



Clean Air Act Compliance Inspection Report

United States Environmental Protection Agency
Region 10 – Seattle, WA

Clean Air Act Partial Compliance Evaluation Emission Test Observation

City of Lynnwood Wastewater Treatment Facility

Edmonds, Washington

Inspection Date: October 12 and 13, 2022

SARA CONLEY

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Sara Conley

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Attachments

Attachment 1	EPA Region 10 Inspection Digital Image Log
Attachment 2	Final Stack Test Report

1. Basic Facility and Inspection Information

Facility:	City of Lynnwood Wastewater Treatment Facility
Physical Address:	17000 76TH AVE W, EDMONDS, WA 98026
ICIS-Air ID:	WAPSC0005306116096
Permit Number:	Title V permit has not been issued
NAICS:	221320 – Sewage Treatment Facilities
Facility Contact:	John Ewell, PE – Treatment Plant Supervisor Office: 425-670-5250 Email: jewell@LynnwoodWA.gov
U.S. EPA Inspector:	Sara Conley Air and Toxics Enforcement Section (ATES) Enforcement and Compliance Assurance Division (ECAD) U.S. EPA Region 10 1200 Sixth Ave. Seattle, WA 98101 (206) 553-6914 conley.sara@epa.gov
Dates of Inspection:	October 12 and 13, 2022
Date of Report:	February 10, 2023
Inspection Notice:	Announced
Purpose of Inspection	The purpose of this inspection was to observe emission testing designed to assess the effect of filter temperature on HCl emissions measured using Method 26A. The testing is also designed to address the emissions from the plume suppression air, if any. This testing is not meant to take the place of annual compliance testing.

Disclaimer

This report is a summary of observations and information gathered from the facility at the time of the inspection. The information provided does not constitute a final decision on compliance with CAA regulations or applicable permits, nor is it meant to be a comprehensive summary of all activities and processes conducted at the facility.

2. Introduction

- a) We have been hearing from the City of Lynnwood and their consultants about a possible NH₄Cl interference they believe is causing elevated HCl emissions data during M26A testing required in 40 CFR Part 62 LLL. The facility has conducted previous engineering testing to determine the cause of their HCl emissions, but EPA has not been present for those tests.
- b) The facility provided the test schedule included below in advance of the stack test.

Lynnwood Test Matrix - Week of 10/9/22						
Date	Time	Activity				
Tuesday 10/11/22	8:00-12:00	Travel to site				
	12:00-15:00	Setup				
	15:00-17:00	Ramp test on FTIR for HCl from ~350F to stack temp				
Wednesday 10/12/22	8:00-16:00	Method 5/26A on Stack				
		-Two x 2 hour test runs				
		-Two sample trains simultaneously				
		-Train 1 probe/filter at stack temp				
		-Train 2 probe/filter at M26A temp				
		-FTIR Temps TBD but will be recorded				
Thursday 10/13/22	8:00-16:00	Method 5/26A on Air preheat and Stack				
		-Two x 2 hour test runs				
		-Two sample trains simultaneously				
		-Run 1 probe/filter at stack temp				
		-Run 2 probe filter at stack M26A temp				
		-FTIR on stack, match stack 26A temp				
		Method 5/26A on Stack (added on 10/13/22)				
Thursday 10/13/22	Added Thursday 10/13	- One x 1-hour test run				
		- Two sample trains simultaneously				
		- -Train 1 probe/filter at FTIR cell temp				
		- -Train 2 probe/filter at M26A temp				

3. Inspection Elements and Field Observations – October 12, 2022

- a) I arrived onsite at 8:05 am. I entered the office and introduced myself to John Ewell and Steve Nelson. We began the opening conference immediately. I explained that I was onsite to observe the engineering stack test and that I would be travelling between the stack, the control room, the trailer, and the onsite lab. I also mentioned that I would be interviewing the facility staff and the stack testers. John Ewell agreed to all of this. I

asked if there was anything that the facility might consider confidential business information and John said that there was nothing confidential.

- b) Steve started off the conversation and described preliminary work done on 10/11. The stack testers arrived at the facility and set up the sample lines. As part of this process, they measured HCl using the FTIR while they heated the sample line from 150F to 350F taking measurements at 250F as well. They had preliminary data on-site that showed increasing concentrations of HCl and NH₄ with increasing temperature in the filter and the sample line. We discussed the testing plan for the day and reviewed the sample matrix that was provided by email and is in Section 2 above.
- c) Staff on-site at the facility include Tanner Boyle who works in the WWTP Lab for the City of Lynnwood. Ryan Reynolds - Control Room Operator, John Gunn – Operator IV, Zach Hickey – Operator II, Matt Griep – Operator 1.
- d) Staff on-site with Mostardi Platt:
 - a. Rich Solars – Director of Western Operations
 - b. Kyle Jones – Project Supervisor
 - c. Angelo Sorce – Test Engineer
- e) At 8:45 am I entered the control room and spoke with the incinerator operator, Ryan Reynolds. He explained the information about the stack that is displayed on the large control panel, which is a display of the data in their SCADA system. He explained that the stack information displayed via the SCADA system is measured just below the point in the system where the plume suppression air is added. The “scrubber cooler gas out temperature” is the temperature of the gas after it exits the scrubber before it encounters the plume suppression air. I noticed that they had a ppm measurement displayed and a percentage displayed along with the stack data and asked what they were. The ppm measurement is from their O₂ CEMs which is a CO and O₂ CEMS. Oxygen percentage at the stack and the CO concentration in ppm are measured constantly and recorded in the SCADA system.
- f) Parameters in the Control Room at 8:45
 - a. Freeboard Temperature: 1507 F
 - b. Out Temp (post Freeboard): 1490F
 - c. Quench supply: 100gpm
 - d. Delta P Venturi Throat: 27” WC
 - e. Stack Exhaust: 149F
 - f. Scrubber Cooler Gas Out: 72F
 - g. Stack Out: 150F
 - h. CO CEMS reading: 54ppm (not used)
- g) Run 1 Began at 9:40 am. O₂ was 17.4% and CO₂ was at 2.9% at 9:45am. The FTIR was reading 0.15 ppm for HCl. FTIR inlet temp 191.1 C and FTIR cell temperature 191.0 C. Today the facility is conducting two 120-minute 2-runs tests for HCl using Method 26A. One test has the filter at stack temperature and the other is at the required filter temperature for Method 26A, 250F.
- h) Parameters in the Control Room at 9:47
 - a. Freeboard Temperature: 1514 F
 - b. Out Temp (post Freeboard): 1501 F
 - c. Mid incinerator: 1351F
 - d. Quench supply: 100gpm
 - e. Delta P Venturi Throat: 28” WC
 - f. Stack Exhaust: 149F

- g. Scrubber Cooler Gas Out: 72F
- h. Stack Out: 152F
- i. CO CEMS reading: 66ppm (not used)
- j. Drain pH 6.12
- k. Stack O2: 10.7%
- i) I observed the end of the run at the stack. I met with Kyle Jones and Angelo Sorce of Mostardi Platt on the stack. The testers completed the leak check, positive, and negative pressure check and the zero, all passed. They also checked all the temperatures. I observed the filter removal and the acetone rinses required by Method 5.
- j) I returned to the lab for sample analysis. I observed Rich Solars recover the sample from Run 1. Rich ran calibration curves on the ion chromatograph. Rich also recovered the two filters collected during Run 1. The filters are placed into labeled dishes and not placed in a desiccator as they were in the April compliance test. Rich explained that the filters will be weighed again in the Mostardi Platt lab. Rich did weigh the filters from Run 1 and Run 2. The probe rinse was about 7.5% of the total for the last compliance test, this will be assessed in the lab later.

Table 1: Method 5 Preliminary Results from Different Filter Temperatures

Method 5 PM 10/12/2022	Run 1 mg/dscm 7%	Run 2 mg/dscm 7%	Average mg/dscm 7%
@ Stack temp 160F	43.5	39.5	41.5
Method Temp 250F	41.1	35.9	38.5

Table 2: Test Report Method 5 Results from Different Filter Temperatures

Method 5 PM 10/12/2022	Run 1 mg/dscm 7%	Run 2* mg/dscm 7%	Average mg/dscm 7%
@ Stack temp 160F	41.165	35.179	38.172
Method Temp 250F	40.943	36.231	38.587

*The Run 2 filters show an increase in weight between the on-site measurement and the final measurement for the filter at Method 26A temp and a decrease in weight for the filter at stack temp. We don't see this for Run 1.

- k) FTIR values for Run 1 are averaging about 0.1ppm but are not corrected and will be processed by Laura for the final test report.
- l) Run 2 began at 12:50PM.
- m) FTIR values for this run look like non-detect but the baseline may have drifted so we may have to wait for the work-up after Run 2. At the start of Run 2 the FTIR temperature in the line and filter was shifted toward 160F. Run 1 was conducted at 250F for the FTIR filter and line.
- n) At 13:25 O2 is at 17.1% and CO2 is at 3.1%.
- o) At 13:30 I am waiting for the Run 1 samples to be run on the IC. The first sample is the Run 1 at stack temperature, a duplicate was run and measured the same as the first. The

next sample analyzed on the IC was the Run 1 sample collected using the required filter temp for M26A, 250F. I observed the laboratory portion of Method 26A that took place in the lab at the WWTP. The IC column tubing is labeled with an installation date of 3/18/22.

- p) Parameters in the Control Room at 14:58
 - a. Freeboard Temperature: 1513 F
 - b. Out Temp (post Freeboard): 1495 F
 - c. Mid bed incinerator: 1350F
 - d. Quench supply: 100gpm
 - e. Delta P Venturi Throat: 27" WC
 - f. Stack Exhaust: 149F
 - g. Scrubber Cooler Gas Out: 73F
 - h. Stack Out: 155F
 - i. CO CEMS reading: 61ppm (not used)
 - j. Drain pH 6.12
 - k. Stack O2: 10.3%
- q) Run 2 completed at 15:05.
- r) In the onsite lab I watch Rich Solars prepare the samples for the IC and recover the filters. The stack temperature sample for run 2 is the first run on the IC. Sulfates have a very large peak that is not able to finish coming off the column in time for the next run. Rich investigates if it is a problem with the IC. After running another DI sample, the sulfate peak clears, and he runs the 250F sample from Run 2, it shows the same sulfate peak seen in the first run. Rich also tests the reagent to see if it was contaminated but ultimately concludes the Sulfate peak is real and makes a note for their lab who will re-run the samples.
- s) Left for the day at 16:30.

Table 3: Results from Day 1 M26A testing at two filter temperatures

Method 26A HCl	Run 1 ppm 7% O2	Run 2 ppm 7% O2	Average ppm 7% O2
@ Stack temp 160F	0.73	0.76	0.75
Method Temp 250F	0.53	0.69	0.61

Table 4: Day 1 FTIR Results

Condition of sample train	HCl ppmvd @7% O2
@ Stack temp 160F	0.09
Method Temp 250F	0.17
Method 320 Temp	0.78

Table 5: Day 1 Final Reported Values for Method 5 and Method 26A

10/12/2022	Method 5 PM mg/dscm 7% O2*	Method 26A HCl ppm 7% O2**
@ Stack temp 160F	38.17	0.75
Method Temp 250F	38.59	0.61

* Part 62 Subpart LLL PM limit is 18 milligrams per dry standard cubic meter @7% O2,

**HCl emission limit is 0.51 parts per million by dry volume @ 7% O2.

4. Inspection Elements and Field Observations – October 13, 2022

- a) I arrived onsite at 8:10AM and met with Steve Nelson in the office. John Ewell is here but has an online training all day. Today the testing will consist of two 2-hour runs measuring emissions from the plume suppression air and from the stack. Run 1 will start at 8:30 and will keep the Method 26A filters at stack temp. There is some discussion of testing the second run at 250F. Rich and Laura will discuss.
- b) Parameters in the Control Room at 10:25
 - a. Freeboard Temperature: 1439 F
 - b. Out Temp (post Freeboard): 1478 F
 - c. Mid incinerator: 1352F
 - d. Quench supply: 100gpm
 - e. Delta P Venturi Throat: 27" WC
 - f. Stack Exhaust: 148F
 - g. CO CEMS reading: 80ppm (not used)
 - h. Drain pH 6.16
 - i. Stack O2: 11.38%
- c) In the lab at 11:30 they are about to start Run 2. Laura, Steve, and Rich decided to run this test at 250F, the Method 26A temp, for both the stack and the duct/plume air. Run 2 starts at 11:35am.
- d) The results from Run 1 for the duct and the stack sample show an HCl peak from the duct air but it is about a magnitude lower than the values that are coming out of the IC for the stack sample. I will summarize the results for both runs below. The HCl values for Run 1 from the duct/plume suppression air are about 10% of what is measured out of the stack for Run 1.
- e) The duct sample filter collected in Run 1 showed no weight gain.
- f) Laura will work up the FTIR data and send it to Steve at a later time. The FTIR for Run 1 was at stack temp and was gradually increased to 250F. For Run 2 they are starting the run at 250F and increasing the temperature to 350F.
- g) After seeing the results of the first two runs the facility decided to conduct one hour long run at 350F or as high a temperature that the probe can reach if it cannot reach 350F.
- h) All testing was done using a teflon filter and a teflon frit. The filter specifications are included in photo PA130071.JPG.
- i) The stack reheat air comes from a duct between the buildings and has two filters on the intake. There is a photo of the area between the buildings (PA130067, PA130068) and a

photo of the intake vents (PA130069) in the photo log. The stack reheat air flows through the primary heat exchanger prior to entering the incinerator and flows through the secondary heat exchanger to the quench.

- j) I spoke with Ryan Reynolds and Zach Hickey in the control room and asked them about any changes to the system since 2019. Ryan mentioned the facility switched the pump they used to feed cake into the incinerator and the new pump cannot feed cake that is too dry. They now run at about 30% moisture in the cake. Since the cake is so wet, they have to use diesel fuel in the incinerator to meet the required temperatures in the bed. I also asked about the tarp near the top of the secondary heat exchanger and the drips I saw in photos (PA120051-PA120054). Ryan said the liquid is highly corrosive and is eating away at surfaces it comes in contact with. The plugging issue was another change after 2019. Once they fixed the expansion joint, they tried to stop the plugging. The wet sludge has to be fed very slowly to prevent plugging. Ryan thinks this was not an issue when they had the other pump and could run drier cake. Zach also mentioned the removal of the quench sprays in the freeboard because they had fouling issues.
- k) Run 2 ended at 13:45.
- l) Preliminary results for testing on the plume suppression air and the stack.

Table 6: Day 2 Preliminary HCl Results Method 26A testing on stack and duct

Method 26A HCl	Run 1 ppm 7% O2 @160F	Run 2 ppm 7% O2 @255F	Average
Duct/plume suppression air	0.05*	0.04*	0.05*
Stack	1.08	0.76	0.92

*Plume suppression air was not oxygen corrected.

- m) Run 3 will start at 14:30 and run for one hour at 350F.
- n) Run 3 on the FTIR showed elevated HCl readings.
- o) The IC showed an elevated sulfate peak again on the sample for Run 3. We saw this in the samples collected in the afternoon on the 12th.

Table 7: Day 2 Run 3 HCl results for Method 26A at FTIR temperatures and FTIR at Method 321 Temperatures.

Condition of sample train	M26A HCl ppmvd @7% O2	FTIR HCl ppmvd @7% O2
Method 320 Temp	0.63	1.57

Table 8: Day 2 Final Reported Values for Method 5 and Method 26A

10/13/2022	Method 5 PM mg/dscm 7% O2*	Method 26A HCl ppm 7% O2**
@ Stack temp 160F	56.00	1.08

Method Temp 250F	49.12	0.72
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* Part 62 Subpart LLL PM limit is 18 milligrams per dry standard cubic meter @7% O₂,

**HCl emission limit is 0.51 parts per million by dry volume @ 7% O₂.

5. Closing Conference – October 13, 2022, 15:54

Attending: John Ewell – Lynwood

Steve Nelson – Coal Creek Environmental

p) I started off the meeting asking about the CO CEMS listed in the SCADA readout. Steve said that the CO CEMS is located such that it is influenced by the plume suppression air. He thinks that the unit is not trustworthy. (10/12 Run 1 CO data from the test report shows a value of 28.98 ppm @7% O₂, my instant read during Run 1 was 66ppm CO not corrected). I also mentioned the leaking and moisture that I saw near the top of the secondary heat exchanger. John noted that the hot gas is hitting the cooler and condensing, they just put a new plug in that location, and it started leaking. I asked about the moisture level of the sludge cake; John said the cake is at 20% moisture and they want it dryer. He said the values are in line with the incinerator manufacturer and they have looked into this issue with the manufacturer. John noted that the pumping system was new in 2016, not 2019. He also stated that deposition at the crossover has been helped by slowing the feed rate and increasing the combustion zone temperature. Steve and John confirm that there will be a test report with the final data.

q) Left for the day at 17:40

6. Post inspection

We received the Stack Test report on January 27, 2023, from City of Lynnwood. The test report included some information about a filter study conducted by Mostardi Platt after the inspection regarding NH₄Cl interference with Method 26A. The test is briefly described in Section 3.0 of the final test report. Appendix G of the final report includes the data sheets from the filter study. The report does not present the results of the NH₄Cl filter study.