REGION 8
DENVER, CO 80202

DATE: See date of Branch Manager signature

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Waste Connections – Front Range Landfill, Erie, CO

FROM: [redacted]
Enforcement and Compliance Assurance Division,
Air and Toxics Enforcement Branch

THRU: [redacted]
Enforcement and Compliance Assurance Division,
Air and Toxics Enforcement Branch

TO: File

BASIC INFORMATION

Facility Name: Front Range Landfill

Facility Location: 1830 Weld CR 5, Erie, Colorado 80516

Date of Inspection: October 18, 2023

EPA Inspector(s):

1. [redacted], Clean Air Act Inspector, EPA Region 8
2. [redacted], Clean Air Act Inspector, EPA Headquarters
3. [redacted], Clean Air Act Inspector, EPA NEIC

Front Range Landfill Attendees:

1. [redacted], District Manager
2. [redacted], Assistant District Manager
3. [redacted] Lead Site Operator
4. [redacted] Region Engineer
5. [redacted], Gas Technician

Contact Email Address: [redacted];

Purpose of Inspection: To determine Clean Air Act (CAA) compliance and perform a comparative Surface Emissions Monitoring (SEM) survey

Facility Type: Municipal solid waste (MSW) landfill

Regulations Central to Inspection: 40 C.F.R. Part 60, Subpart Cf (formerly subject to 40 C.F.R. Part 60, Subpart WWW); 40 C.F.R. Part 63, Subpart AAAA; Title V Permit Requirements of Operating Permit 97OPWE188

Date: **10/18/2023**
Arrival Time: 8:45 MDT
Departure Time: 13:30 MDT

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: Not a small business
☒ Provided CBI warning to facility

The following information was obtained verbally from Front Range Landfill (FRLF) representatives or through review of facility records.

Process Description:
Front Range Landfill (FRLF) is a municipal solid waste (MSW) landfill located near Erie, in Weld County, Colorado and is owned and operated by Waste Connections, Inc. FRLF is part of a larger facility which includes Denver Regional Landfill South (DRLS) (Operating Permit 03OPWE254), also owned by Waste Connections; Denver Regional Landfill North (DRLN) (Operating Permit 99OPWE215), owned by Allied Waste; and a landfill gas to energy plant (GTEP) owned by Timberline Energy (Operating Permit 10WE1096). Both Denver Regional Landfill South and Denver Regional Landfill North have stopped accepting waste since December 2020 and April 1992, respectively. The Timberline Energy GTEP receives and processes landfill gas from all three landfills. Only the operations covered under Operating Permit 97OPWE188 and within the boundaries of FRLF were inspected during the EPA inspection.

FRLF began accepting waste in 1996 and accepts MSW, construction and demolition debris, non-friable asbestos, and various contaminated soils. Asbestos wastes and PCS are buried at the working face when they are received. The landfill accepts white goods, but does not

conduct recycling, open burning, or composting. Its design capacity is approximately 348 million cubic yards or 35,768,342 megagrams (Mg). FRLF is expected to remain open until approximately 2040.

By itself, Front Range Landfill does not exceed the emissions thresholds of 34 and 50 Mg/yr of non-methane organic compounds (NMOC) above which emissions must be controlled. However, CDPHE conducted a single source determination in 2009 and determined that FRLF was to be considered a single source with DRLS and DRLN. Once Front Range Landfill became a single source with DRLS and DRLN, total facility emissions on an uncontrolled basis exceeded 50 Mg NMOC/year, and NSPS Subpart WWW required the existing gas collection and control system (GCCS) at DRLS and DRLN be expanded to FRLF. CDPHE informed FRLF of the single source determination and associated control requirements in a letter dated August 25, 2009, and established a deadline of April 1, 2010, for submission of a GCCS design plan, and of October 1, 2011, to install the GCCS. A GCCS and open flare began operation at FRLF on October 1, 2011, as required under the terms of Construction Permit 11WE1680.

FLRF receives approximately 7,000 - 9,000 tons of waste per day, a majority of which is MSW. Other wastes, such as construction and demolition waste as well as asbestos waste, are comingled for disposal with MSW. Since there are no dedicated monofils at the landfill, all portions of the landfill with waste-in-place for greater than five years are under active landfill gas (LFG) collection.

Condensate and leachate collected at FRLF is recirculated or managed via the leachate management system and/or managed in accordance with FRLF's operating plan. From June 2022 through May 2023, the landfill recirculated 274,100 gallons of leachate.

Based on the 2009 single source determination, an initial GCCS design plan was submitted April 1, 2010 and the initial GCCS was subsequently installed and began operation on October 1, 2011. At the time of the inspection, the GCCS consisted of approximately 60 vertical landfill gas extraction wells. The LFG collection system spans all areas where waste has been in place for at least 5 years.

FRLF's GCCS control system consists of two control devices rated to accommodate a combined inlet LFG flow of up to 3,200 standard cubic feet per minute (scfm). The control devices include one open (candlestick) flare with a capacity of 2,000 scfm and an on-site landfill GTEP with a rated maximum capacity of 1,200 scfm. The GTEP consists of two reciprocating internal combustion Caterpillar G3520C engines. On August 8, 2023, FRLF submitted a permit modification application to replace the 2,000 scfm flare with a 3450 scfm flare. According to a GCCS design plan prepared by FRLF on March 2, 2023 (2023 Design Plan), EPA Landfill LandGEM modeling predicts LFG generation of 4,165 scfm in 2024, with peak LFG generation in 2031 of 6,861 scfm and declining LFG generation thereafter. FRLF assumes 75% of LFG is captured through the GCCS, with the remaining 25% uncollected and venting directly through the landfill surface.

Surface Emission Monitoring:

According to the 2023 Design Plan, the GCCS is design to extract LFG at a sufficient rate to minimize subsurface lateral migration and surface emissions of LFG. Among other monitoring and operational practices, FRLF is required to conduct quarterly surface emission monitoring (SEM) to verify the GCCS' ability to minimize LFG migration. Methane concentrations above 500 ppm discovered during a SEM event are considered exceedances and require that FRLF perform corrective actions and follow-up monitoring to ensure the exceedance has been resolved. SEM exceedances are addressed by evaluating both the GCCS and intermediate/final cover systems.

A 2018 CDPHE inspection found FRLF out of compliance for failing to demonstrate repairs and follow-up monitoring after surface emissions were discovered. CDPHE Enforcement Case No. 2018-144 was opened because the source had a history of other noncompliance related to SEM, including failing to maintain SEM records in 2015 and failing to calibrate SEM equipment to approved background values of methane in 2016. The enforcement case was settled with an early settlement agreement on January 14, 2019 with a penalty of $5,100. Historic SEM methane exceedances above 500 ppm from past FRLF SEM surveys are included in Table 1 below.

Table 1. FRLF Historical SEM methane exceedance findings.

Monitoring Period	FRLF Historical Methane Exceedances			
Quarter	Q1	Q2	Q3	Q4
2024	8			
2023	0	5	3	6
2022	0	0	0	0
2021	0	0	0	0
2020	0	0	0	0
2019	0	0	0	1
2018	1	0	0	0

FRLF semiannual reports indicate that SEM is conducted in all accessible areas, including:

a) Areas of active fill under interim cover, where waste has been in place for > 5 years,
b) Areas that have waste in-place for more than 2 years and are closed or at final grade, and
c) Areas where GCCS components have been installed to meet regulatory requirements.

FRLF representatives confirmed that in-house SEM technicians monitor penetrations during surface emission monitoring. FRLF's 2023 Design Plan defines penetrations as "any landfill gas collection well or landfill gas collection device that completely passes through the landfill cover into waste and is located within an area of the landfill where waste has been placed and a gas collection system is required. Cover penetrations do not include items such as survey stakes, fencing or litter fencing, flags, signs, trees, and utility poles." As stated in FRLF's 2023 Design Plan, SEM excludes areas with potentially dangerous conditions including the following:

- roads;
- working areas and/or the working face;
- truck traffic areas;
- steep and dangerous slopes;

- icy, snow covered, and/or extremely muddy slopes; and
- areas where the landfill cover material has been exposed for the express purpose of installing, expanding, replacing, or repairing components of the GCCS, leachate, or gas condensate collection and removal systems.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:
EPA conducted a partial SEM and cover integrity survey of the facility. EPA used two ThermoFisher Toxic Vapor Analyzer 2020s (TVA2020) to perform EPA Reference Method 21 for the SEM survey. EPA confirmed each exceedance with both TVA2020s and also offered FRLF representatives the opportunity to visually confirm each exceedance above 500 ppm measured on the TVA2020s during the SEM survey. [redacted] and [redacted] of FRLF visually confirmed all exceedances. See Appendix C for additional instrument and calibration information.

The EPA SEM survey covered central and eastern slopes of the landfill, estimated to constitute roughly 30% of the area routinely monitored during quarterly SEM events. EPA did not monitor northern portions of the landfill in order to avoid the working face, which was designated as unsafe to monitor by FRLF staff. Areas monitored during the EPA SEM survey were selected in accordance with regulatory requirements, focusing on locations with visual indicators of elevated landfill gas (e.g., distressed vegetation, cracks, seeps, cover penetrations) and areas with sparse vegetation, which are also prone to elevated emissions. EPA inspectors recorded 6 points on the landfill surface where methane concentrations equaled or exceeded 500 ppm, including 4 exceedances recorded at penetrations and 2 exceedances recorded on the landfill surface. Note that exceedance #8 of Appendix B is labeled as a penetration exceedance, although it does not meet FRLF's definition of a penetration. See Appendix B for more details.

On the landfill slope where exceedances #3 - #5 were recorded, EPA observed a large continuous area with little to no vegetation and some erosion rills. These conditions were also noted near exceedances #6 and #7. Aside from these locations, the landfill cover was generally in good condition, with minimal erosion and well-established vegetation.

CLOSING CONFERENCE

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

Compliance Assistance: None.
Photos and/or Videos: were taken during the inspection. See Appendix A
Field Measurements: were taken during this inspection. See Appendix B.
Records: were not taken during this inspection. Publicly available records were reviewed as part of the inspection.

Concerns:
EPA recorded cover integrity and SEM exceedances issues during the inspection which were communicated to FRLF staff during the closing conference.

The locations of the methane exceedances were communicated to FRLF personnel during the closing conference. FRLF committed to addressing the methane exceedances in the same way that is required for exceedances identified through quarterly SEM and followed up with EPA to confirm correction of the exceedances and return to appropriate methane levels at the surface.

Review of the 2023 Design Plan revealed a few alternative requests that are not supported by EPA: 1) SEM exclusion areas and, 2) FRLF's interpretation of the cover penetration definition.

First, areas may be excluded from monitoring only if the act of monitoring an area poses a significant risk of death or injury of the person conducting the monitoring, and/or the act of monitoring an area would violate state or federal occupational safety standards. Consistent with the State Plan and NESHAP AAAA, slopes may be excluded from monitoring only if it is not practically feasible for the area to be monitored safely and legally during the quarter. Final design slopes should not be designed in such a way that prevents surface emissions monitoring (SEM) in applicable areas.

The working face (if above applicable waste) should only be excluded if there is active truck traffic and waste deposition on the day of monitoring – areas under daily cover where waste has been in place for greater than 5 years are still otherwise subject to SEM requirements. SEM should be scheduled around large-scale construction projects that would make significant areas of the landfill unsafe to monitor. SEM should be scheduled to avoid or minimize snowy, icy, or muddy surfaces, and within a weather window during the quarterly period that is conducive to monitoring in the preferred conditions. Excluding areas from monitoring that could have been safely and legally monitored during the quarter constitute a violation of the Clean Air Act. SEM reports should include detailed explanations for reasons of excluding any areas subject to the collection and control requirements of the regulations.

Finally, the FRLF 2023 Design plan incorrectly interprets the definition of cover penetration by shortening the full definition. Survey stakes, fencing including litter fences, flags, signs, utility posts, and trees would all be considered cover penetrations if they pass through the cover, according to the definition of "cover penetration" at 40 C.F.R. § 63.1990. The landfill cover includes that portion which covers the waste, as well as the portion which borders the waste extended to the point where it is sealed with the landfill liner or the surrounding land mass.

No other concerns were noted.

DIGITAL SIGNATURES

[redacted], Report Author

[redacted], Manager

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APPENDICES AND ATTACHMENTS

Appendix A: Digital Image Log

Appendix B: Field Measurement Data

Appendix C: Calibration Data

Appendix D: Maps of SEM Results and Satellite Imagery

Facility Name: Front Range Landfill
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APPENDIX A: DIGITAL IMAGE LOG

Photographer: [redacted] **Camera:** Canon PowerShot ELPH 100 HS (S43435)		
File Name	**Date/ Time (MST)**	**Description of Image**
IMG_0038.JPG	10/18/2023 10:28	Taken at the location of exceedance #3. Captures Well 37 surrounded by exposed waste and loosely packed dirt with no vegetation in the vicinity.
IMG_0039.JPG	10/18/2023 10:35	Taken at the location of exceedance #4. Image demonstrates a lack of vegetation in the vicinity.
IMG_0040.JPG	10/18/2023 10:42	Taken at the location of exceedance #5. Demonstrates the extent of several erosion rills in the area and a lack of vegetation in the vicinity of the exceedance.
IMG_0041.JPG	10/18/2023 10:59	Taken at the location of exceedance #6. Captures Well 31 surrounded by a mound of dirt with no vegetation in the vicinity. The red circle in the image is red spray paint used by facility staff to mark the main point of the exceedance after inspectors logged the location.
IMG_0042.JPG	10/18/2023 11:03	Taken at the location of exceedance #7. Captures Well 29 surrounded by a mound of dirt with no vegetation in the vicinity.
IMG_0043.JPG	10/18/2023 11:09	A duct-taped seal on a collection well under vacuum. Ambient air being sucked into the pipe through the duct-taped seal was audible.
IMG_0044.JPG	10/18/2023 11:19	Exposed waste and some erosion on the surface of the landfill.
IMG_0045.JPG	10/18/2023 12:08	Taken at the location of exceedance #8. Captures an unnamed isolation valve and concrete pillar penetrations with no vegetation in the vicinity.

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APPENDIX B: FIELD MEASUREMENT DATA

Measured Exceedances

#	Reading Time	Well / Location / Description/ Observations	Reading (ppm)	Conf. Reading (ppm)	Latitude	Longitude	Media Records
1	9:59 AM	Downwind reading *Not exceedance*	0		N 40.02063	W -105.01585	
2	10:04 AM	Upwind Reading *Not exceedance*	0		N 40.01824	W -105.00865	
3	10:23 AM	Well 37 penetration exceedance. Inspectors noted no vegetation and presence of exposed waste.	12000	30000	N 40.02198	W -105.01184	IMG_0038.JPG
4	10:30 AM	Surface exceedance with elevated methane readings in the general vicinity. No vegetation was noted.	600	600	N 40.02215	W -105.0123	IMG_0039.JPG
5	10:37 AM	Surface exceedance recorded in a small 6"X6" erosion rill. No vegetation was noted.	1200	750	N 40.02212	W -105.01262	IMG_0040.JPG
6	10:55 AM	Well 31 penetration exceedance. Elevated readings were also recorded in the general vicinity of the well. No vegetation was noted.	600	600	N 40.02086	W -105.01368	IMG_0041.JPG
7	11:01 AM	Well 29 penetration exceedance, specifically on the extraction well penetration. No vegetation was noted.	650	1600	N 40.02011	W -105.01353	IMG_0042.JPG
8	12:03 PM	Exceedance recorded at an isolation valve penetration at the edge of the waste mass near the flare. Exceedances noted at both the valve penetration and the northwestern post, and methane was elevated in the general area as well. No vegetation was noted.	1600	2500	N 40.02188	W -105.00903	IMG_0045.JPG

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APPENDIX C: CALIBRATION DATA

EPA used two ThermoFisher Toxic Vapor Analyzer 2020s (TVA2020). The EPA TVA2020 response times are in the 4 to 5 second range.

- [redacted] used the EPA TVA 2020 #C01087 with an extension probe for the duration of the survey.
- [redacted] used the EPA TVA 2020 #C01086 with an extension probe for the duration of the survey.
- Both EPA TVA2020s were used to confirm all exceedances.
- Front Range Landfill staff did not operate a TVA or similar instrument during the survey.
- Front Range Landfill staff were shown readings on EPA instruments for visual confirmation of exceedances.

TVA2020 Calibration Gas Readings: TVA # C01086 w/ extension probe			
Calibration/Drift Check Time	**Zero ppm**	**500 ppm**	**10,000 ppm**
10/18/2023, 8:00 AM initial calibration reading	0.6 ppm	498 ppm	10,000 ppm
10/18/2023, 1:30 PM end of day drift check		490 ppm	

TVA2020 Calibration Gas Readings: TVA # C01087 w/ extension probe			
Calibration/Drift Check Time	**Zero ppm**	**500 ppm**	**10,000 ppm**
10/18/2023, 8:00 AM initial calibration reading		515 ppm	10,020 ppm
10/18/2023, 1:30 PM end of day drift check		507 ppm	

EPA Calibration Gases			
Manufacturer	**Composition**	**Lot #**	**Expiration**
GASCO	Zero Air	1-114-61	05/2024
GASCO	500 ppm CH4	1-112-80	05/2024
GASCO	10,000 ppm CH4	1-070-80	05/2024

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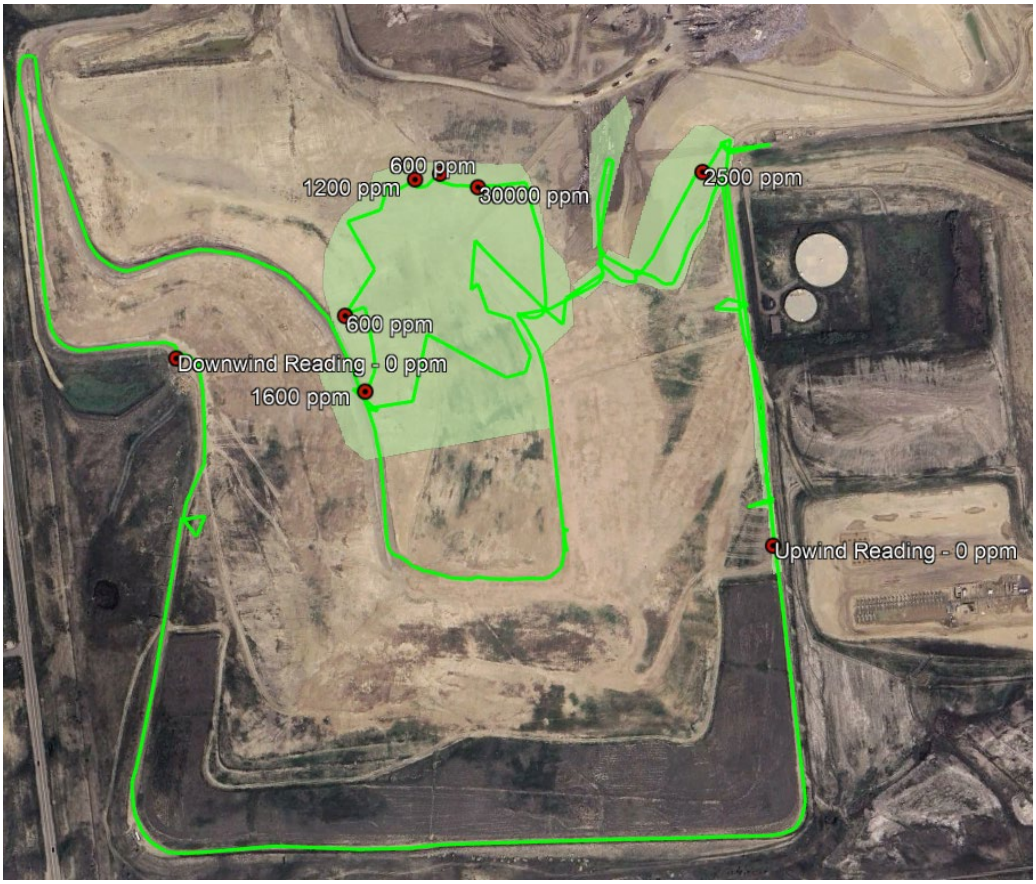
APPENDIX D: MAPS OF SEM RESULTS AND SATELLITE IMAGERY

SEM hit locations plotted over satellite imagery from September 4, 2023 as depicted on Google Earth. Approximate monitoring path and monitored areas included (green line and green highlight), derived from GPS data.



Detail view of exceedances in the central portion of landfill

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Google Earth satellite imagery from September 4, 2023, demonstrating extensive erosion rills and sparse vegetation on the central slope of the landfill near exceedances #3 – #5

Google Earth satellite imagery from September 4, 2023, demonstrating erosion rills and sparse vegetation on the western slope of the landfill near exceedances #6 and #7.