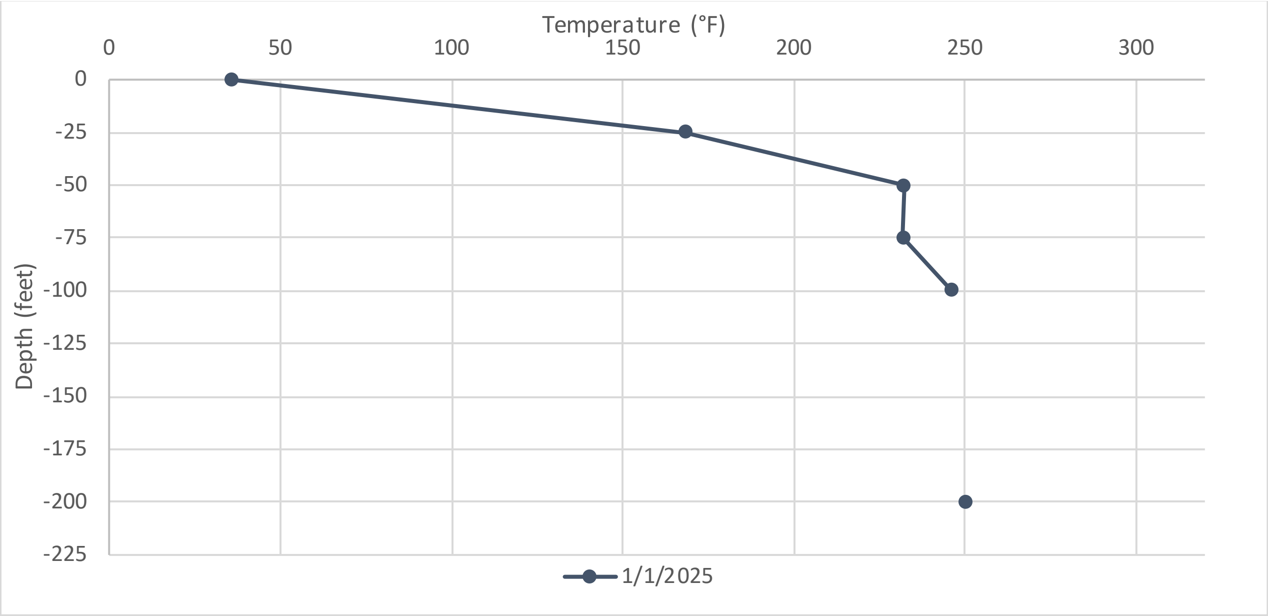


Figure B - 6 Average Temperatures Recorded by TP-3 on January 8, 2025

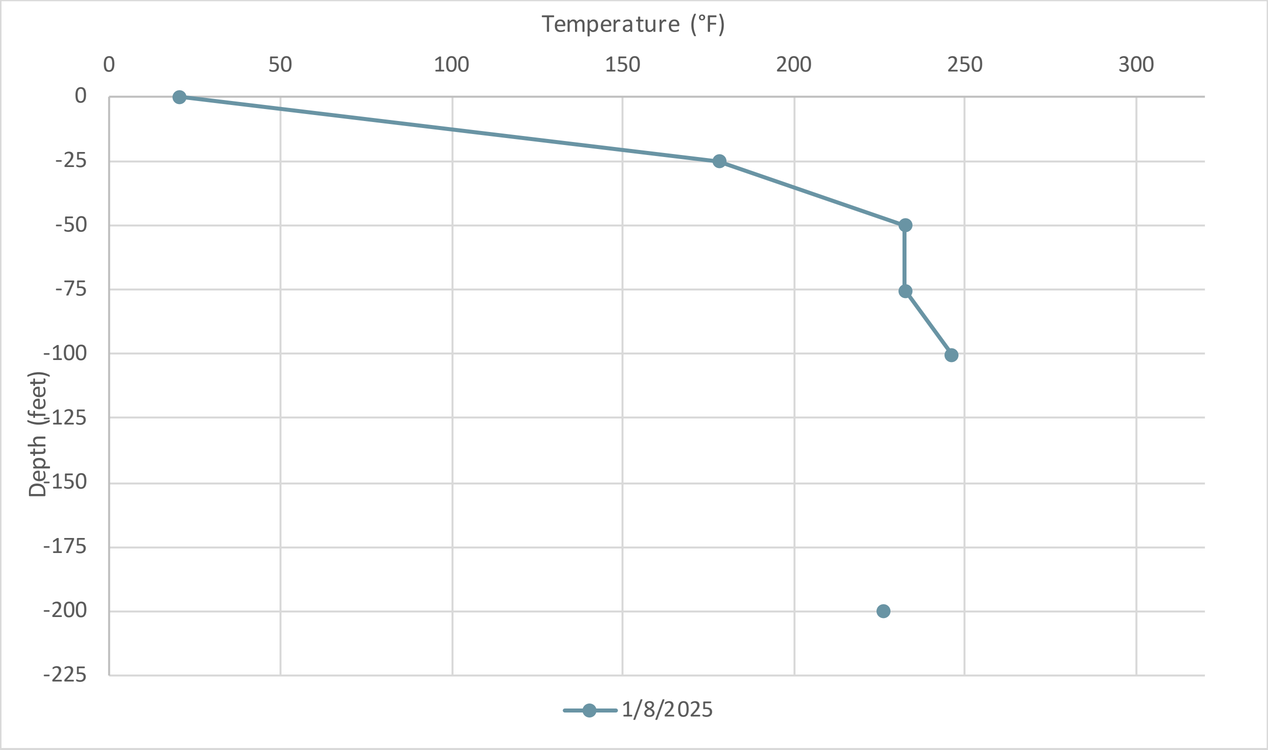


Figure B - 7 Average Temperatures Recorded by TP-3 on January 15, 2025

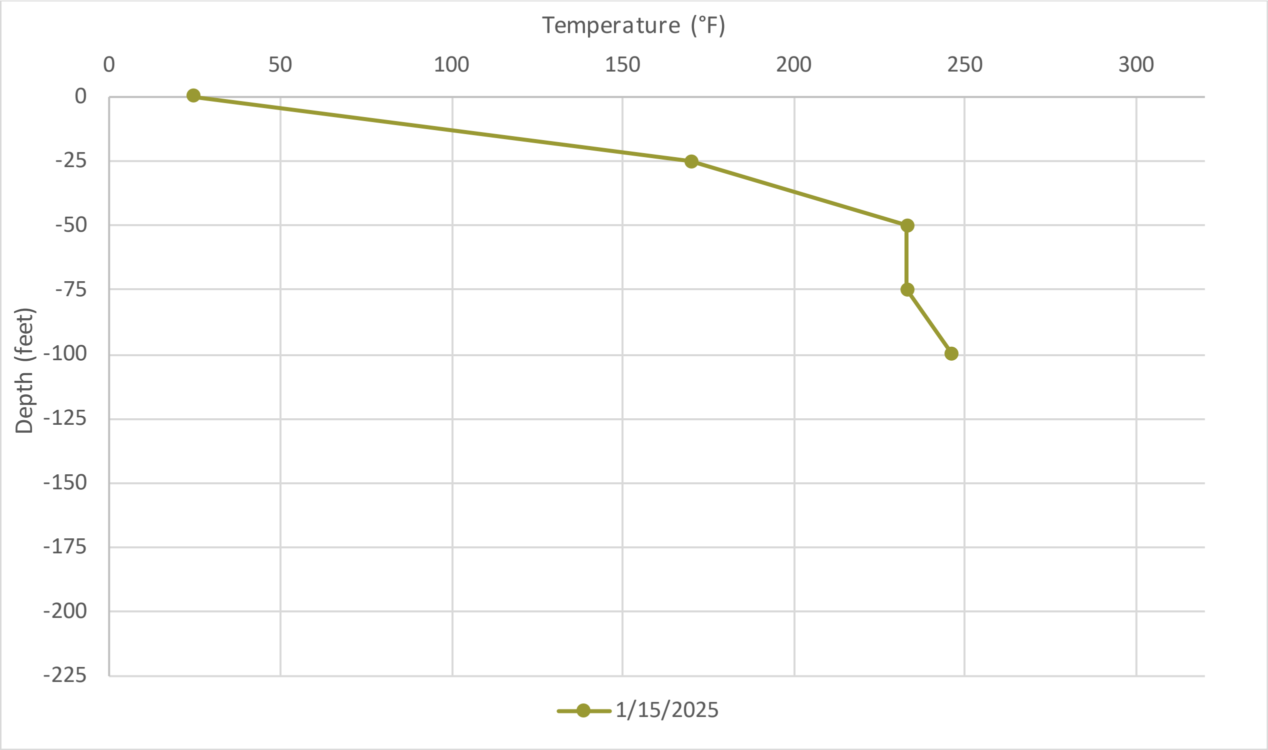


Figure B - 8 Average Temperatures Recorded by TP-3 on January 22, 2025

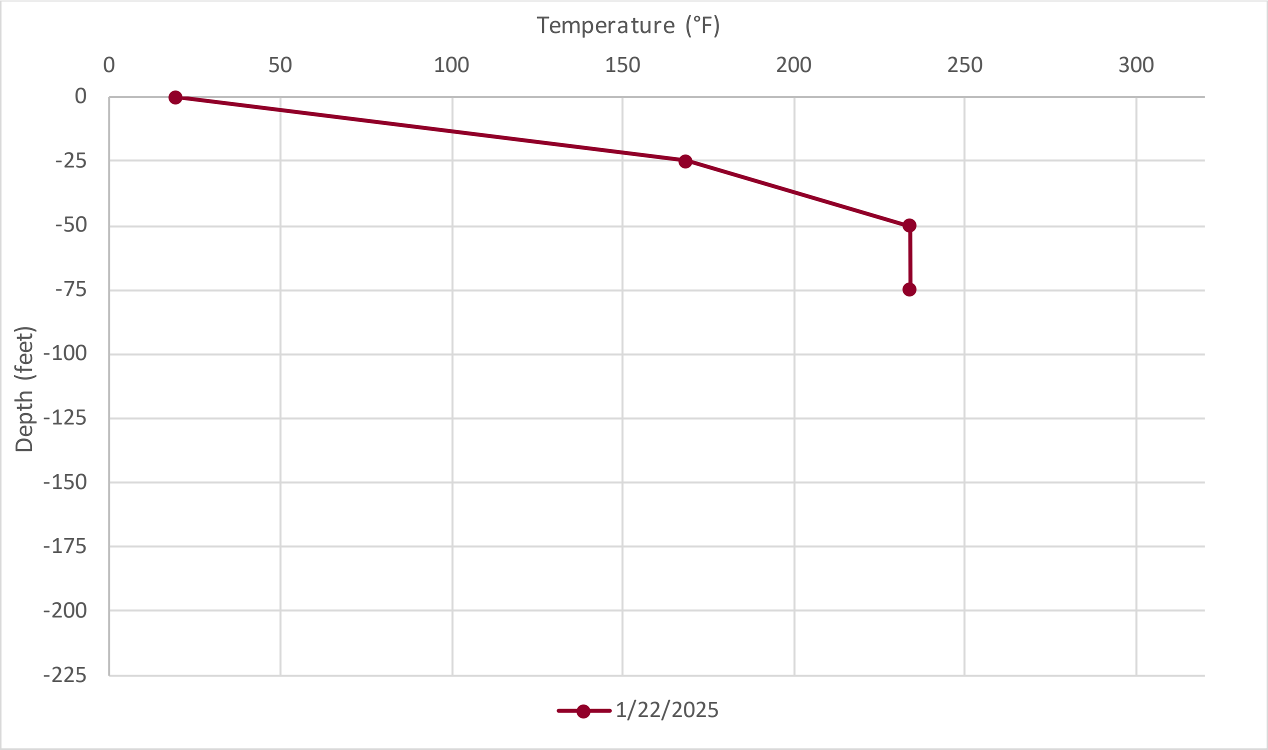


Figure B - 9 Average Temperatures Recorded by TP-3 on January 29, 2025

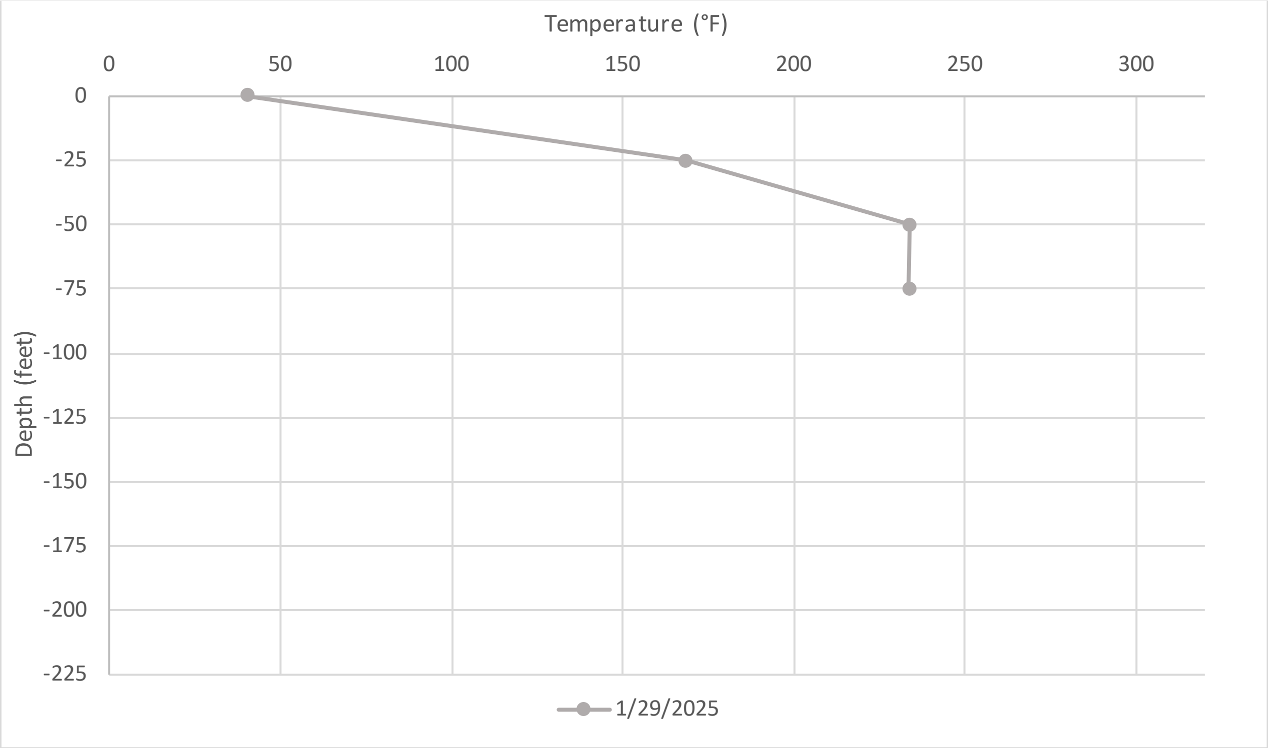


Figure B - 10 Average Temperatures Recorded by TP-5 on January 1, 2025

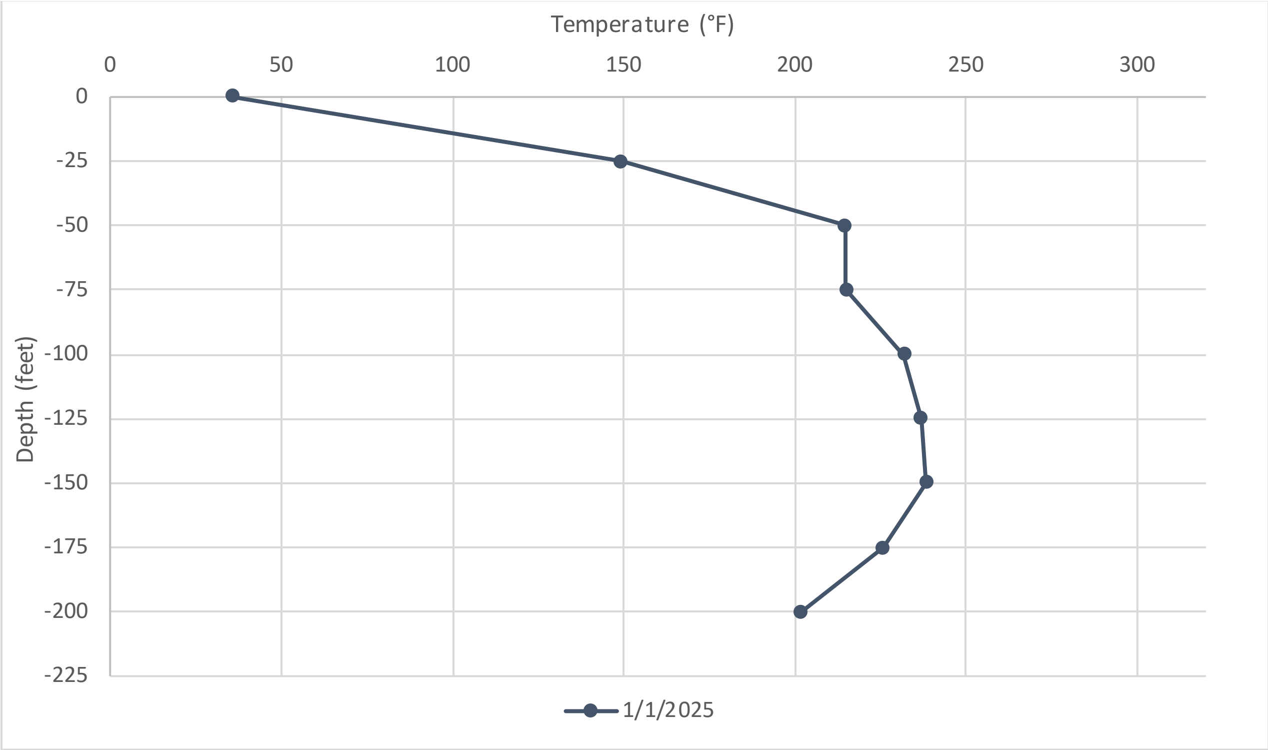


Figure B - 11 Average Temperatures Recorded by TP-5 on January 8, 2025

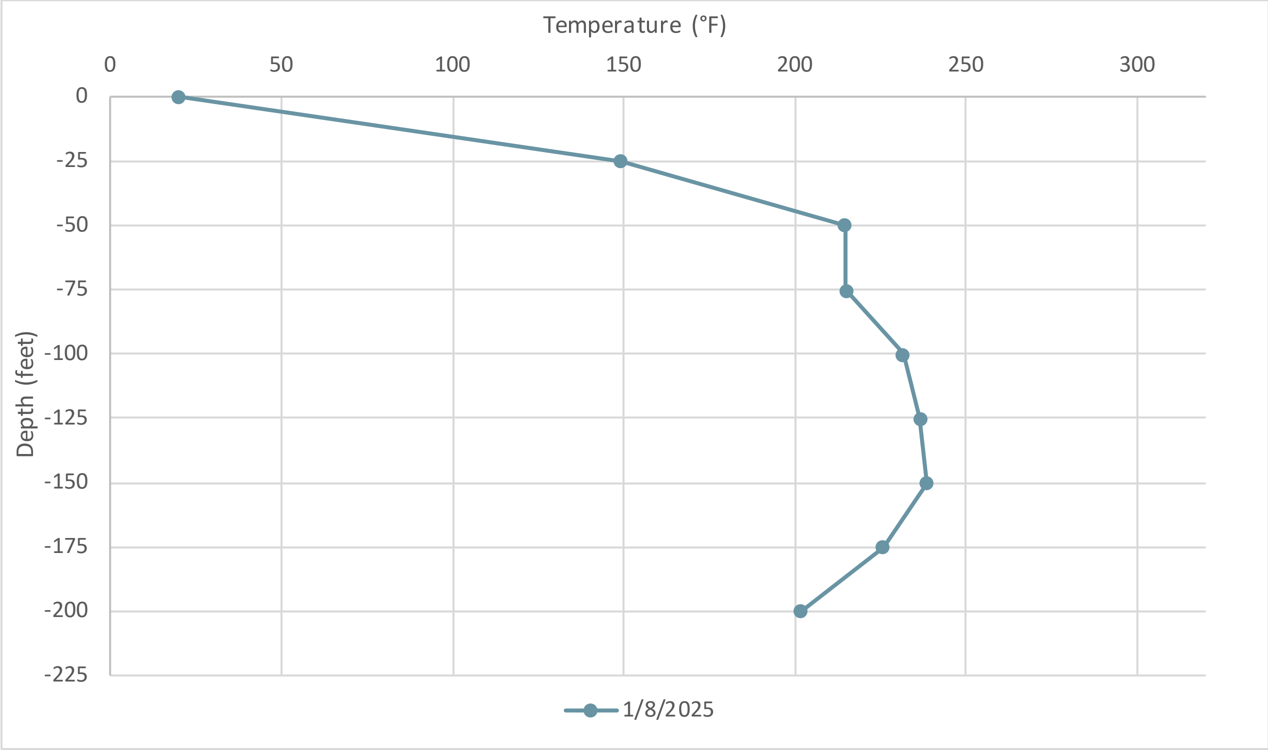


Figure B - 12 Average Temperatures Recorded by TP-5 on January 15, 2025

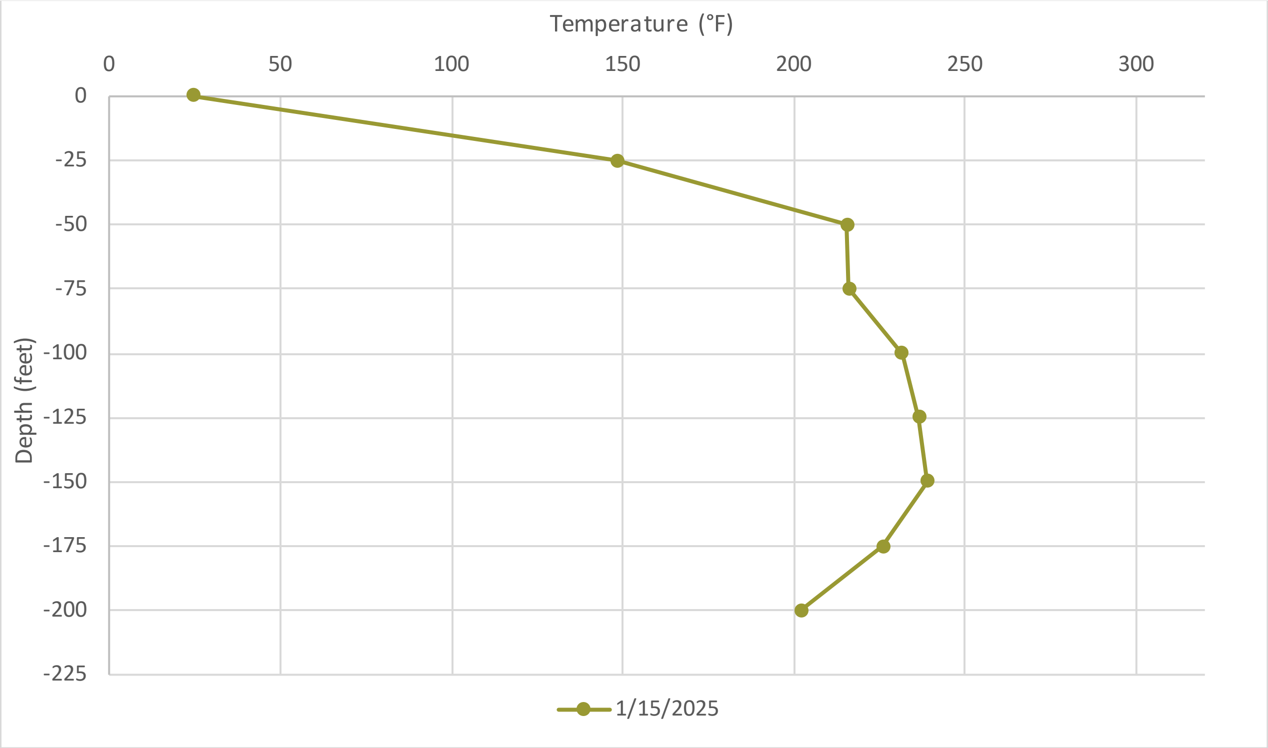


Figure B - 13 Average Temperatures Recorded by TP-5 on January 22, 2025

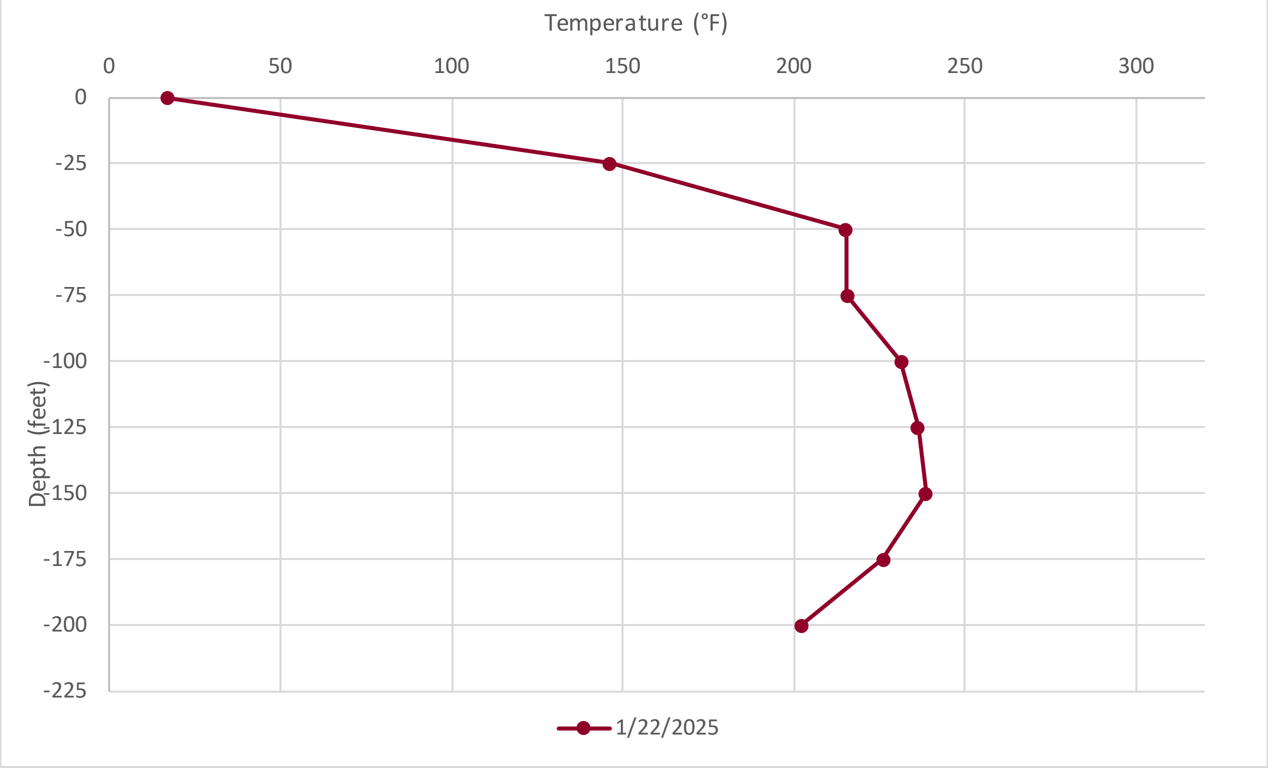


Figure B - 14 Average Temperatures Recorded by TP-5 on January 29, 2025

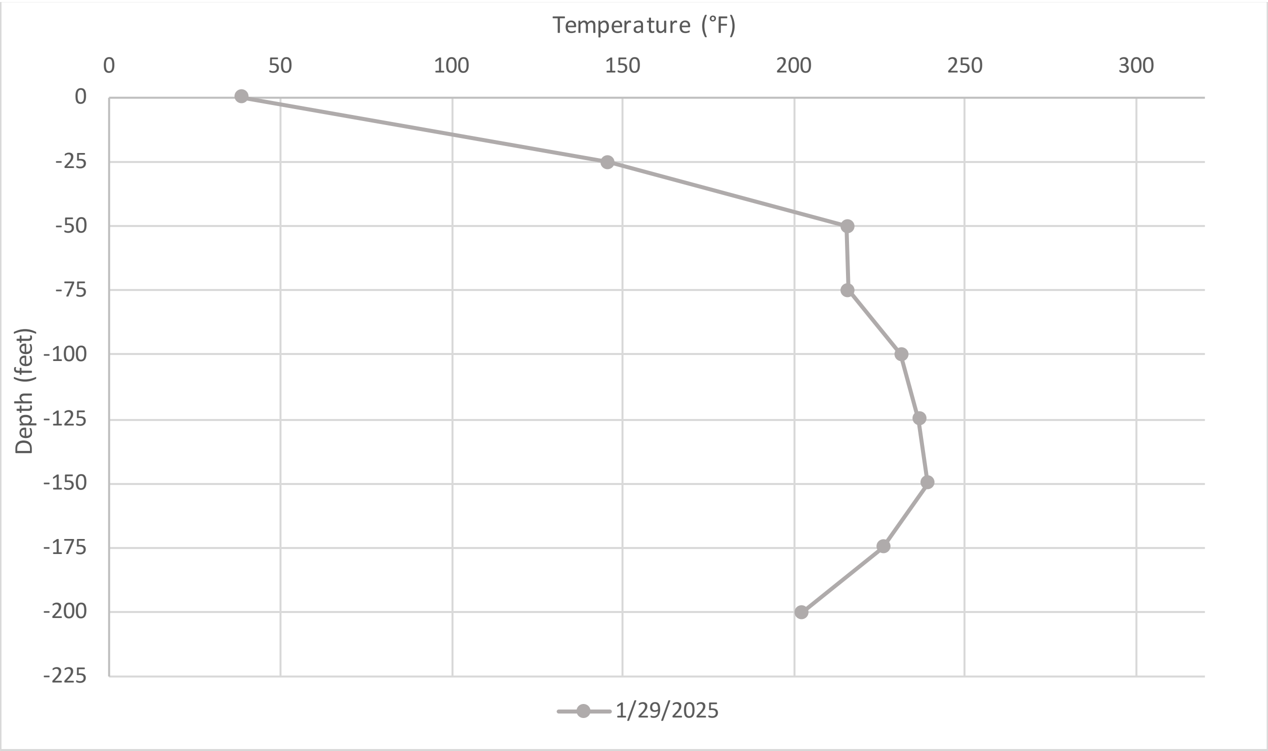


Figure B - 15 Average Temperatures Recorded by TP-6 on January 1, 2025

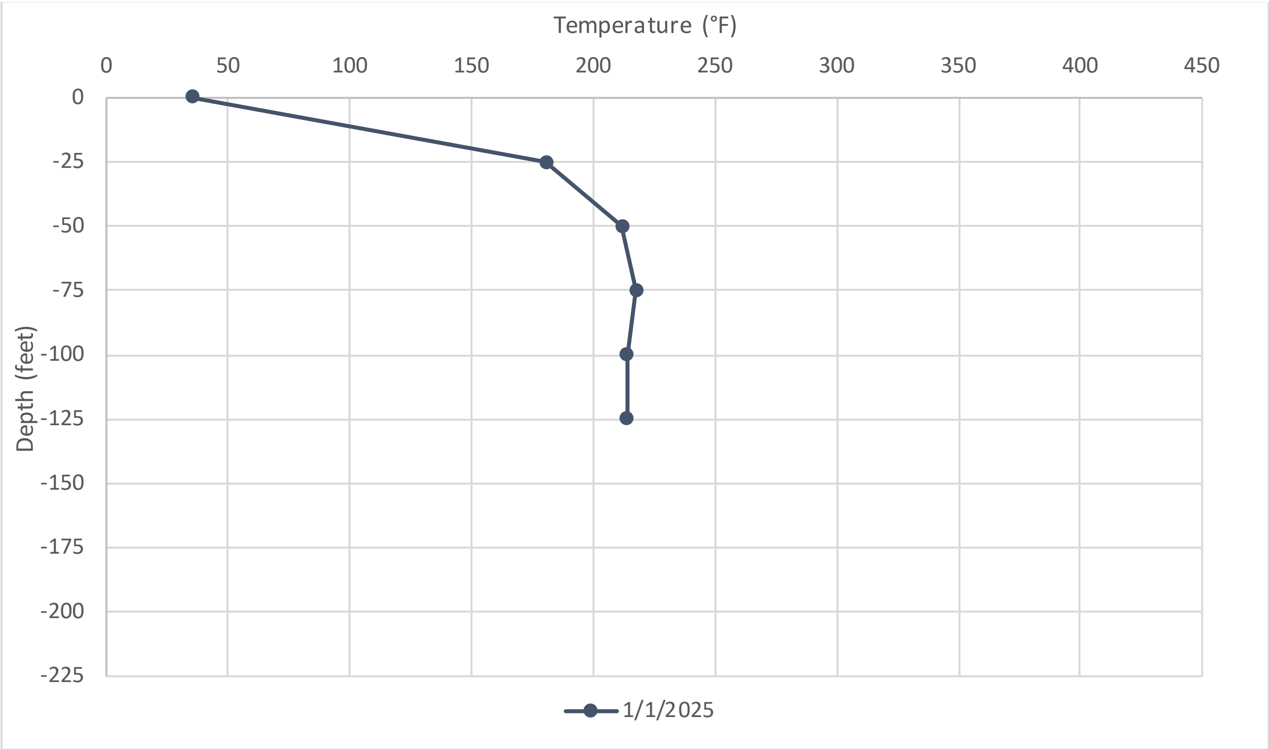


Figure B - 16 Average Temperatures Recorded by TP-6 on January 8, 2025

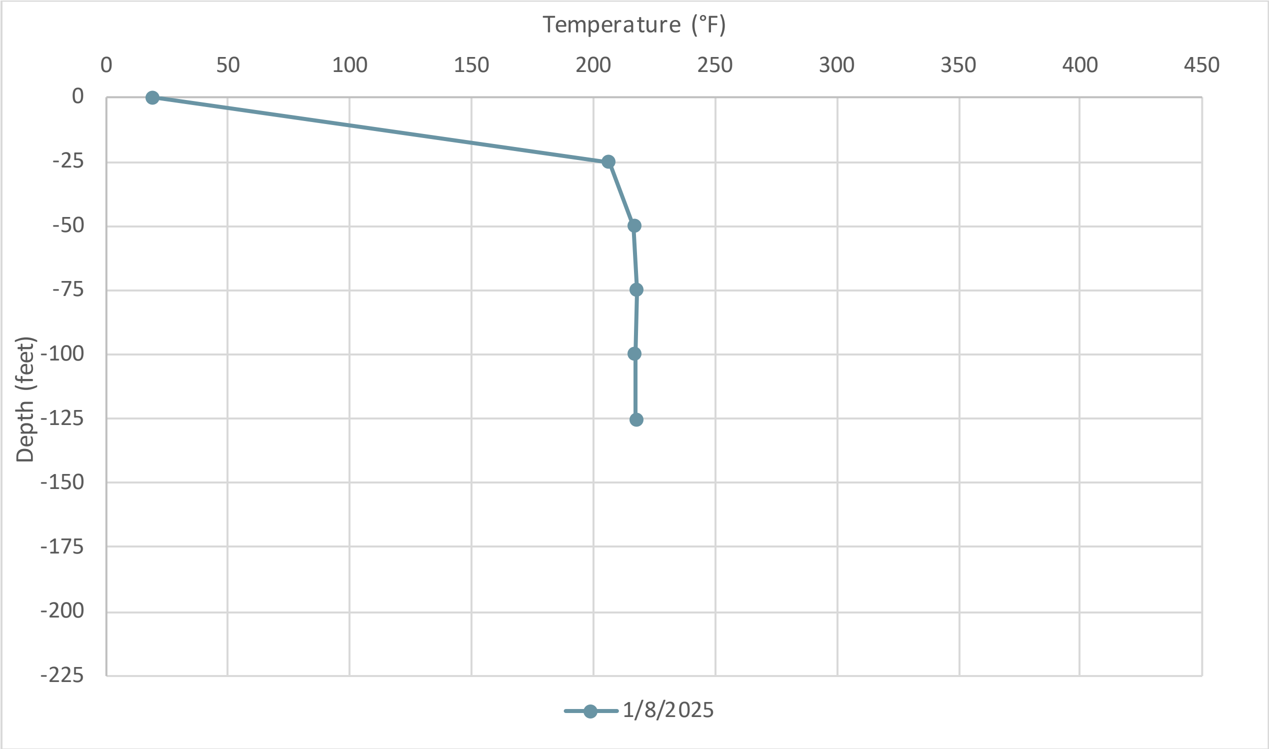


Figure B - 17 Average Temperatures Recorded by TP-6 on January 15, 2025

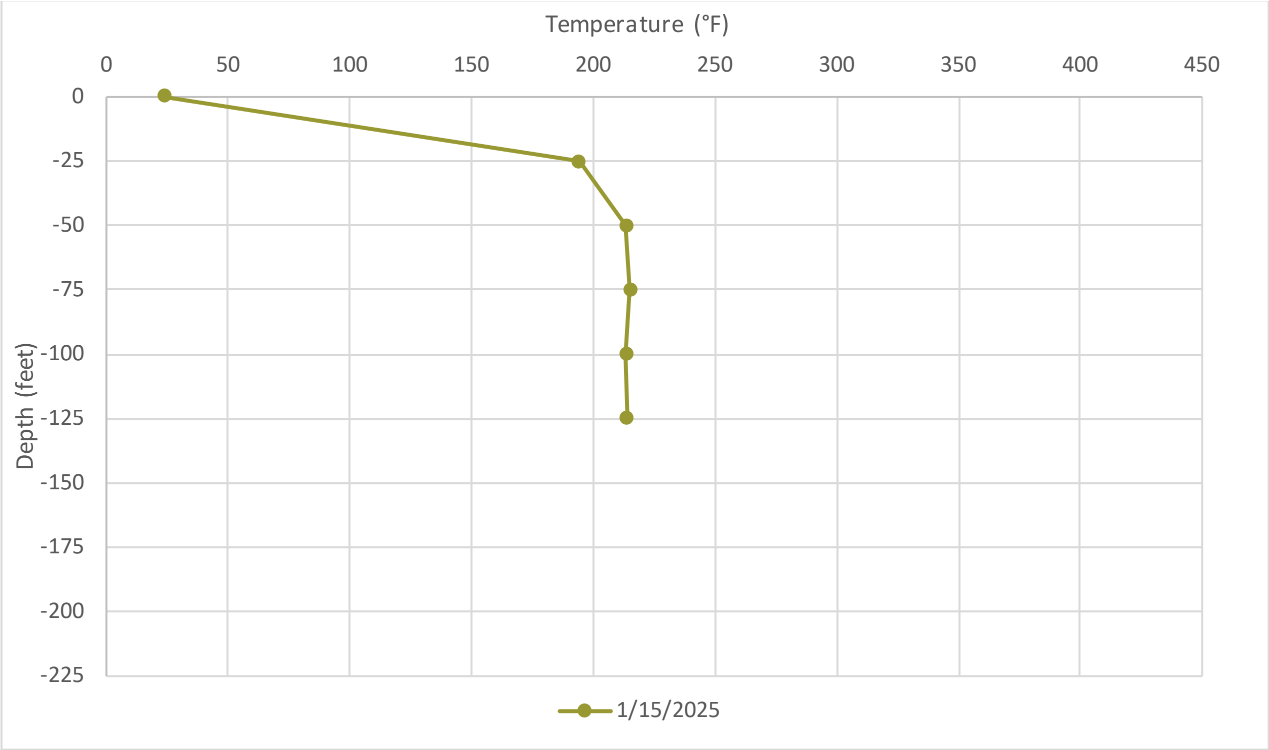


Figure B - 18 Average Temperatures Recorded by TP-6 on January 22, 2025

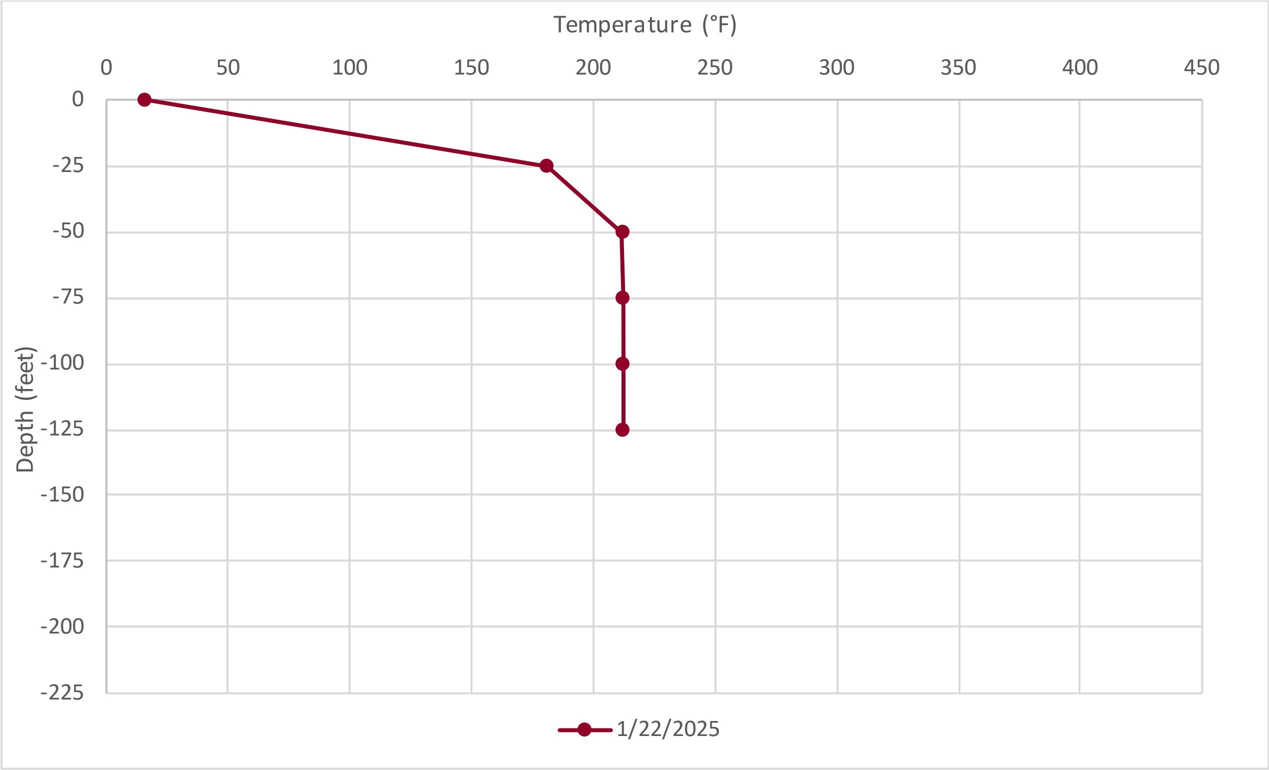


Figure B - 19 Average Temperatures Recorded by TP-6 on January 29, 2025

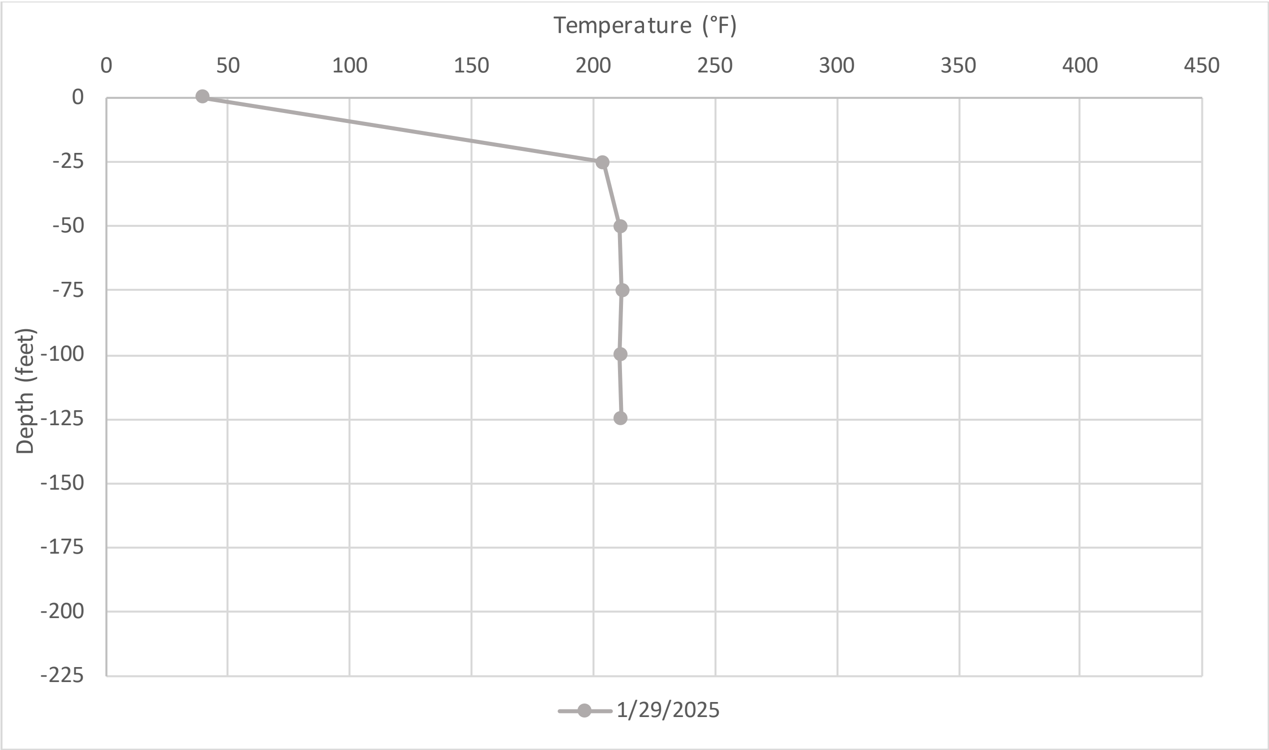


Figure B - 20 Average Temperatures Recorded by TP-7 on January 1, 2025

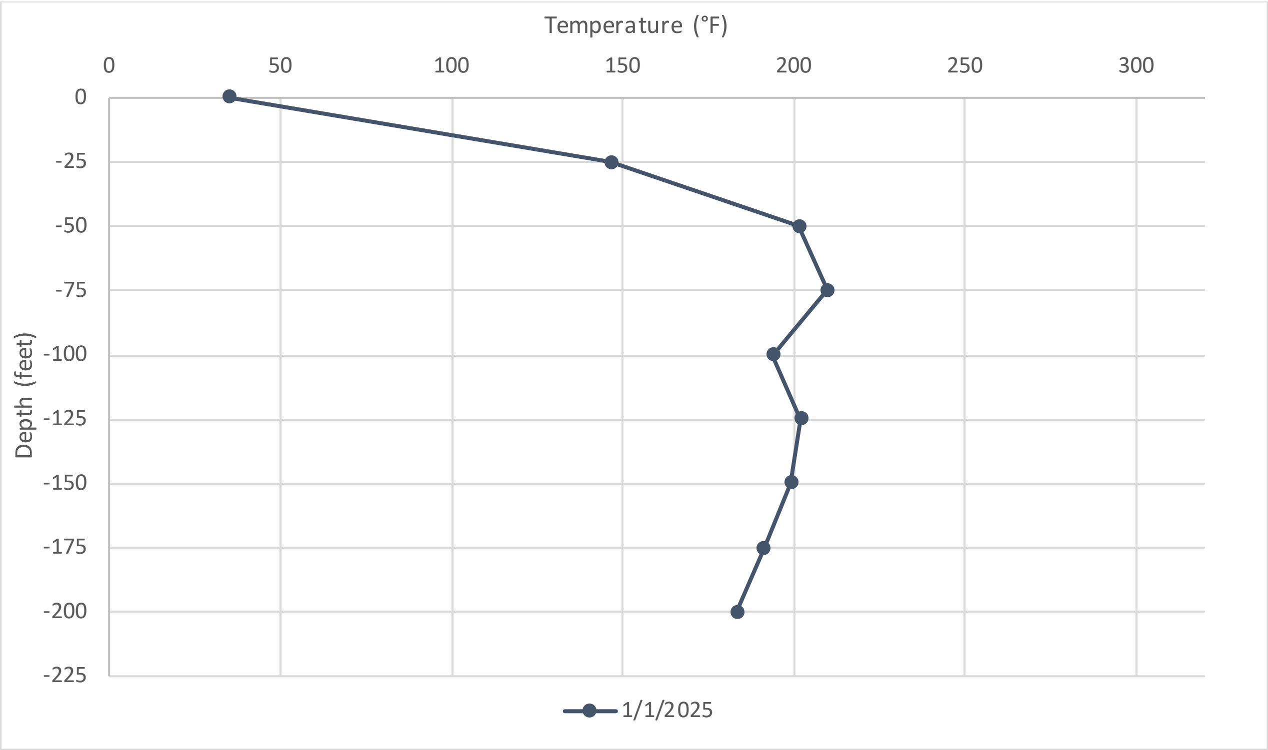


Figure B - 21 Average Temperatures Recorded by TP-7 on January 8, 2025

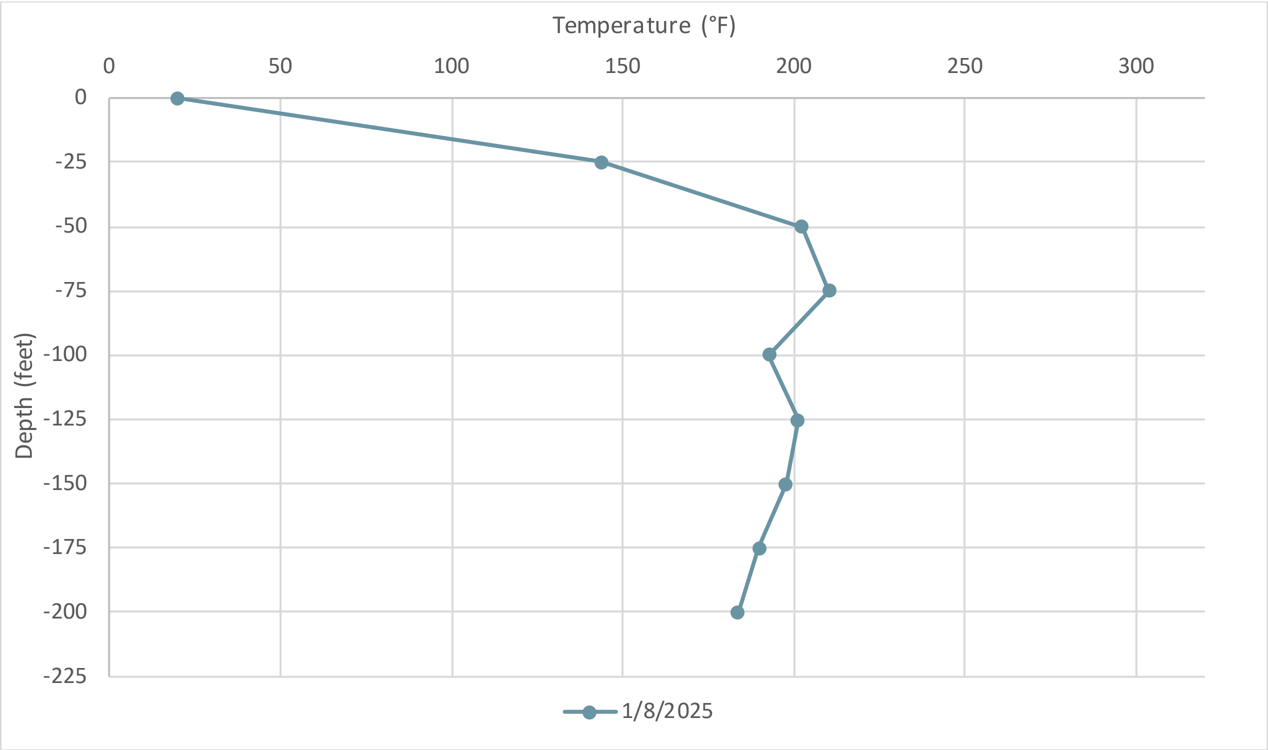


Figure B - 22 Average Temperatures Recorded by TP-7 on January 15, 2025

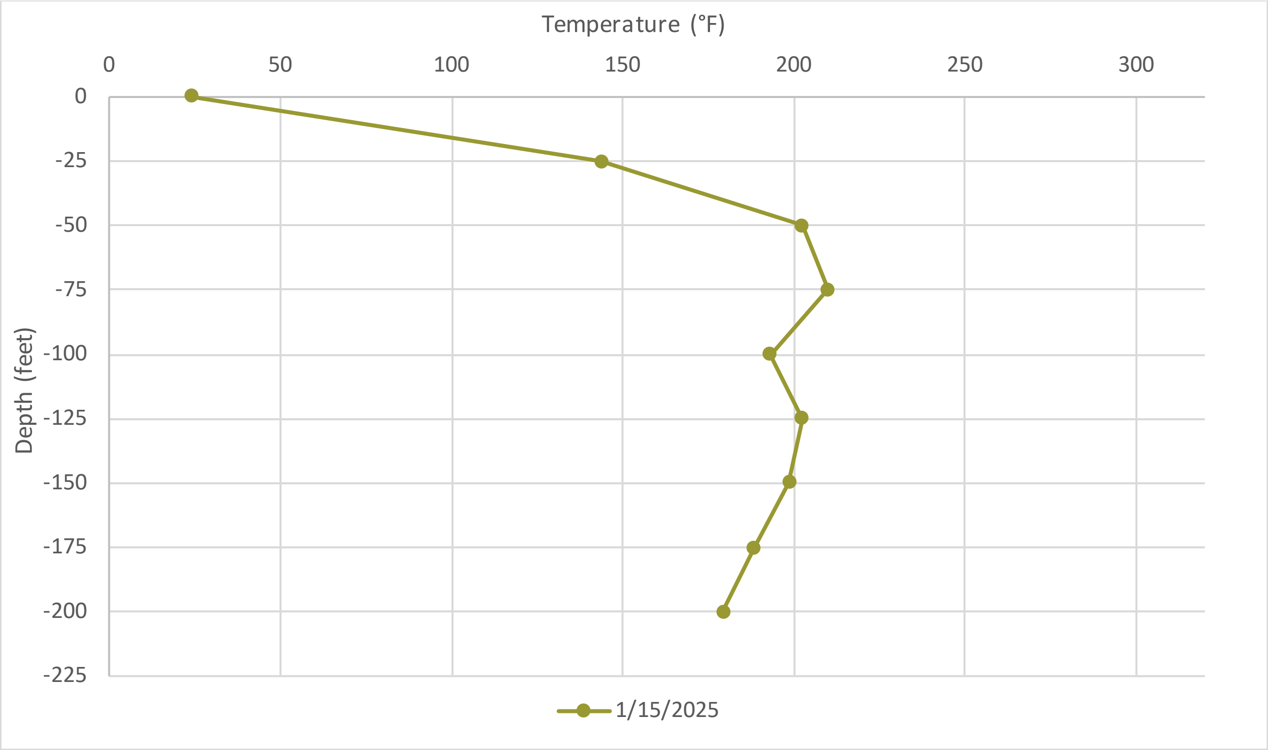


Figure B - 23 Average Temperatures Recorded by TP-7 on January 22, 2025

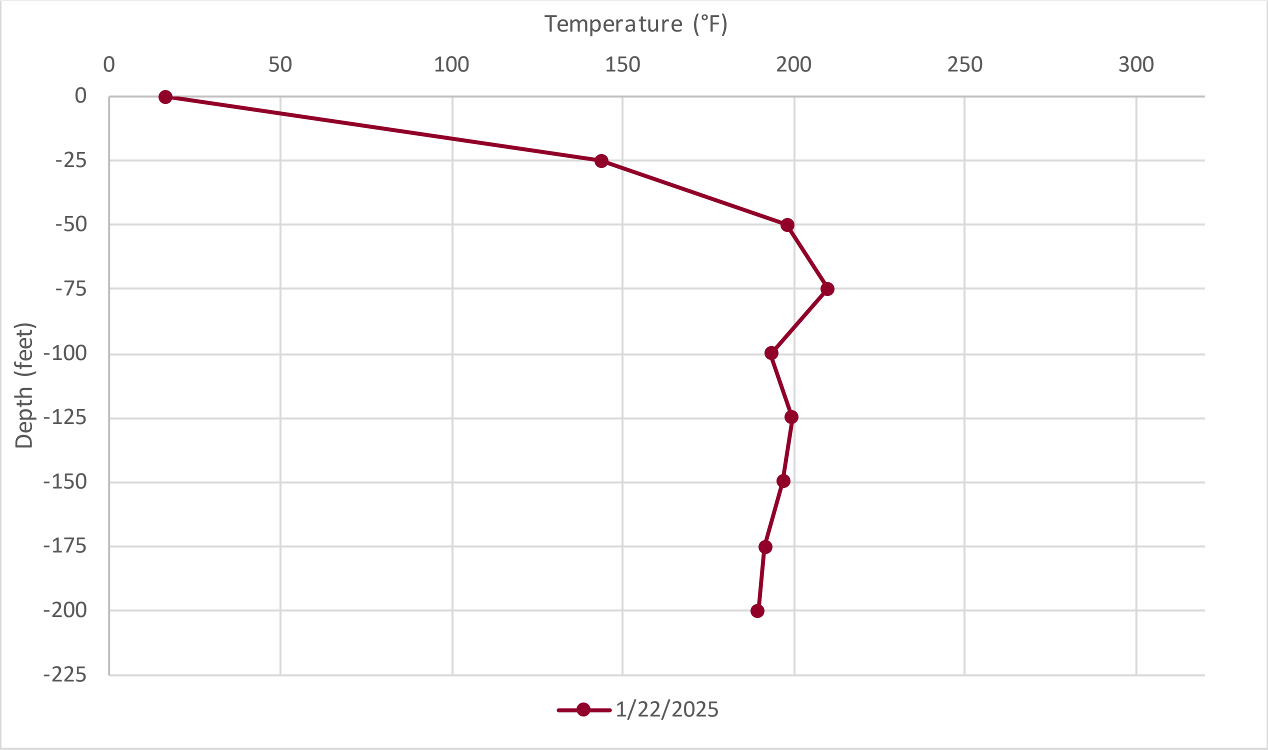


Figure B - 24 Average Temperatures Recorded by TP-7 on January 29, 2025

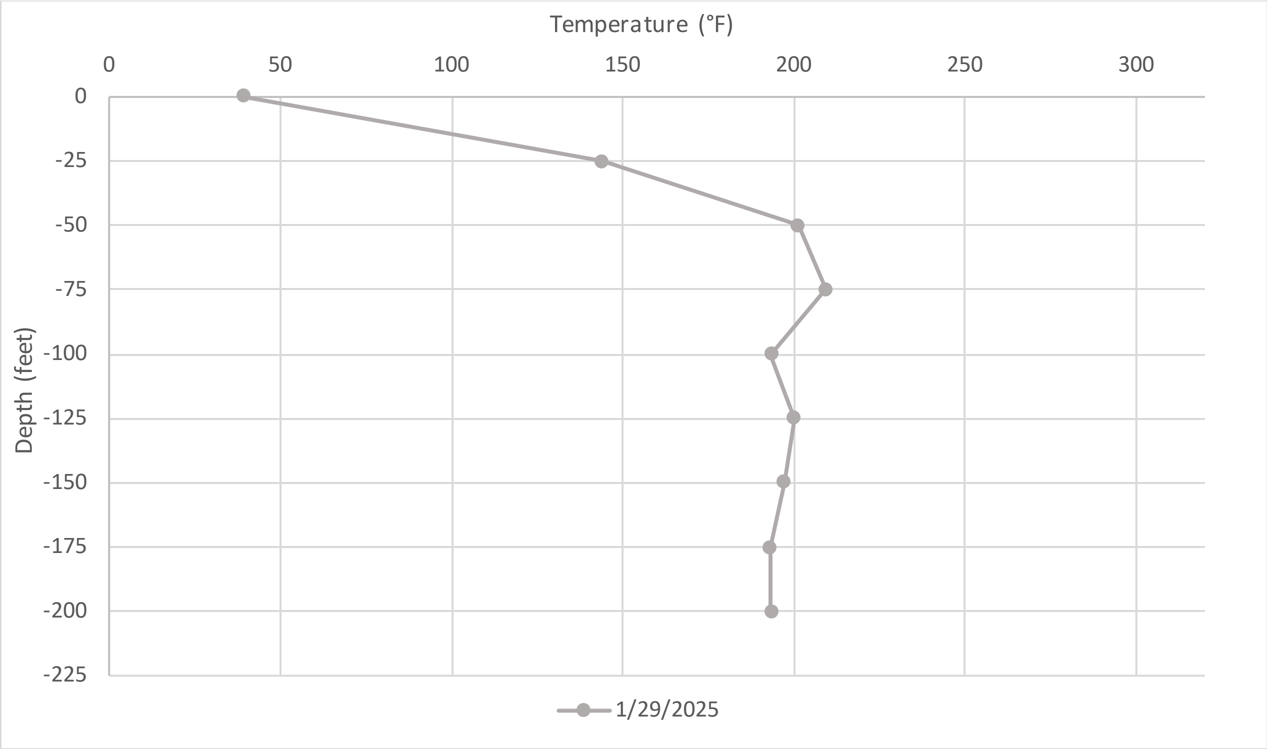


Figure B - 25 Average Temperatures Recorded by TP-8 on January 1, 2025

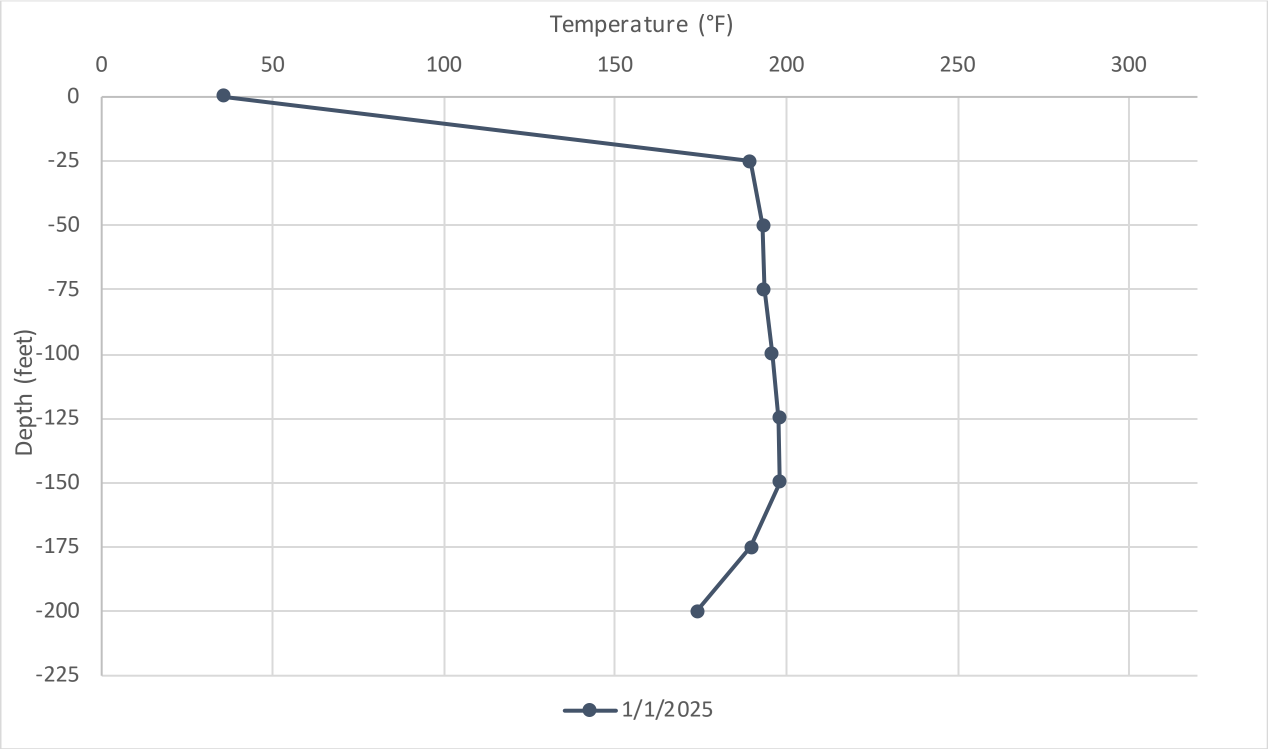


Figure B - 26 Average Temperatures Recorded by TP-8 on January 8, 2025

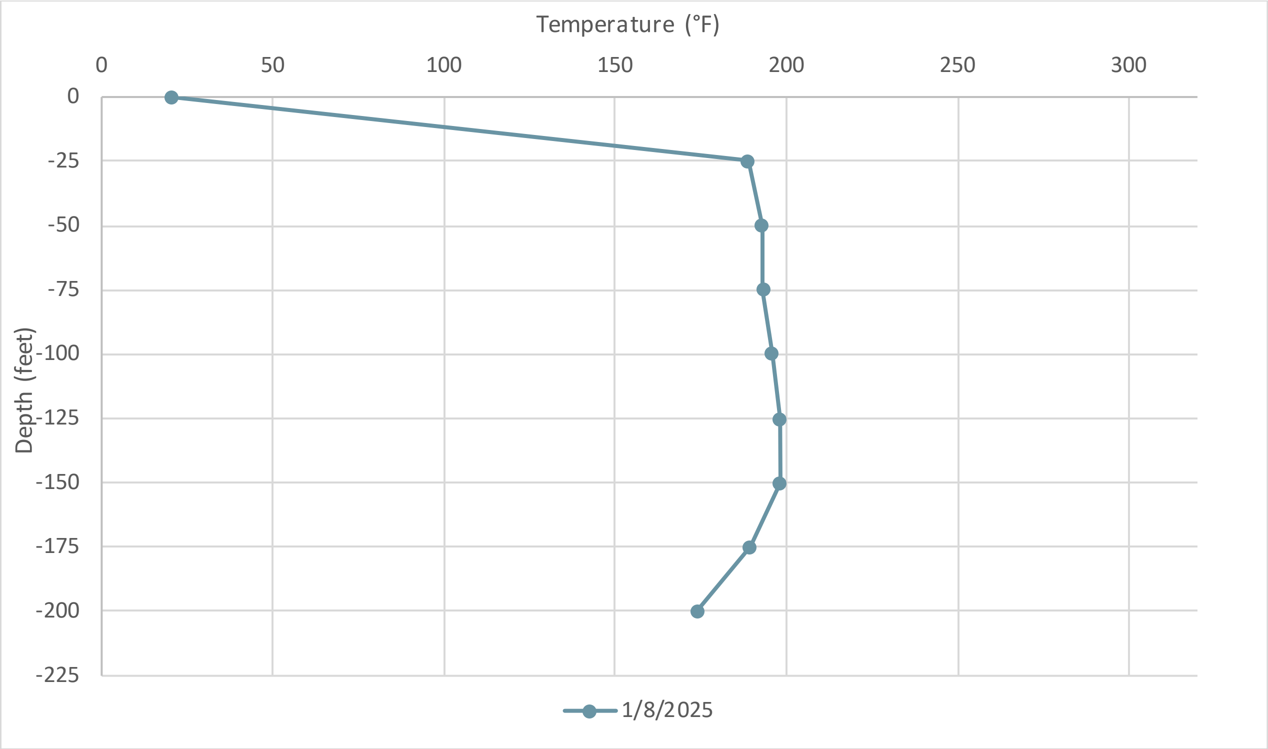


Figure B - 27 Average Temperatures Recorded by TP-8 on January 15, 2025

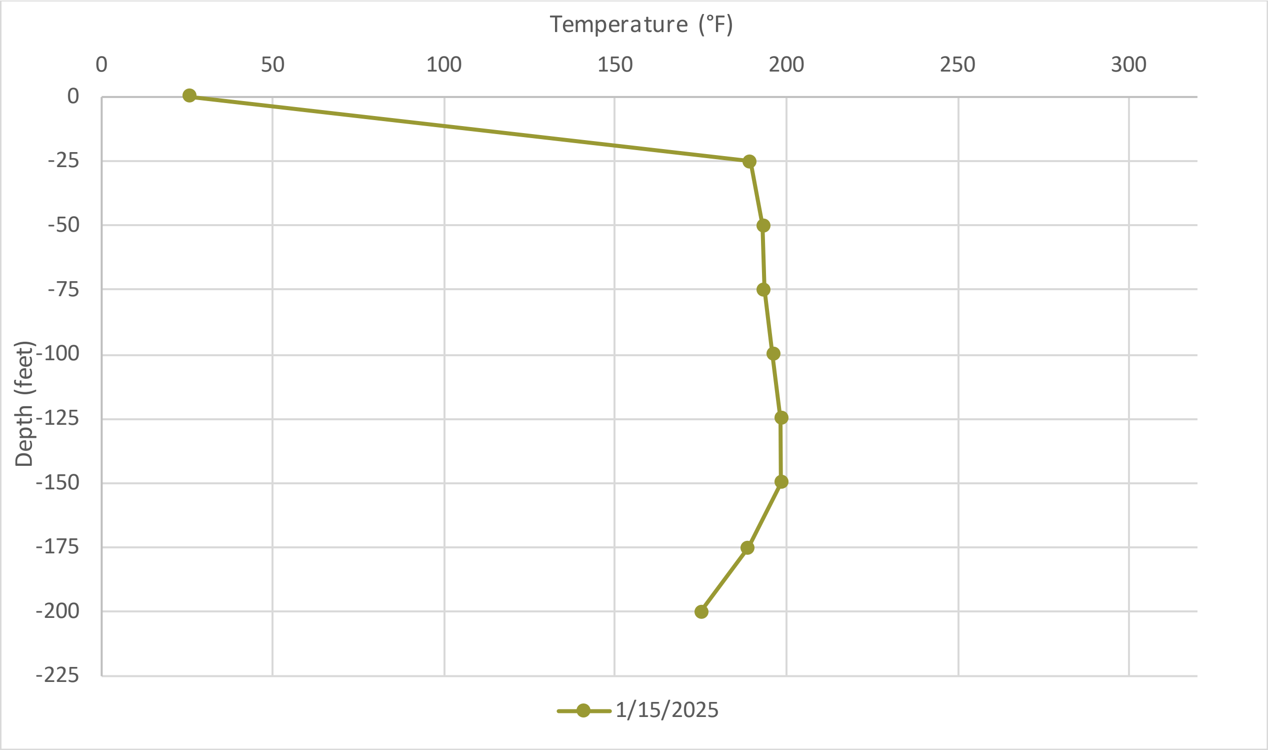


Figure B - 28 Average Temperatures Recorded by TP-8 on January 22, 2025

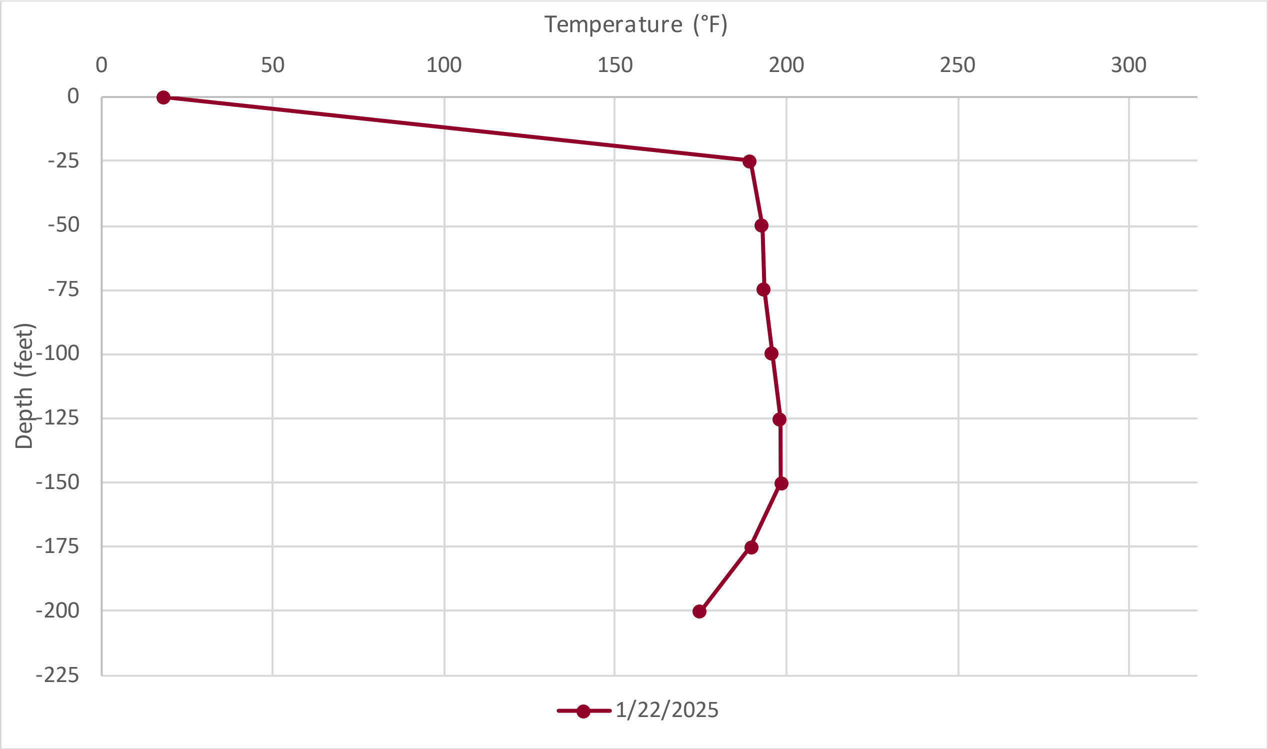


Figure B - 29 Average Temperatures Recorded by TP-8 on January 29, 2025

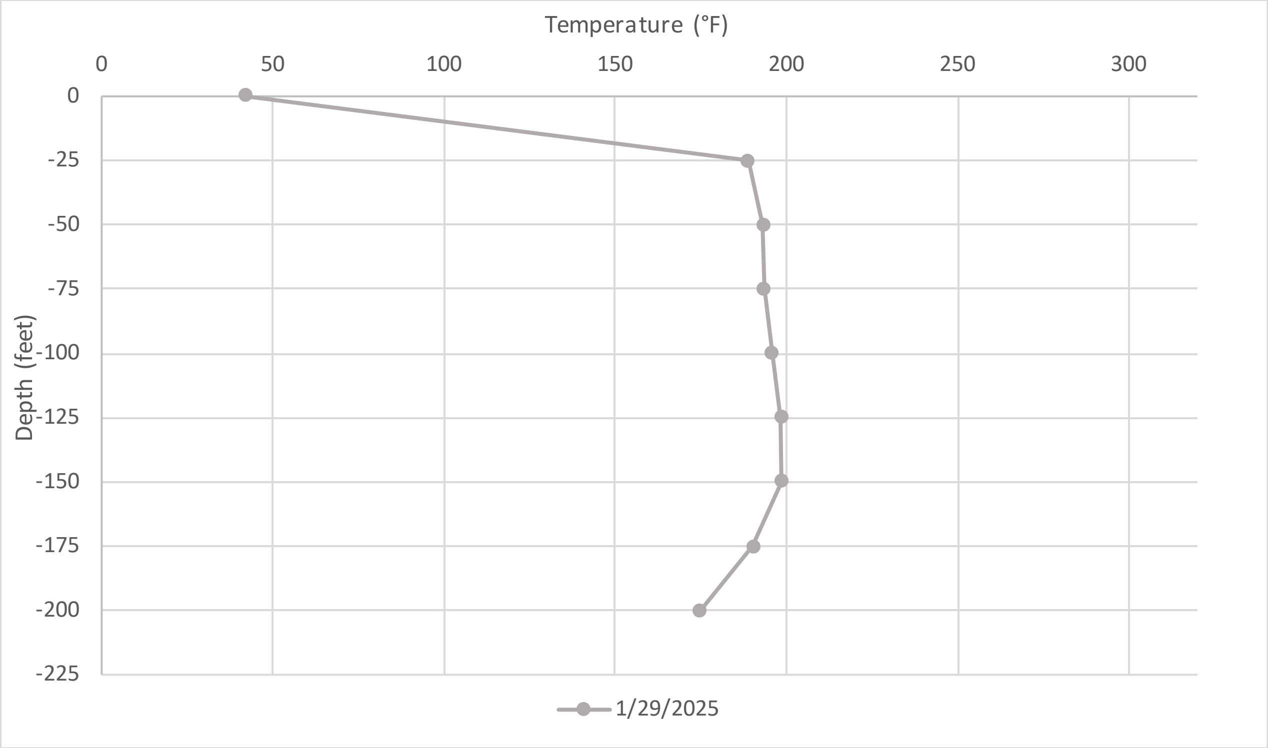


Figure B - 30 Average Temperatures Recorded by TP-9 on January 1, 2025

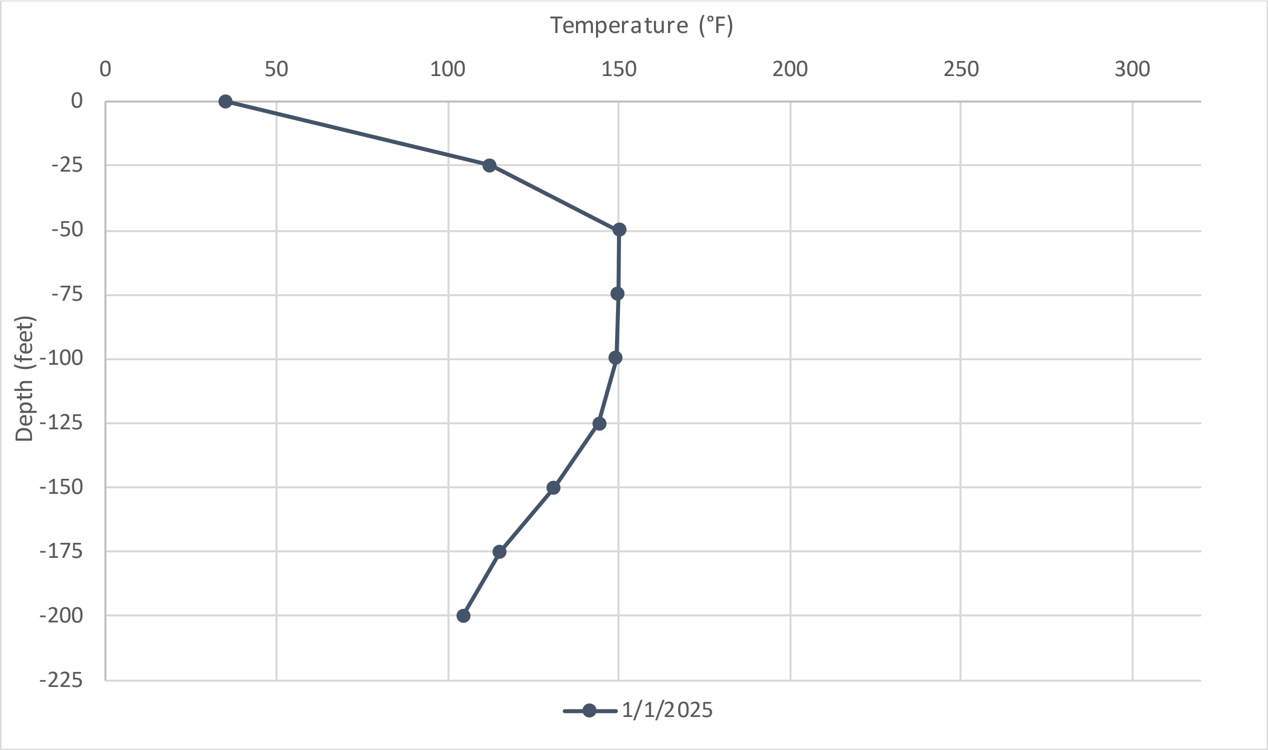


Figure B - 31 Average Temperatures Recorded by TP-9 on January 8, 2025

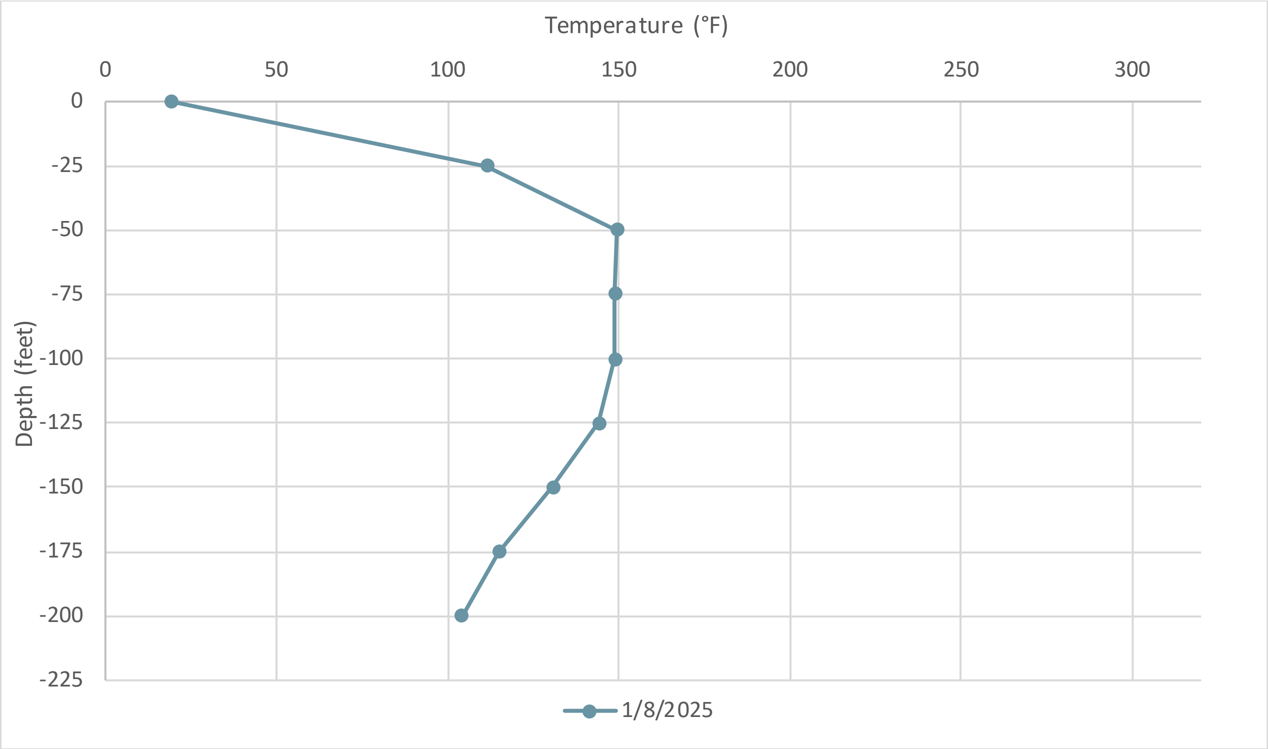


Figure B - 32 Average Temperatures Recorded by TP-9 on January 15, 2025

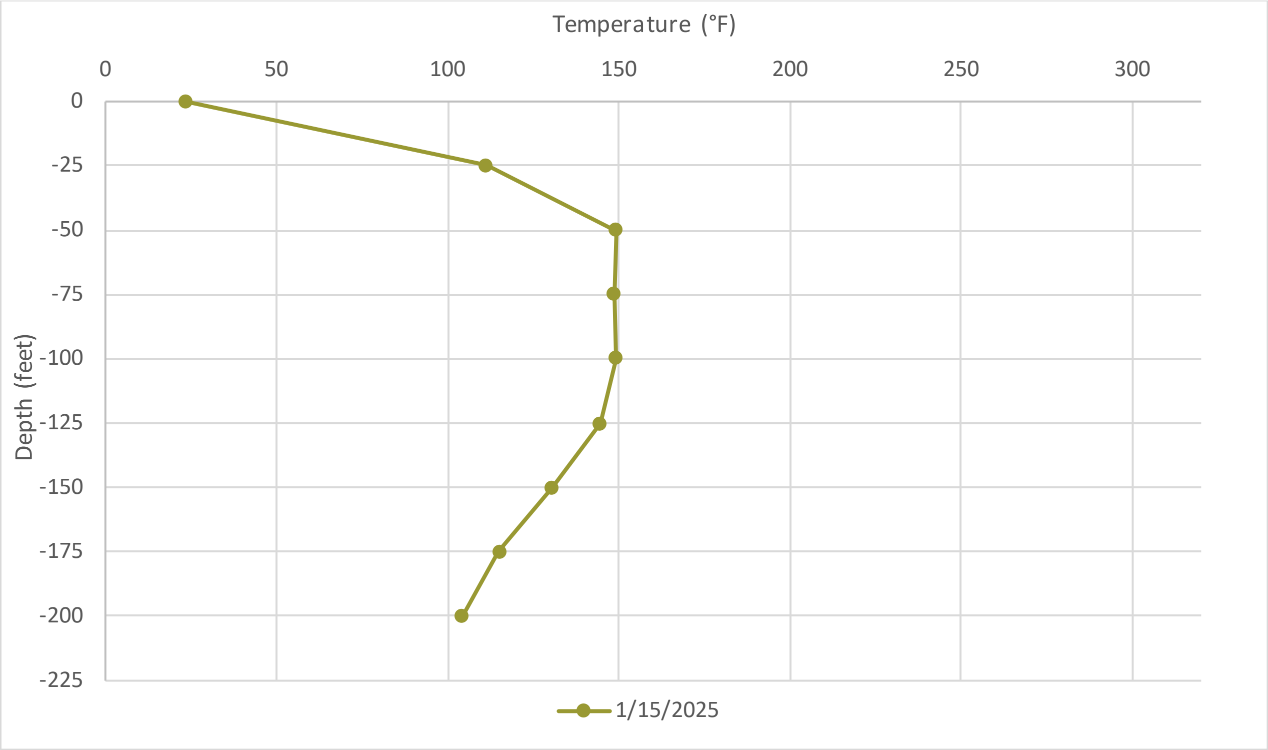


Figure B - 33 Average Temperatures Recorded by TP-9 on January 22, 2025

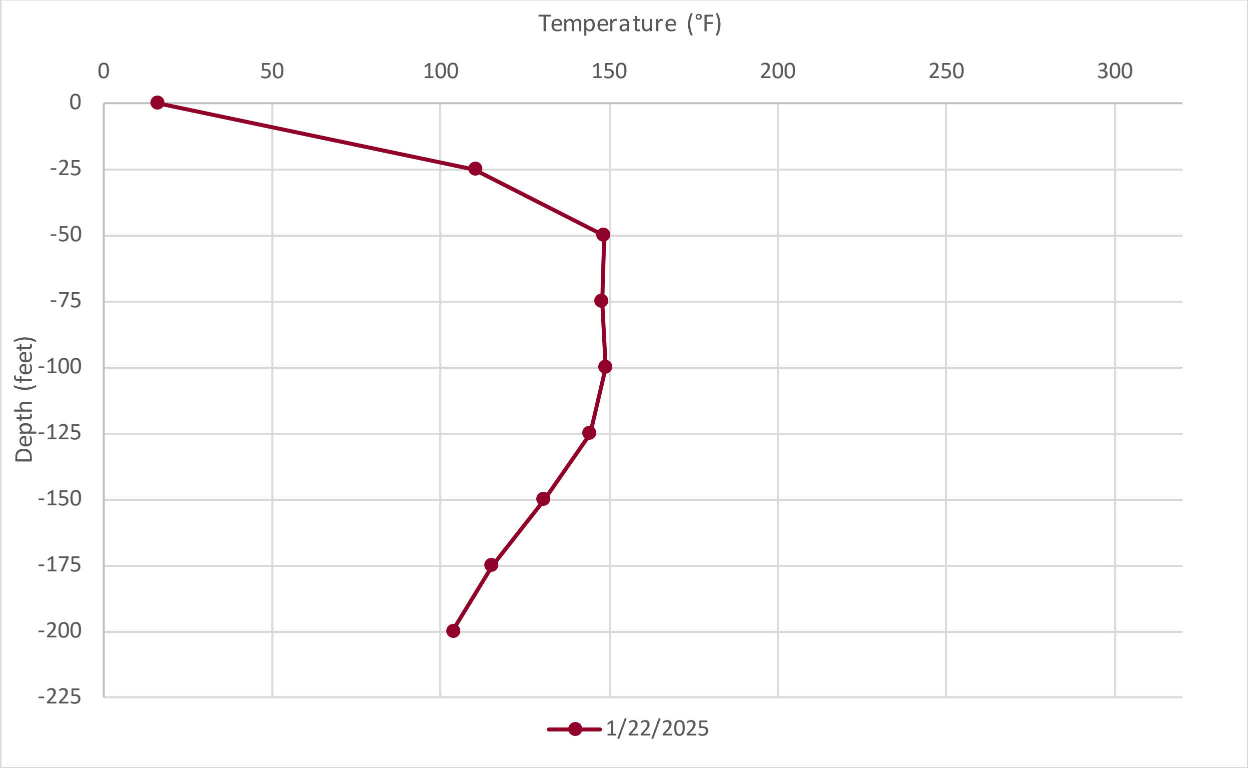
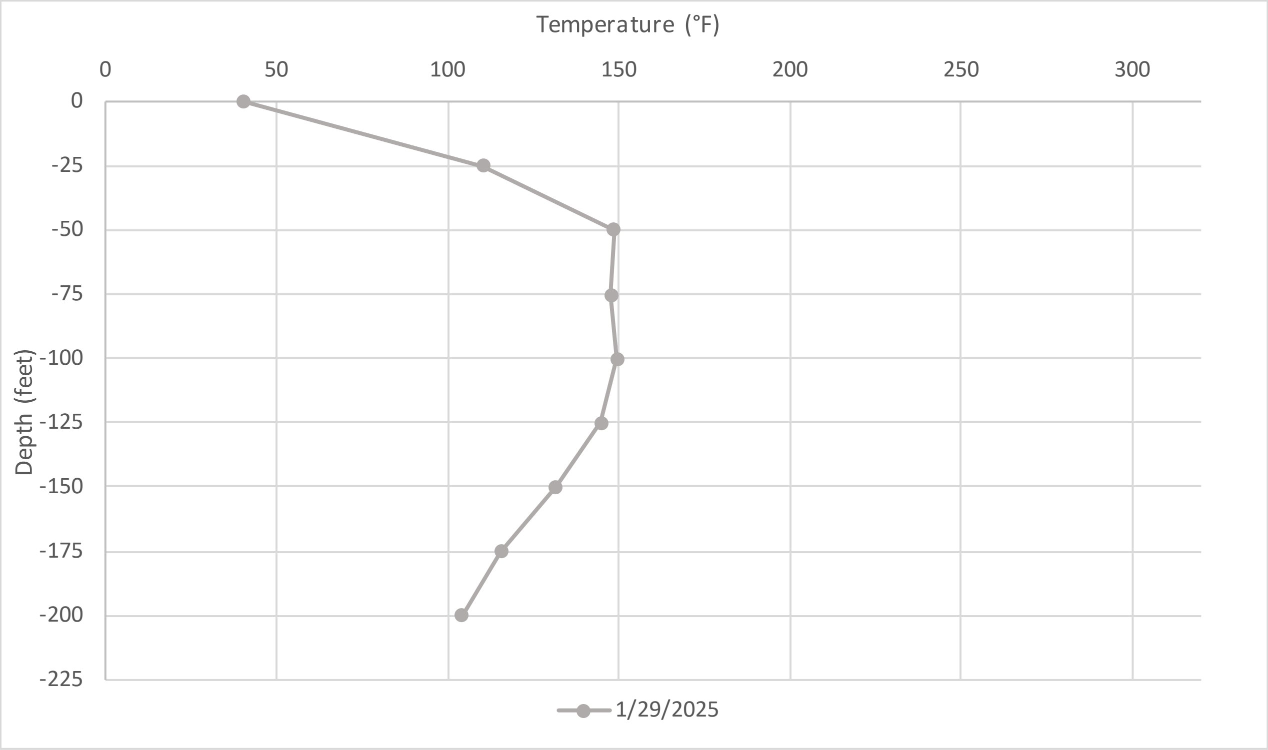


Figure B - 34 Average Temperatures Recorded by TP-9 on January 29, 2025



Appendix C

Daily Wellhead Temperature Averages

Appendix D

Solid Waste Permit 588 Daily Borehole Temperature Averages

Appendix D Table of Contents

Section Page

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 1

	Depth from Surface					
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft
1-Jan	164.8	218.0	218.5	228.8	238.5	263.8
2-Jan	165.3	217.9	218.5	228.8	238.3	263.7
3-Jan	165.8	217.8	218.4	228.7	238.2	263.6
4-Jan	165.8	217.8	218.4	228.7	238.1	263.6
5-Jan	166.2	217.8	218.4	228.7	238.1	263.6
6-Jan	165.4	218.0	218.5	228.8	238.2	263.6
7-Jan	164.5	217.9	218.5	228.6	238.0	263.6
8-Jan	165.3	217.9	218.4	228.7	238.0	263.5
9-Jan	165.6	217.8	218.4	228.7	237.8	263.4
10-Jan	166.4	218.0	218.6	228.7	238.0	263.5
11-Jan	166.2	218.0	218.7	228.8	237.9	263.4
12-Jan	166.2	218.3	218.8	228.7	237.9	263.4
13-Jan	166.3	218.1	218.7	228.7	238.0	263.4
14-Jan	166.2	218.1	218.6	228.7	237.9	263.3
15-Jan	166.2	218.2	218.7	228.7	237.8	263.4
16-Jan	166.5	218.2	218.8	228.7	237.8	263.4
17-Jan	166.7	218.5	219.1	229.0	237.9	263.6
18-Jan	166.9	218.5	219.0	229.0	237.9	263.5
19-Jan	164.4	218.4	218.9	228.8	237.5	263.3
20-Jan	164.2	218.3	218.7	228.6	237.3	263.2
21-Jan	164.5	218.1	218.7	228.6	237.1	263.1
22-Jan	165.0	218.3	218.8	228.7	237.2	263.2
23-Jan	165.2	218.3	218.9	228.7	237.1	263.1
24-Jan	165.2	218.3	218.9	228.8	237.2	263.1
25-Jan	165.3	218.5	219.0	228.9	237.1	263.2
26-Jan	165.6	218.7	219.1	229.0	237.4	263.4
27-Jan	165.9	218.6	219.0	228.9	237.3	263.2
28-Jan	165.9	218.8	219.2	229.0	237.3	263.3
29-Jan	165.9	218.9	219.3	229.1	237.6	263.3
30-Jan	166.1	219.1	219.6	229.5	237.9	263.7
31-Jan	165.2	219.0	219.6	229.3	237.8	263.5
Average	**165.6**	**218.3**	**218.8**	**228.8**	**237.7**	**263.4**

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 2

	Depth from Surface					
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft
1-Jan	156.4	237.7	*	258.5	244.8	*
2-Jan	156.2	237.7	*	258.9	244.8	*
3-Jan	156.1	237.5	*	258.7	244.5	*
4-Jan	156.1	237.7	*	258.9	245.0	*
5-Jan	156.1	237.7	*	259.0	244.5	*
6-Jan	156.2	237.7	*	258.7	244.6	*
7-Jan	156.1	237.7	*	258.9	244.6	*
8-Jan	156.0	237.8	*	259.0	244.8	*
9-Jan	155.8	237.9	*	259.0	244.4	*
10-Jan	155.8	237.9	*	258.5	244.4	*
11-Jan	155.9	237.9	*	258.9	244.2	*
12-Jan	156.2	238.1	*	259.5	244.6	*
13-Jan	155.9	238.0	*	259.5	244.2	*
14-Jan	156.0	238.2	*	259.5	244.5	*
15-Jan	156.0	238.4	*	259.9	244.4	*
16-Jan	155.9	238.4	*	259.2	244.4	*
17-Jan	156.3	238.2	*	259.7	245.4	*
18-Jan	156.1	238.5	*	259.0	244.3	*
19-Jan	156.0	238.5	*	259.0	244.1	*
20-Jan	155.8	238.5	*	259.3	244.1	*
21-Jan	155.7	238.4	*	259.1	243.8	*
22-Jan	155.7	238.6	*	259.4	244.1	*
23-Jan	156.0	238.4	*	259.4	244.1	*
24-Jan	155.9	238.5	*	259.1	243.9	*
25-Jan	156.0	238.8	*	259.4	244.2	*
26-Jan	156.2	238.8	*	259.5	244.1	*
27-Jan	155.9	238.6	*	259.2	243.9	*
28-Jan	156.2	238.8	*	259.3	244.2	*
29-Jan	156.3	238.8	*	259.4	244.2	*
30-Jan	156.3	238.8	*	259.5	244.1	*
31-Jan	156.4	238.8	*	259.2	244.1	*
Average	**156.0**	**238.2**	**N/A**	**259.2**	**244.4**	**N/A**

* Indicates sensor reading issues

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 3

	Depth from Surface							
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Jan	168.4	232.0	231.9	246.1	*	*	*	250.2
2-Jan	169.6	232.3	232.1	246.2	*	*	*	*
3-Jan	170.3	232.1	231.9	246.0	*	*	*	*
4-Jan	174.4	232.3	232.2	246.0	*	*	*	*
5-Jan	174.0	232.2	232.1	246.0	*	*	*	*
6-Jan	177.3	232.3	232.0	246.0	*	*	*	*
7-Jan	177.1	232.3	232.2	246.0	*	*	*	*
8-Jan	178.2	232.4	232.3	246.0	*	*	*	*
9-Jan	176.7	232.5	232.4	246.1	*	*	*	*
10-Jan	172.9	232.4	232.3	246.0	*	*	*	*
11-Jan	171.3	232.5	232.3	245.9	*	*	*	*
12-Jan	171.3	232.9	232.7	246.4	*	*	*	*
13-Jan	170.1	232.5	232.4	246.0	*	*	*	*
14-Jan	169.9	232.9	232.7	246.2	*	*	*	*
15-Jan	169.9	233.0	232.9	246.3	*	*	*	*
16-Jan	169.2	232.8	232.7	246.2	*	*	*	*
17-Jan	169.9	233.2	233.0	246.4	*	*	*	*
18-Jan	169.3	232.9	232.6	246.1	*	*	*	*
19-Jan	168.8	232.7	232.5	246.0	*	*	*	*
20-Jan	170.0	234.1	233.9	247.4	*	*	*	*
21-Jan	168.6	233.6	233.6	*	*	*	*	*
22-Jan	168.5	234.0	233.8	*	*	*	*	*
23-Jan	168.1	233.8	233.6	*	*	*	*	*
24-Jan	167.7	233.6	233.5	*	*	*	*	*
25-Jan	167.9	233.9	233.7	*	*	*	*	*
26-Jan	167.8	233.8	233.7	*	*	*	*	*
27-Jan	167.4	233.5	233.3	*	*	*	*	*
28-Jan	167.9	233.8	233.6	*	*	*	*	*
29-Jan	168.4	233.8	233.7	*	*	*	*	*
30-Jan	170.0	233.7	233.6	*	*	*	*	*
31-Jan	171.7	233.6	233.4	*	*	*	*	*
Average	**170.7**	**233.0**	**232.9**	**246.2**	**N/A**	**N/A**	**N/A**	**N/A**

* Indicates sensor reading issues

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 5

	Depth from Surface							
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Jan	149.2	214.7	215.0	231.8	236.7	238.3	225.7	201.8
2-Jan	149.6	214.8	215.2	232.0	236.9	238.5	225.8	202.0
3-Jan	149.5	214.5	214.9	231.7	236.7	238.3	225.6	201.7
4-Jan	149.7	214.7	215.0	231.9	236.8	238.6	225.9	201.9
5-Jan	149.1	214.6	214.9	231.6	236.6	238.4	225.7	201.7
6-Jan	162.6	214.6	214.9	231.5	236.6	238.5	225.8	201.8
7-Jan	150.3	214.6	214.9	231.6	236.6	238.5	225.8	201.8
8-Jan	148.9	214.7	214.9	231.5	236.5	238.5	225.8	201.8
9-Jan	151.1	214.8	215.1	231.5	236.5	238.7	226.0	201.9
10-Jan	152.2	215.0	215.4	231.6	236.4	238.6	225.8	201.8
11-Jan	148.8	215.2	215.6	231.5	236.4	238.6	225.8	201.9
12-Jan	149.1	215.6	216.0	231.6	236.6	238.9	226.0	202.2
13-Jan	148.5	215.3	215.8	231.4	236.4	238.7	225.8	201.9
14-Jan	148.5	215.5	215.9	231.5	236.5	238.9	226.0	202.1
15-Jan	148.2	215.5	216.0	231.6	236.6	238.9	226.0	202.2
16-Jan	147.8	215.3	215.8	231.4	236.5	238.9	226.0	202.1
17-Jan	147.9	215.5	216.0	231.5	236.6	238.9	226.1	202.3
18-Jan	147.0	215.3	215.7	231.4	236.4	238.8	226.0	202.1
19-Jan	146.7	215.1	215.6	231.1	236.3	238.7	225.8	202.0
20-Jan	147.0	215.2	215.7	231.3	236.3	238.7	225.9	202.1
21-Jan	146.4	215.1	215.5	231.1	236.1	238.6	225.7	201.9
22-Jan	146.4	215.2	215.6	231.3	236.3	238.7	225.9	202.1
23-Jan	146.0	215.2	215.6	231.2	236.2	238.7	225.9	202.0
24-Jan	145.9	215.1	215.5	231.2	236.2	238.7	225.8	202.0
25-Jan	146.0	215.2	215.6	231.3	236.3	238.8	225.9	202.1
26-Jan	146.0	215.4	215.8	231.2	236.4	238.9	226.0	202.3
27-Jan	146.0	215.3	215.7	231.1	236.3	238.9	225.9	202.2
28-Jan	146.0	215.5	215.9	231.3	236.4	239.0	226.0	202.3
29-Jan	145.7	215.5	215.9	231.4	236.5	239.1	226.1	202.4
30-Jan	145.8	215.3	215.8	231.3	236.4	239.1	226.1	202.3
31-Jan	145.6	215.0	215.4	231.3	236.4	239.1	226.1	202.5
Average	**148.3**	**215.1**	**215.5**	**231.4**	**236.5**	**238.7**	**225.9**	**202.0**

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 6

	Depth from Surface				
Date	25 ft	50 ft	75 ft	100 ft	125 ft
1-Jan	181.0	211.9	217.4	213.5	213.8
2-Jan	162.9	202.5	219.4	218.2	211.7
3-Jan	158.9	209.4	218.8	216.5	214.1
4-Jan	157.4	212.8	219.1	215.5	215.3
5-Jan	171.5	219.4	219.4	219.7	220.4
6-Jan	205.5	227.9	227.0	227.8	228.5
7-Jan	206.4	217.2	217.7	217.7	218.0
8-Jan	206.3	216.6	217.9	216.9	217.5
9-Jan	206.4	215.1	216.6	215.6	216.1
10-Jan	205.8	213.9	215.8	214.3	214.9
11-Jan	205.6	211.4	213.0	211.6	212.0
12-Jan	206.1	214.1	214.9	214.1	214.2
13-Jan	206.1	213.2	214.5	213.5	213.7
14-Jan	206.5	213.0	213.4	213.3	213.5
15-Jan	194.9	213.4	215.0	213.6	213.9
16-Jan	197.6	212.0	212.4	212.2	212.4
17-Jan	206.5	213.3	213.6	213.4	213.5
18-Jan	205.8	213.1	212.8	213.1	213.2
19-Jan	206.1	212.5	212.5	212.6	212.7
20-Jan	202.2	211.1	213.1	211.5	211.9
21-Jan	173.3	210.7	216.1	213.7	213.0
22-Jan	179.9	211.8	212.3	212.1	212.2
23-Jan	206.5	211.9	212.3	212.1	212.1
24-Jan	206.4	211.9	212.9	212.2	212.2
25-Jan	206.7	211.2	212.7	211.4	211.5
26-Jan	206.7	211.5	212.6	211.6	211.7
27-Jan	206.2	211.5	212.7	211.6	211.7
28-Jan	197.3	211.1	211.7	211.2	211.3
29-Jan	204.2	210.9	211.6	211.0	211.2
30-Jan	201.9	212.3	212.8	212.5	212.6
31-Jan	206.4	210.4	210.5	210.5	210.5
Average	**196.6**	**212.9**	**214.9**	**214.0**	**213.9**

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 7

	Depth from Surface							
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Jan	146.6	201.4	209.7	193.8	202.1	199.0	191.2	183.5
2-Jan	146.3	201.0	210.5	193.9	203.0	200.1	191.4	183.8
3-Jan	145.7	201.1	209.9	194.1	201.8	199.0	192.1	184.9
4-Jan	145.2	201.9	210.4	194.3	201.7	199.1	191.3	184.3
5-Jan	144.8	201.0	210.3	193.9	201.3	199.2	191.6	185.8
6-Jan	144.7	207.1	209.0	192.4	205.0	199.6	185.0	174.0
7-Jan	144.7	202.4	209.9	192.5	201.6	198.5	189.3	182.7
8-Jan	143.8	202.4	210.2	192.8	201.1	197.8	189.8	183.6
9-Jan	143.0	202.9	210.1	192.7	202.3	197.6	189.3	183.1
10-Jan	142.5	201.7	209.8	192.8	202.2	198.6	190.2	185.0
11-Jan	142.5	203.0	208.9	192.7	202.1	197.8	189.0	182.3
12-Jan	143.0	203.0	209.6	193.0	202.5	199.0	189.7	183.3
13-Jan	143.0	202.4	209.9	192.3	202.4	198.9	189.4	183.7
14-Jan	143.3	202.1	210.1	192.6	201.4	198.3	189.8	184.6
15-Jan	143.5	202.5	210.0	193.1	202.5	198.5	188.1	179.0
16-Jan	143.5	201.9	210.0	191.9	201.3	198.7	191.0	188.2
17-Jan	143.9	202.0	210.1	192.4	201.4	197.8	191.0	188.1
18-Jan	143.9	202.9	209.6	192.1	202.3	198.1	190.3	187.5
19-Jan	143.8	209.9	209.3	191.0	206.5	199.6	184.1	175.0
20-Jan	144.0	201.6	209.5	192.1	201.6	197.4	188.9	184.2
21-Jan	143.7	199.3	209.8	192.5	199.7	196.2	190.5	187.6
22-Jan	143.7	198.0	209.9	193.3	199.6	196.9	191.4	189.5
23-Jan	143.4	199.5	209.7	193.5	199.7	197.2	191.8	189.9
24-Jan	143.4	200.2	209.8	193.3	199.9	197.0	191.6	189.6
25-Jan	143.5	200.3	209.8	193.4	200.3	196.8	191.8	191.4
26-Jan	143.6	201.0	209.7	193.4	200.3	197.1	191.9	191.4
27-Jan	143.6	201.5	209.4	193.0	200.3	196.9	191.9	191.3
28-Jan	143.8	201.5	209.2	192.9	200.3	197.1	192.6	192.4
29-Jan	144.0	201.0	209.4	193.3	200.1	197.0	193.1	193.4
30-Jan	144.1	199.5	209.5	193.9	199.6	197.5	194.1	194.4
31-Jan	144.3	191.0	210.3	194.7	193.7	196.4	202.2	205.3
Average	**144.0**	**201.5**	**209.8**	**193.0**	**201.3**	**198.0**	**190.8**	**186.5**

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 8

	Depth from Surface							
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Jan	189.3	193.0	193.3	195.8	197.8	198.0	189.6	173.9
2-Jan	189.5	193.2	193.5	196.1	198.2	198.2	189.7	174.1
3-Jan	189.1	192.9	193.3	195.8	197.9	197.9	189.6	173.8
4-Jan	189.4	193.0	193.4	196.0	198.1	198.1	189.7	174.0
5-Jan	189.0	192.9	193.3	195.8	198.1	198.1	189.4	173.7
6-Jan	189.2	192.8	193.1	195.6	197.9	198.1	189.5	173.9
7-Jan	189.5	192.9	193.3	195.8	198.1	198.1	189.4	174.0
8-Jan	188.7	192.9	193.2	195.8	198.1	198.1	189.2	173.8
9-Jan	189.0	192.9	193.2	195.8	198.1	198.1	189.4	174.1
10-Jan	189.0	192.8	193.2	195.6	198.0	198.2	189.4	174.1
11-Jan	189.4	192.7	193.0	195.4	197.8	198.1	189.6	174.4
12-Jan	189.7	192.9	193.3	195.7	198.1	198.3	189.7	174.8
13-Jan	189.3	192.8	193.2	195.7	198.1	198.2	189.3	174.7
14-Jan	189.3	193.0	193.4	195.9	198.2	198.4	189.0	175.1
15-Jan	189.2	193.1	193.5	196.0	198.3	198.4	188.8	175.2
16-Jan	189.2	193.0	193.3	195.8	198.2	198.4	188.8	175.0
17-Jan	189.4	193.1	193.5	195.9	198.3	198.5	189.3	175.4
18-Jan	189.3	192.9	193.3	195.7	198.0	198.4	189.5	175.6
19-Jan	189.2	192.7	193.1	195.5	197.9	198.2	189.5	175.3
20-Jan	189.6	192.8	193.2	195.8	198.1	198.2	189.7	175.2
21-Jan	189.2	192.7	193.1	195.8	198.1	198.1	189.6	174.9
22-Jan	189.3	192.9	193.3	195.8	198.2	198.3	189.6	174.8
23-Jan	189.3	192.9	193.3	195.8	198.2	198.3	189.7	174.8
24-Jan	189.3	192.9	193.2	195.7	198.2	198.3	189.7	174.7
25-Jan	189.4	192.9	193.3	195.9	198.3	198.4	189.8	174.6
26-Jan	189.3	193.0	193.4	196.0	198.4	198.5	189.8	174.6
27-Jan	189.1	192.9	193.3	195.8	198.2	198.4	189.9	174.6
28-Jan	189.2	193.0	193.4	195.8	198.2	198.5	190.1	174.9
29-Jan	188.7	193.1	193.4	195.8	198.3	198.5	190.2	174.9
30-Jan	188.7	193.1	193.4	195.9	198.3	198.4	190.0	174.8
31-Jan	188.8	193.1	193.5	195.8	198.3	198.6	190.3	175.7
Average	**189.2**	**192.9**	**193.3**	**195.8**	**198.1**	**198.3**	**189.6**	**174.6**

Solid Waste Permit 588 Daily Borehole Temperature Averages for Borehole 9

	Depth from Surface							
Date	25 ft	50 ft	75 ft	100 ft	125 ft	150 ft	175 ft	200 ft
1-Jan	112.4	150.0	149.6	149.2	144.3	131.1	115.1	104.6
2-Jan	113.0	150.4	150.0	149.2	144.3	131.0	115.2	104.6
3-Jan	112.5	150.0	149.6	149.0	144.0	130.7	114.9	104.3
4-Jan	112.5	150.1	149.7	149.1	144.2	130.8	115.0	104.3
5-Jan	112.4	149.9	149.5	149.0	144.1	130.8	115.0	104.3
6-Jan	110.3	149.1	148.2	149.3	144.3	130.8	115.1	104.3
7-Jan	111.5	149.3	148.8	148.9	144.1	130.6	115.0	104.1
8-Jan	111.5	149.4	148.9	149.0	144.1	130.6	114.9	104.0
9-Jan	111.5	149.4	148.9	149.1	144.2	130.7	115.1	104.1
10-Jan	111.0	149.1	148.4	149.0	144.1	130.6	115.0	103.9
11-Jan	110.4	148.6	147.9	149.1	144.1	130.6	115.0	103.8
12-Jan	111.1	149.2	148.5	149.3	144.4	130.8	115.2	104.1
13-Jan	110.5	148.8	148.1	149.0	144.2	130.5	115.0	104.0
14-Jan	110.9	149.1	148.4	149.2	144.4	130.7	115.1	104.1
15-Jan	111.0	149.1	148.5	149.2	144.3	130.5	115.0	104.1
16-Jan	110.7	148.9	148.1	149.2	144.3	130.6	115.1	104.0
17-Jan	110.9	149.2	148.4	149.5	144.6	130.9	115.4	104.2
18-Jan	110.2	148.8	148.0	149.3	144.5	130.8	115.3	104.1
19-Jan	110.0	148.4	147.6	149.1	144.3	130.6	115.1	103.8
20-Jan	110.2	148.4	147.7	148.9	144.2	130.6	115.0	103.6
21-Jan	109.7	148.1	147.4	148.6	143.9	130.3	114.7	103.4
22-Jan	110.0	148.3	147.7	148.9	144.2	130.6	115.0	103.6
23-Jan	109.8	148.3	147.6	148.8	144.2	130.6	115.0	103.6
24-Jan	109.6	148.2	147.4	148.9	144.2	130.6	115.0	103.6
25-Jan	110.0	148.5	147.7	149.0	144.3	130.8	115.1	103.8
26-Jan	110.3	148.7	147.9	149.2	144.5	131.4	115.3	104.0
27-Jan	109.9	148.3	147.5	149.0	144.4	131.3	115.2	103.8
28-Jan	110.3	148.4	147.5	149.2	144.6	131.5	115.3	103.9
29-Jan	110.3	148.5	147.7	149.3	144.7	131.6	115.5	104.1
30-Jan	110.4	148.6	147.9	149.4	144.7	131.6	115.6	104.2
31-Jan	107.8	148.1	147.0	149.4	144.8	131.4	115.7	104.3
Average	**110.7**	**148.9**	**148.3**	**149.1**	**144.3**	**130.8**	**115.1**	**104.0**

Appendix E

Monthly Topography Analysis

Appendix F

Field Logs

Lab Report

Historical LFG-EW Leachate Monitoring Results Summary

Appendix G

LFG Dewatering Pump Stroke Counter Data Analysis

Stroke Counter Data Analysis

Based on the number of strokes in each well, SCS can estimate the number of gallons of liquid pumped from each well to assess pump performance. SCS assumed that each stroke from a float-style pneumatic pump correlates to approximately 0.3 gallons of liquid removed from the well. Blackhawk piston-style pumps remove approximately 0.11 gallons per stroke. The recorded stroke count data is shown in Table G-1 and estimates of the quantities of liquids removed from each well during January are included in Figure G-1.

Table G - 1 Summary of Dual Extraction Well Pump Stroke Counter Data

Well	12/30/2024	12/31/2024	1/14/2025	1/27/2025
EW33B				
EW36A				
EW49	79565			
EW50	1508875		1517215	1523134
EW51	180635			
EW52	1233644		1233644	1233665
EW53	3294343			
EW54	1207083			
EW55				73305
EW57				
EW58				
EW59	3487400		72640	3499376
EW60	99318		104686	105445
EW61	421139		440250	467510
EW62		214599	214599	
EW64		196791		
EW65	77153		77153	
EW67	288735			288743
EW68	2615908		2639561	2460375
EW69	18			
EW70				
EW74				
EW75	SSO		SSO	
EW76				
EW78	470		2975	
EW81				
EW82				
EW83				
EW85	243112		258069	267294
EW87	340749			

Well	12/30/2024	12/31/2024	1/14/2025	1/27/2025
EW88	254736			
EW89				
EW90				
EW91				
EW92				
EW93	896817		896817	973173
EW94	697353		697364	778897
EW96				
EW98	1489271			1522107
EW100				

Total LFG Liquids Removal

To improve the accuracy of the total landfill gas liquids flow rate, two flow meters were installed on the landfill gas liquid forcemains in December 2023. One flow meter was installed on the SWP No. 588 primary landfill gas liquid forcemain. The other was installed on the SWP No. 588 alternate landfill gas liquids forcemain, which also serves as the conduit for condensate from the SWP No. 498 landfill gas liquids and the SWP No. 588 stormwater pump. Given the improved accuracy of the flowmeter data compared to flow estimates based on collected stroke counter data, SCS prefers to use flow rates from the flowmeters to estimate total liquids removed when that data is available because the volume of liquid pumped per stroke is highly variable. Flow rates from individual pump performance data (e.g., stroke counts) will typically only be used to evaluate pump performance.

The progress in landfill gas liquids removal over the past year is depicted in Figure G-1. In September, November, and December 2024 and January 2025, the liquids recorded by the flowmeter were replaced with estimates from stroke counter data (colored in blue in Figure G-1) for the following reasons:

- **September:** The data for September were not representative of LFG liquids removal, but rather mainly represented stormwater that was used to flush the landfill gas liquids piping in September.
- **November and December:** In November and December, the total liquids flow recorded by the SWP No. 588 primary landfill gas liquids flowmeter showed 0 gallons for several days in a row, while pump stroke counter data indicate that pumps were moving liquids. SCS investigated potential causes for the discrepancy. SCS-RMC reached out to the manufacturer of the flowmeter and received counsel that possible causes may be that liquid flowrates were simply below the threshold of the flowmeter's totalizer (1,000 gallons per day), or that air intrusion caused the flowmeter to malfunction. SCS-FS inspected the flowmeter and informed the City that there were known air pockets in the pipeline that were unable to be released during the period of zero readings. Because the flowmeter began to function normally in late December (recording typical amounts of liquid flow each day) after these air pockets were released by SCS-FS, air intrusion appears to have been the cause.
- **January:** In January, the total liquids flow recorded by the SWP No. 588 primary landfill gas liquids flowmeter again showed 0 gallons for several days in a row, while pump stroke counter data indicate that pumps were moving liquids. SCS and SCS-RMC will continue to seek a more permanent solution to the flowmeter's malfunctioning.

Stroke counts indicate approximately 83,000 gallons of liquid were pumped out of the landfill in January. SCS and the City are in the process of addressing the air intrusion in this LFG liquids flowmeter and will continue to use stroke count estimates in the meantime.

Figure G-1 Estimated Volume of Liquids Removed from Landfill Gas Wells