REGION 5
CHICAGO, IL 60604

MEMORANDUM

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Clark-Floyd Landfill, Borden, Indiana

FROM: Kenneth Ruffatto, Environmental Engineer
AECAB (IL/IN)

THRU: Nathan Frank, Section Supervisor
AECAB (IL/IN)

TO: File

BASIC INFORMATION

Facility Name: Clark-Floyd Landfill

Facility Location: 14304 SR 60, Borden, Indiana

Date of Inspection: November 13, 2024

EPA Inspector(s):

1. Kenneth Ruffatto, Environmental Engineer
2. Ethan Chatfield, Environmental Engineer
3. Aileen Drum, Environmental Engineer
4. Giles Chickering, Environmental Engineer/Scientist

Other Attendees:

1. Amy Rotert, Air Compliance Inspector, IDEM
2. Jeremiah Hunt, Air Compliance Inspector, IDEM
3. Matt Lee, President, CFL, LLC
4. Albert Masticola, Gas Technician, CFL, LLC

Contact Email Address: Matt Lee -- mlee@clarkfloydlandfill.com

Purpose of Inspection: Landfill Monitoring Inspection

Facility Type: Municipal Solid Waste Landfill

Regulations Central to Inspection: 40 C.F.R. Part 60, Subpart XXX; 40 C.F.R. Part 63, Subpart AAAA; Title V Permit

Arrival Time: 8:00 AM EST
Departure Time: 3:30 PM EST

Inspection Type:
☒ Unannounced Inspection
☐ Announced Inspection

OPENING CONFERENCE

☒ Presented Credentials
☒ Stated authority and purpose of inspection
☒ Provided Small Business Resource Information Sheet
☐ Small Business Resource Information Sheet not provided. Reason:
☒ Provided CBI warning to facility

The following information was obtained verbally from Mr. Lee and Mr. Masticola unless otherwise noted.

Company Ownership: The landfill is jointly owned by Clark and Floyd counties in Indiana and is operated by CFL, LLC. Phil Kato operated the landfill prior to CFL taking over operation in 2004.

Process Description:
Clark-Floyd Landfill (CFL) is a municipal solid waste (MSW) landfill that began accepting waste in approximately 1971. The expected closure of the landfill is 2046 with the possibility of a horizontal expansion moving the closure to 2056. CFL is made up of an East and West hill with active faces on both. Construction and demolition waste is currently being disposed on the West hill, while MSW is being disposed on the East hill. A slurry wall was completed around the perimeter of CFL, and operations are expected to be moved primarily to the West hill. CFL has a RCRA Subtitle D liner and leachate is collected and stored in leachate storage tanks on the east side of the site. CFL does not currently perform any leachate recirculation but is permitted to do so.

The gas collection and control system (GCCS) is composed of approximately 140 vertical gas extraction wells and a single Parnel candlestick flare for gas control. The flare is supplied by two blowers, with only one blower operating at a time. Prior the current expansion/reconstruction that began in 2024, there were 93 wells. Prior to the Parnel flare, installed in approximately 2016, there was a gas to energy system operated by Hoosier Energy at the site with a backup enclosed flare (did not include a variable speed motor), both now decommissioned.

Staff Interview:
CFL stated that they are currently undergoing a large construction project on the GCCS, including new header/lateral lines and gas wells. They are currently finishing Phase 3 of a seven-phase project. CFL stated that while they have approximately 140 gas wells, there are 10 new wells that are scheduled to be installed on the west side of the East hill. Tetra Tech AEG is responsible for well installations. The East hill also recently went through a gas system overhaul where header lines were moved from the middle of the landfill towards the outside to avoid filling operations. When installing new gas wells, CFL increased well diameter to 6" instead of 4" and have installed pneumatic pumps in approximately 10 wells with water issues. CFL staff stated that the pumps were installed due to water issues in wells on the south side of the East hill, indicating that many of the wells were potentially "watered in". CFL staff noted that while one blower to the open flare could provide approximately 1,260 standard cubic feet per minute (scfm) of landfill gas; a switch to the second blower causes a drop of 200+ scfm (i.e., flow rate of 1,000 scfm) of gas to the flare. The operating blower is rotated monthly to allow for equal wear-and-tear on each of the two blowers. CFL stated that there are plans for a potential renewable natural gas (RNG) facility to be installed on the north end of the landfill and that they are currently in negotiation over gas rights with the County.

CFL is responsible for all SEM, gas monitoring probe, and wellhead monitoring at the landfill. CFL stated that their most recent SEM monitoring found approximately three SEM hits, though they have historically found up to 30 SEM hits in a single monitoring period. CFL also stated that they have not had gas migration issues at the landfill.

The only closed portion of the landfill is a small 2-to-3-acre section called Cell 5. Otherwise, all other areas of the landfill are under interim cover, which is composed of 2 feet of soil in most areas but 4 to 5 feet in areas prone to erosion. Interim cover has been used since CFL is primarily adding waste vertically at this point rather than horizontally into new cells. CFL plans to put seed on the East hill in Spring 2025 to help prevent erosion. CFL staff stated that due to the use of river mud (i.e., silty) soil for cover, there has been a lot of difficulty controlling erosion.

Closing Conference Follow-up Call: Since key site staff were not available during the time of the inspection, EPA agreed to a follow-up call with CFL for the closing conference. A call was conducted on November 25, 2024 at 11 AM CST, where a typical closing conference was conducted including sharing concerns, outlining next steps, and requesting documents. This was attended by CFL, LLC including Matt Lee (present during inspection); Robert Lee, President (not present during inspection); and Bruce Schmucker, Vice President of Engineering and Environmental Affairs (not present during inspection) and Tetra Tech and facility consultant Jessica Palmer, Senior Project Manager (not present during inspection).

TOUR INFORMATION

EPA Toured the Facility: Yes

Data Collected and Observations:
EPA first observed the Parnel open flare and recorded that it was operating at approximately 1,250 scfm and 15 inches of water column. The flare nameplate stated: Parnel Biogas Job # 16-155 DNL-101 ship date 8-15-2016. The Blower nameplates stated: Model # NT88103-03-GD, Order # 2161104 with Serial #s 2161104A and B.

EPA conducted a partial SEM survey of the Landfill that centered around areas where visual observations may indicate elevated concentrations of landfill gas (e.g., distressed vegetation, cracks or seeps in cover, and cover penetrations). Kenneth Ruffatto, Ethan Chatfield, and Giles Chickering monitored the surface and confirmed each other's exceedances. Aileen Drum recorded readings, took pictures, and marked with flags each SEM hit location. EPA used three Elkin Irwin devices to perform EPA Reference Method 21 for the SEM.

EPA inspectors detected and documented 50 points on the Landfill surface with concentrations of methane above 500 ppm. Some of the documented points involved areas where there were numerous exceedances, particularly in eroded areas, but only one point was recorded for each location. Of the 50 SEM hits found, 21 were found in areas of erosion, 27 were at the base of wellheads, and 2 were found near header seams. All SEM photos and locations/concentrations are documented in Appendices A and B, respectively, with visual maps shown in Appendix C. Cover integrity issues were noted over most of the non-vegetative slopes on the East hill during SEM including large erosion reels and exposed trash, with some locations having leachate breakouts. *See* Appendix A for photos. Additionally, elevated levels of landfill gas above background were seen over a large portion of the SEM path taken. *See* Appendix C for a concentration map of all continuous 10 second readings taken during SEM.

EPA inspectors found three gas wells (i.e., 366R, 485, 507) where the flex hose was detached from the lateral line. The valves on the wellheads were not closed, and gas was determined to be passively venting from the flex hose. In all three cases, the Irwin was used to verify that it was landfill gas. *See* Appendix A for photos of the three wells (i.e., Image #s 51-52, 79-83). CFL staff reattached the three well hoses when EPA staff alerted them. EPA inspectors also noted at least one well for which the flex hose was still attached, but appeared to have a poor seal and was leaking landfill gas (as detected by the Irwin).

During monitoring, CFL staff noted that numerous wells had water issues on the south side of the East hill which triggered CFL to install pneumatic pumps in the wells. CFL staff also stated during the inspection that they do not believe there is enough vacuum, which is why numerous wells may have SEM hits at the base.

Photos: were taken during the inspection and are listed in Appendix A.

Field Measurements: were taken as a part of SEM during the inspection and are listed in Appendix B with associated maps in Appendix C.

RECORDS REVIEW

An overhead map of the facility was reviewed on-site.

CLOSING CONFERENCE

☒ Provided U.S. EPA point of contact to the facility

Requested documents:

- GCCS Design Plan—most recent
- GCCS As-Built—most recent
- Construction Plans for GCCS Improvements
- Semi-Annual Reports—last 3 reports
- Quarterly Surface Emission Monitoring Reports—last 3 quarters
- Monthly Gas Wellhead Monitoring—last 3 months

Concerns: EPA had four areas of immediate concern after visiting the Landfill: 1) **SEM** – a high rate of SEM hits, above the historical average for the Landfill; 2) **Cover** – major erosion issues and exposed trash over a majority of the East hill seen during SEM with little vegetative cover; 3) **Gas Collection** – at least three vertical wells were found where the flex hose from the wellhead was detached from the lateral line and passively venting to the atmosphere, and leaking was found in gas components including wellhead connections and header/lateral welds; and 4) **Gas Control** – facility staff reported that the flare drops nearly 200 scfm when switching to Blower #2 (i.e., redundant blower).

DIGITAL SIGNATURES

Report Author: Ruffatto, Kenneth Digitally signed by Ruffatto, Kenneth Date: 2024.12.02 07:40:18 -06'00'

Section Supervisor: NATHAN FRANK Digitally signed by NATHAN FRANK Date: 2024.12.04 10:52:12 -06'00'

APPENDICES

1. Appendix A: Digital Image Log
2. Appendix B: Field Measurement Data
3. Appendix C: Field Measurement Data Maps

APPENDIX A: DIGITAL IMAGE LOG

Inspector Name: Kenneth Ruffatto and Ethan Chatfield **Archival Record Location:** ERC

Image #	File Name	Date and Time	Description of Image	MAP ID (*See App C*)
1	IMG_1706.JPG	11/13/2024 9:13	IRwin S/N 82 Probe Placement	
2	IMG_1707.JPG	11/13/2024 9:15	Calibration Gas	
3	IMG_1708.JPG	11/13/2024 9:15	Calibration Gas	
4	IMG_1709.JPG	11/13/2024 9:15	IRwin S/N 50 Probe Placement	
5	IMG_1710.JPG	11/13/2024 9:16	IRwin S/N 50 Probe Placement	
6	IMG_1711.JPG	11/13/2024 9:17	IRwin S/N 52 Probe Placement	
7	IMG_1712.JPG	11/13/2024 9:18	IRwin S/N 52 Probe Placement	
8	IMG_1713.JPG	11/13/2024 9:26	Landfill Site Map	
9	IMG_1714.JPG	11/13/2024 9:38	Flare	
10	IMG_1715.JPG	11/13/2024 9:38	Flare equipment	
11	IMG_1716.JPG	11/13/2024 9:39	Flare	
12	IMG_1717.JPG	11/13/2024 9:39	Flare control screen (unreadable due to glare)	
13	IMG_1718.JPG	11/13/2024 9:40	Flare control screen (unreadable due to glare)	
14	IMG_1719.JPG	11/13/2024 9:40	Flare control screen (unreadable due to glare)	
15	IMG_1720.JPG	11/13/2024 9:41	Backside of flare	
16	IMG_1721.JPG	11/13/2024 9:43	Hill opposite flare	
17	IMG_1722.JPG	11/13/2024 9:50	Exposed waste on hill (leachate?)	
18	IMG_1723.JPG	11/13/2024 9:50	Exposed waste on hill (leachate?)	
19	IMG_1724.JPG	11/13/2024 10:04	Exposed waste on hill	
20	IMG_1725.JPG	11/13/2024 10:04	Pooling liquid leading up hill	
21	IMG_1726.JPG	11/13/2024 10:05	Exposed waste on hill	
22	IMG_1727.JPG	11/13/2024 10:05	Erosion rills	
23	IMG_1728.JPG	11/13/2024 10:07	Erosion rills	
24	IMG_1729.JPG	11/13/2024 10:08	Erosion rills	
25	IMG_1730.JPG	11/13/2024 10:12	Exceedance G1	2
26	IMG_1731.JPG	11/13/2024 10:15	Exceedance K1	1
27	IMG_1732.JPG	11/13/2024 10:19	Exposed waste and erosion	
28	IMG_1733.JPG	11/13/2024 10:29	Exceedance G2	3
29	IMG_1734.JPG	11/13/2024 10:30	Exceedance E1	4
30	IMG_1735.JPG	11/13/2024 10:31	Erosion rills	
31	IMG_1736.JPG	11/13/2024 10:31	Exposed waste and erosion	
32	IMG_1737.JPG	11/13/2024 10:31	Exposed waste and erosion	
33	IMG_1738.JPG	11/13/2024 10:35	Exceedance G3 at well 308R	5
34	IMG_1739.JPG	11/13/2024 10:36	Exposed waste and erosion	
35	IMG_1740.JPG	11/13/2024 10:44	Exposed waste	
36	IMG_1741.JPG	11/13/2024 10:50	Exceedance K2 at well 286 (Ken heard water and Albert confirmed the well is watered in)	7

Image #	File Name	Date and Time	Description of Image	MAP ID (*See App C*)
37	IMG_1742.JPG	11/13/2024 10:51	Exposed waste and flagging mattress	
38	IMG_1743.JPG	11/13/2024 10:54	Exceedance E3	8
39	IMG_1744.JPG	11/13/2024 10:55	Exposed waste	
40	IMG_1745.JPG	11/13/2024 10:58	Exceedance K3 at well 326	9
41	IMG_1746.JPG	11/13/2024 10:58	Exposed waste	
42	IMG_1747.JPG	11/13/2024 10:58	Exposed waste	
43	IMG_1748.JPG	11/13/2024 10:59	Exposed waste and pile of foam	
44	IMG_1749.JPG	11/13/2024 11:00	Exposed leachate	
45	IMG_1750.JPG	11/13/2024 11:00	Exposed leachate	
46	IMG_1751.JPG	11/13/2024 11:01	Exposed waste	
47	IMG_1752.JPG	11/13/2024 11:05	Exceedance G4 at well 345	10
48	IMG_1753.JPG	11/13/2024 11:06	Exposed trash at well 346	
49	IMG_1755.JPG	11/13/2024 11:08	Exceedance E4 at well 346	11
50	IMG_1756.JPG	11/13/2024 11:10	Unconfirmed exceedance E5 near erosion rill with exposed leachate	12
51	IMG_1757.JPG	11/13/2024 11:19	Well 366R open venting with a leak of 65,000 ppm measured coming from detached pipe	
52	IMG_1760.JPG	11/13/2024 11:19	Well 366R open venting	
53	IMG_1761.JPG	11/13/2024 11:25	Erosion gullies with exposed waste	
54	IMG_1762.JPG	11/13/2024 11:26	Erosion gullies with exposed waste	
55	IMG_1763.JPG	11/13/2024 11:27	GCCS Piping above ground	
56	IMG_1764.JPG	11/13/2024 11:30	GCCS Piping above ground	
57	IMG_1765.JPG	11/13/2024 11:30	Exceedance K4	14
58	IMG_1766.JPG	11/13/2024 11:33	Exceedance E7 by deep erosion gully with flagging waste	15
59	IMG_1767.JPG	11/13/2024 11:34	Exceedance E7 by deep erosion gully with flagging waste	15
60	IMG_1768.JPG	11/13/2024 11:37	Exceedance E8	17
61	IMG_1769.JPG	11/13/2024 11:39	Exceedance E9 at well 387R	18
62	IMG_1770.JPG	11/13/2024 11:42	Erosion and exposed waste	
63	IMG_1771.JPG	11/13/2024 11:44	Exceedance G5 at well 405	16
64	IMG_1772.JPG	11/13/2024 11:45	Exposed waste and erosion	
65	IMG_1773.JPG	11/13/2024 11:46	Erosion gullies	
66	IMG_1774.JPG	11/13/2024 11:47	Exposed waste	
67	IMG_1775.JPG	11/13/2024 11:50	Exceedance K5 at former well 426 (staff said well needs to be dug up and capped)	19
68	IMG_1776.JPG	11/13/2024 11:54	Exceedance G6 at well 447R	20
69	IMG_1777.JPG	11/13/2024 11:56	Exceedance K6 by erosion gullies	21
70	IMG_1778.JPG	11/13/2024 12:01	Exceedance E10 at well 409	22
71	IMG_1779.JPG	11/13/2024 12:05	Exceedance E11 at well 429	23
72	IMG_1780.JPG	11/13/2024 12:10	Exceedance E12	24

Image #	File Name	Date and Time	Description of Image	MAP ID (*See App C*)
73	IMG_1781.JPG	11/13/2024 12:14	Exceedance K7 at well 470R	25
74	IMG_1782.JPG	11/13/2024 12:16	Exposed waste and above ground GCCS piping	
75	IMG_1783.JPG	11/13/2024 12:18	Erosion	
76	IMG_1784.JPG	11/13/2024 12:21	Exceedance G7 at well 446	26
77	IMG_1785.JPG	11/13/2024 12:27	Exceedance K8 at well 489R	27
78	IMG_1786.JPG	11/13/2024 12:33	Exceedance G8 at well 465	28
79	IMG_1787.JPG	11/13/2024 12:36	Open venting at well 485 with disconnected pipe	
80	IMG_1788.JPG	11/13/2024 12:36	Open venting at well 485 with disconnected pipe	
81	IMG_1789.JPG	11/13/2024 12:36	Open venting at well 485 with disconnected pipe	
82	IMG_1790.JPG	11/13/2024 12:38	Open venting at well 507 with disconnected pipe	
83	IMG_1791.JPG	11/13/2024 12:38	Open venting at well 507 with disconnected pipe	
84	IMG_1793.JPG	11/13/2024 12:42	Exceedance G9 at well 506	29
85	IMG_1794.JPG	11/13/2024 12:46	Exceedance K9 at well 527	30
86	IMG_1795.JPG	11/13/2024 12:46	Exceedance K9 at well 527	30
87	IMG_1796.JPG	11/13/2024 12:50	Exceedance E13 at well 525	31
88	IMG_1797.JPG	11/13/2024 12:58	GCCS piping and exposed trash	
89	IMG_1798.JPG	11/13/2024 13:01	Exceedance E14	32
90	IMG_1799.JPG	11/13/2024 13:06	Exceedance E15	33
91	IMG_1800.JPG	11/13/2024 13:07	Well 488 uphill of exceedances E14 and E15 (entire slope below this well over 500ppm, we stopped placing flags and recording exceedances because it was every few feet)	
92	IMG_1801.JPG	11/13/2024 13:12	Exceedance K10 by header seam	34
93	IMG_1802.JPG	11/13/2024 13:15	Exceedance E16 by header	35
94	IMG_1803.JPG	11/13/2024 13:28	Unconfirmed exceedance E18	37
95	IMG_1804.JPG	11/13/2024 13:33	Erosion and exposed waste downhill of well 432R3	
96	IMG_1805.JPG	11/13/2024 13:34	Exceedance K11 at well 432R3	38
97	IMG_1806.JPG	11/13/2024 13:36	Erosion and exposed waste	
98	IMG_1807.JPG	11/13/2024 13:37	Deep erosion gullies	
99	IMG_1808.JPG	11/13/2024 13:40	Exceedance K12 at well 452	39
100	IMG_1809.JPG	11/13/2024 13:47	Exceedance K13 at well 455 by old wells or possibly clean outs	41
101	IMG_1810.JPG	11/13/2024 13:51	Exceedance G10 at well 435	40
102	IMG_1811.JPG	11/13/2024 13:55	Exceedance E19 (large area elevated over 500 ppm but we counted as one exceedance)	42
103	IMG_1812.JPG	11/13/2024 14:05	Exceedance E20 at erosion gully by header	43
104	IMG_1813.JPG	11/13/2024 14:06	Erosion gully with flagging waste	
105	IMG_1814.JPG	11/13/2024 14:08	Exposed waste	
106	IMG_1815.JPG	11/13/2024 14:08	Erosion gullies with flagging waste	
107	IMG_1816.JPG	11/13/2024 14:10	Exposed waste	

Image #	File Name	Date and Time	Description of Image	MAP ID (*See App C*)
108	IMG_1817.JPG	11/13/2024 14:20	Exceedance K14 at well 337	44
109	IMG_1818.JPG	11/13/2024 14:25	Exceedance K15 at well 316	45
110	IMG_1819.JPG	11/13/2024 14:28	Exceedance E21	46
111	IMG_1820.JPG	11/13/2024 14:30	Exposed waste	
112	IMG_1821.JPG	11/13/2024 14:33	Unconfirmed exceedance E22 at well 355R2	47
113	IMG_1822.JPG	11/13/2024 14:38	Exceedance G11 at well 314R	48
114	IMG_1823.JPG	11/13/2024 14:42	Exceedance E23	49
115	IMG_1824.JPG	11/13/2024 14:45	Solidification Pit	
116	IMG_1825.JPG	11/13/2024 14:47	Exceedance E24	50
117	IMG_1826.JPG	11/13/2024 14:49	Solidification Pit	
118	IMG_1827.JPG	11/13/2024 14:52	Exposed waste	
119	IMG_1828.JPG	11/13/2024 14:52	Exposed waste and pooling water	

APPENDIX B: FIELD MEASUREMENT DATA

Site Name: Clark Floyd 50

Measured Exceedances

MAP ID (see App C)	Timestamp	Irwin Reading (ppm)	Confirm Reading (ppm)	Comments	Latitude (WGS84)	Longitude (WGS84)	Irwin Instrument ID
1	11/13/2024 10:12	**1881**	600	Erosion	38.457094	-85.836662	92004350
2	11/13/2024 10:12	**613**		Erosion	38.457248	-85.836459	92005482
3	11/13/2024 10:20	**653**	667	Erosion	38.457098	-85.836176	92005482
4	11/13/2024 10:28	**529**	700	Erosion	38.457039	-85.836195	92004352
5	11/13/2024 10:34	**3174**		Well 308R	38.456806	-85.836026	92005482
6	11/13/2024 10:44	**3426**	1060	Erosion	38.45678	-85.836161	92004352
7	11/13/2024 10:51	**952**	2231	Well 286	38.456102	-85.836659	92004350
8	11/13/2024 10:57	**761**	1785	Erosion	38.456218	-85.835968	92004352
9	11/13/2024 10:59	**2839**	2498	Well 326	38.456209	-85.835816	92004350
10	11/13/2024 11:05	**675**	1775	Well 345	38.455836	-85.835321	92005482
11	11/13/2024 11:07	**13419**	27892	Well 346	38.456308	-85.834992	92004352
12	11/13/2024 11:13	**643**		Leachate	38.456357	-85.834934	92004352
13	11/13/2024 11:16	**644**	605	Erosion	38.456404	-85.834706	92004352
14	11/13/2024 11:30	**846**	755	Erosion	38.456199	-85.833782	92004350
15	11/13/2024 11:37	**1283**	555	Erosion	38.456373	-85.833728	92004352
16	11/13/2024 11:38	**1195**	4829	Well 405	38.455922	-85.832879	92005482
17	11/13/2024 11:40	**1869**	1026	Erosion	38.456415	-85.833616	92004352
18	11/13/2024 11:42	**2383**	656	Well 387R	38.456467	-85.83355	92004352
19	11/13/2024 11:50	**2737**	944	Old Well 426	38.456284	-85.832381	92004350
20	11/13/2024 11:54	**948**	2531	Well 447R	38.45653	-85.831903	92005482
21	11/13/2024 11:57	**963**	1307	Erosion	38.456575	-85.831872	92004350
22	11/13/2024 12:01	**1071**	5662	Well 409	38.457045	-85.83264	92004352
23	11/13/2024 12:06	**14129**	4550	Well 429	38.456978	-85.832094	92004352
24	11/13/2024 12:11	**702**	592	Erosion	38.456707	-85.831694	92004352
25	11/13/2024 12:15	**1145**	1370	Well 470R	38.457329	-85.831302	92004350
26	11/13/2024 12:18	**1460**	7010	Well 446	38.456351	-85.831344	92005482
27	11/13/2024 12:29	**7530**	2006	Well 489R	38.456836	-85.830036	92004350
28	11/13/2024 12:36	**1406**	1009	Well 465	38.456028	-85.830445	92005482
29	11/13/2024 12:42	**8382**	14036	Well 506	38.456203	-85.829531	92005482
30	11/13/2024 12:48	**8714**	13924	Well 527	38.456566	-85.829006	92004350
31	11/13/2024 12:52	**6118**	2139	Well 525	38.455987	-85.829111	92004352
32	11/13/2024 13:03	**4055**	617	Erosion	38.456732	-85.830251	92004352
33	11/13/2024 13:08	**1217**	983	Erosion	38.456757	-85.830473	92004352
34	11/13/2024 13:13	**684**	852	Header seam	38.456973	-85.831058	92004350
35	11/13/2024 13:16	**1818**	1129	Header	38.456738	-85.830964	92004352

MAP ID (see App C)	Timestamp	Irwin Reading (ppm)	Confirm Reading (ppm)	Comments	Latitude (WGS84)	Longitude (WGS84)	Irwin Instrument ID
36	11/13/2024 13:20	**7006**	2223	Well 487R	38.456657	-85.831022	92004352
37	11/13/2024 13:30	**744**		Erosion	38.457067	-85.831567	92004352
38	11/13/2024 13:34	**2424**	1106	Well 432R3	38.457974	-85.83186	92004350
39	11/13/2024 13:42	**11031**	19503	Well 452	38.458244	-85.831639	92004350
40	11/13/2024 13:46	**741**	1937	Well 435	38.459163	-85.832001	92005482
41	11/13/2024 13:50	**7713**	792	Well 455	38.459081	-85.83143	92004350
42	11/13/2024 13:56	**2757**	3642	Erosion	38.459344	-85.831523	92004352
43	11/13/2024 14:06	**796**	712	Erosion	38.459568	-85.831908	92004352
44	11/13/2024 14:21	**1948**	719	Well 337	38.459536	-85.835426	92004350
45	11/13/2024 14:26	**2177**	1863	Well 316	38.459278	-85.835996	92004350
46	11/13/2024 14:30	**728**	901	Erosion	38.459029	-85.835442	92004352
47	11/13/2024 14:34	**597**		Well 355R2	38.458805	-85.835211	92004352
48	11/13/2024 14:40	**12596**	1637	Well 314R	38.458727	-85.836002	92005482
49	11/13/2024 14:44	**1203**	946	Erosion	38.45819	-85.835618	92004352
50	11/13/2024 14:49	**1455**	747	Erosion	38.457991	-85.836277	92004352

Calibration and Instrument Information
EPA used three Elkins Irwin devices.

Irwin Calibration Data

	Irwin 50 (S/N 92004350)		Irwin 52 (S/N 92004352)		Irwin 82 (S/N 92005482)	
Measurement	Cal (ppm)	RT (sec)	Cal (ppm)	RT (sec)	Cal (ppm)	RT (sec)
1	491	1	490	0	497	0
2	491	3	490	2	496	0
3	491	0	490	3	497	0

*Cal = Calibration Gas Reading (ppm)
*RT = Response Time (sec)

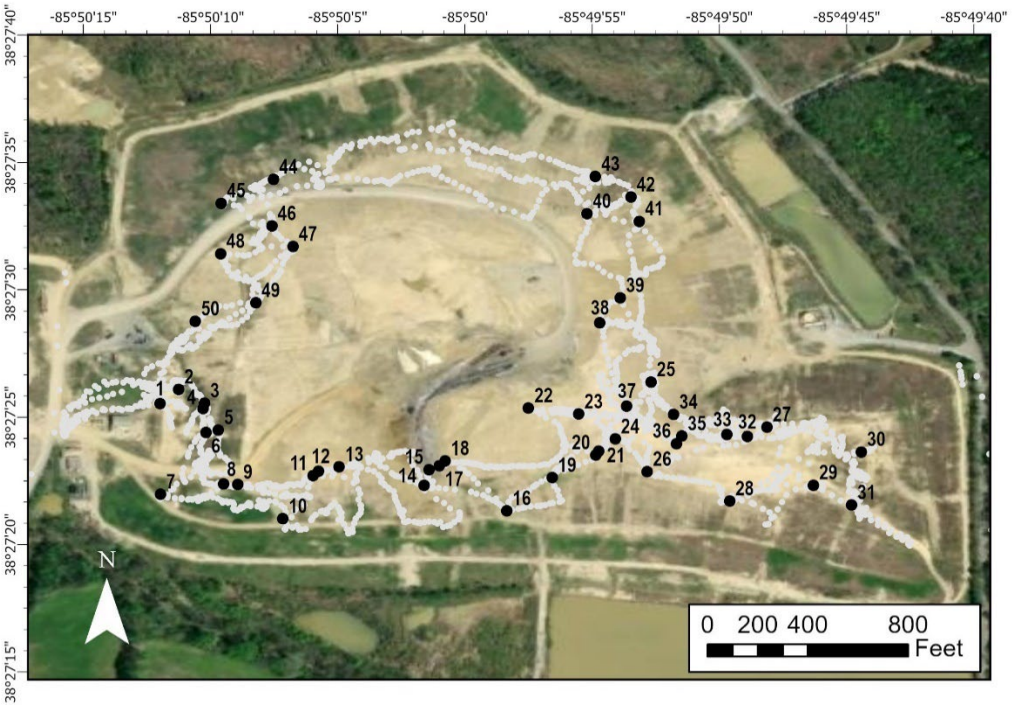
Background Readings:
Upwind: 0 ppm
Downwind: 0 ppm

EPA Calibration Gases

Composition	Lot #	Expiration
Zero Air	Atmospheric	N/A
Methane in air 500 ppm	304-402518883-1	8/2026

APPENDIX C: FIELD MEASUREMENT DATA MAPS

Recorded highest SEM hit locations are mapped on top of satellite imagery with the approximate monitoring path. The numbers correspond to MAP IDs that are presented in Appendix B.



Integrated GPS monitoring points collected every 10 seconds during SEM are mapped over satellite imagery of the landfill. Concentrations of methane (ppmv) are shown using a color scale. The 10 second readings stop when recording a max reading, leading to some variation relative to hits above.