2024 COMPLIANCE TEST REPORT TEST REPORT FOR WET SCRUBBERS AT MICROCHIP'S GRESHAM FACILITY, GRESHAM, OR

PERMIT 26-3240-ST-01

Prepared for:

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Date Prepared:
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Source Test Date:
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March 1-2, 4-6, 2024

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ENVIRONMENTAL SOLUTIONS

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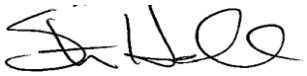
ACRONYMS AND ABBREVIATIONS

acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials International
cal	calibration
CO	Carbon monoxide
CO_2	Carbon dioxide
DL	Detection Limit
dscfm	dry standard cubic feet per minute
EPA	United States Environmental Protection Agency
^oF	degrees Fahrenheit
FTIR	Fourier Transform Infrared Spectroscopy
HAP	Hazardous Air Pollutant
HF	Hydrogen Fluoride or Hydrofluoric Acid
HCl	Hydrogen Chloride or Hydrochloric Acid
H_2O	Water or moisture
lb/hr	pounds per hour
MDL	Minimum Detection Limit
MDC	Minimum Detectable Concentration
Microchip	Microchip Technology Incorporated
MW	Molecular Weight
NIST	National Institute of Standards and Technology
O_2	Oxygen
ODEQ	Oregon Department of Environmental Quality
ppmv	parts per million by volume
QA/QC	Quality Assurance/Quality Control
Scfm	standard cubic feet per minute
Spectrum	Spectrum Environmental Solutions
STP	Source Test Protocol

PROJECT REPORT COMPLIANCE REVIEW

Project Title: COMPLIANCE TEST REPORT
Twelve Wet Scrubber Effluent Testing at Microchip's Gresham Facility, Gresham, Oregon
ODEQ PERMIT 26-3240-ST-01

To the best of my knowledge, I certify that all data collected for this project are accurate and authentic and were taken in accordance with the appropriate source test methods. All data have been audited for entry accuracy, and all computer spreadsheets have been validated.



Date: 5/3/2024

Steven E. Hall
VP – Monitoring
Spectrum Environmental Solutions

STATEMENT OF LIMITATIONS

Final Report:
This report is intended for the sole use of Microchip Technology Incorporated. The scope of services performed for this work may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

1.0 INTRODUCTION

Microchip Technology Incorporated (Microchip) contracted Spectrum Environmental Solutions (Spectrum) to carry out compliance testing on twelve (12) scrubber outlets located at their fabrication facility (Fab 4) in Gresham, Oregon. This compliance testing is specific to emissions of Hazardous Air Pollutants (HAPs) and was completed to demonstrate compliance with Permit 26-3240-ST-01 (initially issued in 2019 and modified in June, 2023). The particular HAPs monitored were hydrogen fluoride (HF) and hydrogen chloride (HCl).

Spectrum performed FTIR and flow measurements as required to demonstrate compliance with Microchip's air permit. The permitted emissions criteria for demonstrating compliance are:

- A facility-wide volumetric flow-weighted average emission concentration limit of 1 ppmv or less for HF and
- A facility-wide volumetric flow-weighted average emission concentration limit of 1 ppmv or less for HCl.

Emissions requirements for the wet scrubbers are stated within Permit 26-3240-ST-01 and the permit, in its entirety, is provided in Appendix C.

To support the permitted hazardous air pollutant (HAP) requirement, HF and HCl concentration data was collected at each wet scrubber outlet on an individual basis. The volumetric flow rate at each scrubber outlet was also measured.

1.1 ANALYTES MONITORED

HF, HCl, carbon dioxide (CO_2), oxygen (O_2), and moisture were the analytes monitored as part of the test campaign. Data was collected on each wet scrubber outlet for determination of total emitted HF and HCl concentration. FTIR measurements for HF, HCl, CO_2 and moisture were performed in accordance with ASTM D6348-12 "Standard Test Method for Determination of Gaseous Compounds by Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy".

Three one-hours runs were performed at each of the 12 scrubbers located atop of Buildings 4-1 and 4-2. The FTIR concentration results for HF, HCl, CO_2, and moisture were determined at a once per minute frequency. Since volumetric flow-weighted average emission rates were required to satisfy permit requirements, the total volumetric flowrate at each wet scrubber outlet was also measured. The flowrate was measured in accordance with EPA Reference Methods 1 and 2 once per run for a total of three flow measurements per wet scrubber. The measured concentration results, in combination with the measured flowrates, were used in determination of the facility-

wide flow-average concentrations. Table 1-1 presents a summary of the monitoring test parameters and methods used for this test program. Additional discussion of the sampling methods and the results are presented in Sections 3.0 and 4.0 of this document.

TABLE 1-1. PARAMETERS TESTED

Parameter	Units	Method	Location
Volumetric Flow Rate	dscfm, acfm, scfm	EPA RM 1-3	Wet Scrubber Exhaust
Moisture	Percent by Volume	FTIR by ASTM D6348-12	
Gas Molecular Weight (O_2)	Percent by Volume	Modified EPA RM 3	
Carbon Dioxide (CO_2)	Percent by Volume	FTIR by ASTM D6348-12	
HF	ppmv, lb/hr	FTIR by ASTM D6348-12	
HCl		FTIR by ASTM D6348-12	

dscfm – dry standard cubic feet per minute
acfm – actual cubic feet per minute
scfm – standard cubic feet per minute
lb/hr – pounds per hour
ppmv – parts per million by volume
RM – Reference Method

1.2 APPLICABLE PERMIT REGULATIONS

Microchip operates under the ODEQ Standard Air Contaminant Discharge Permit 26- 3240-ST-01 originally issued in 2019 and revised on June 6, 2023. The following are applicable excerpts from the permit pertinent to the wet scrubber testing:

> ***3.2. Acid Gas Emissions***
> *The permittee must control acid gases from Building 1 and Building 2 manufacturing operations with wet scrubber systems that achieves a minimum 90% DRE. As an alternative, the permittee may meet a facility-wide volumetric flow-weighted average emission concentration of 1 part per million by volume (ppmv) of HF and 1 ppmv of HCl, using results of a performance source test.*

The compliance demonstration via source testing was performed on the Wet Scrubbers in accordance with the testing requirements in 2023 permit modification Section 6.1(c), (d), (e)(iv), (e)(v), (f), (g), (h), (i), and (j) which state:

> ***6.1. Testing Requirements***
> *The permittee must conduct a source test of the control devices as specified below: [OAR 340-212-0120]*
>
> *c. Source testing must be conducted while the facility is operating within 90% its normal operating capacity at the time of the test. Sampling must take place under worst*

case operating conditions observed during normal operations (i.e., redundant control devices should not be operating during testing);

d. Gas concentrations must be sampled at the inlet and outlet of each wet scrubber system and each RCTO to demonstrate the system's DRE. The source test report must include the DRE demonstrated during each test run as well as the average DRE for the three test runs. As an alternative, the permittee can sample only the outlet of the wet scrubber systems to demonstrate compliance with the 1 ppmv HF and HCl limitations as listed in Condition 3.2;

e. During each source test the following parameters must be monitored and recorded:

iv. Recirculation flow rate and pH of the wet scrubbers; and

v. Other facility/process operating parameters identified prior to the test.

f. Only regular operating staff may adjust the combustion system or production processes and emission control parameters during the source test and within two hours prior to the tests. Any operating adjustments made during the source test, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source test invalid;

g. A pretest plan for each source test required above must be submitted for approval to DEQ's Source Test Coordinator at the ODEQ Northwest Regional Office, at least 30 days prior to testing;

h. The reference test methods identified in the table below must be utilized in the source tests identified above. A test method modification/variance or substitution of an alternative test method must be pre-approved by the DEQ's Source Test Coordinator and

i. All tests must be conducted in accordance with the DEQ's Source Sampling Manual and with the pretest plan. All test data and results must be submitted to the Source Test Coordinator for review within 60 days after completion of the testing cycle unless an alternate submission date or extension is approved by DEQ.

j.

Reference Test Method	***Tested pollutant/parameter***
EPA 1&2	*Flow Rate*
EPA 3	*Dry Molecular Weight*
EPA 4 or ODEQ Method	*Moisture*
EPA 25A	*Total VOC*
EPA 26, 26A, 320 or ASTM D6348-12	*HF & HCl*

1.3 TEST PROGRAM SUMMARY

The monitoring group of Spectrum Environmental Solutions of Austin, Texas was contracted to conduct the compliance testing for the wet scrubber effluent emissions. This source testing was conducted between February 29 and March 1-2, 4-6, 2024 to satisfy the testing and emissions requirements for HF and HCl.

1.3.1 PROJECT LEADS

Table 1-2 summarizes the responsible parties involved with this test campaign.

TABLE 1-2. TEST PROGRAM SUMMARY

Category	Description
Project Name	Compliance Testing of Microchip's 12 Wet Scrubber Units
Equipment Owner	Microchip Technology Incorporated 21015 Stark Street Gresham. OR 97030
Facility Contact	Becky Kim Environmental Engineer Microchip Technology Incorporated 21015 Stark Street Gresham. OR 97030 (971)-266-7887
Equipment Tested	12 Wet Scrubber Outlets
Equipment Location	Building 4-1 and Building 4-2 Microchip Technology Inc. 21015 Stark Street Gresham, OF 97030
Regulatory Agency	ODEQ
ODEQ Permit No.	26-3240-ST-01
Source Test Firm	Spectrum Environmental Solutions 2340 West Braker Lane, Suite A Austin, TX 78758
Source Testing Project Manager	Steve Hall Phone (512) 587-1386 steve@spectrumenvsoln.com

1.4 SOURCE TEST PROTOCOL

A source test protocol was submitted, reviewed, and, after negotiations, approved by ODEQ ahead of the onsite testing. Appendix E contains the protocol and subsequent approval notification.

There are no limitations on the results reported herein that would prohibit them from use for compliance with applicable parts of Microchip's Air Contaminant Discharge Permit. Only a single deviation was required for this testing and is listed in Table 1-3 below.

TABLE 1-3 TEST PROTOCOL DEVIATION

Location	Description	Action	Data Impact
PEN-001 flow traverse	During velocity flow traverse on the vertical port of PEN-001, the last two points were inaccessible due to water at the bottom of the vertical stack.	The 6th point of the traverse was recorded in triplicate and the cross-sectional area of the duct adjusted to account for the area submerged by water.	Insignificant – The dP readings within the duct were relatively stable thus, the loss of measurement of these two points is not believed to have negatively impacted the flow nor subsequent calculation of flow-weighted average..

2.0 EQUIPMENT AND PROCESS DESCRIPTION

2.1 FACILITY DESCRIPTION

Microchip's Fab 4 facility conducts semiconductor manufacturing operations and processes. The wet scrubbers are used to abate water-soluble pollutants from the acid and ammonia process exhaust streams. Microchip further segregates their acid and ammonia process effluents sending them to wet scrubbers designed and operated to abate acid and ammonia gas streams. Microchip operates the wet scrubbers on a 365 x 24 schedule.

2.2 SOURCE DESCRIPTIONS

The wet scrubbers in Building 4-1 and 4-2 are vertical counter-current, packed-bed, abatement devices. Each scrubber contains about 7' to 9' of packing material used to optimize water-to-gas interactions. The wet scrubbers are located at each building as follows:

- Four (4) wet scrubbers are located at Building 4-1,
- Eight (8) wet scrubbers are located at Building 4-2.

The Scrubbers operate as follows:

- Fab 4 process gas is drawn into the bottom of the scrubber. Water is pumped from a sump in the bottom of the scrubber and distributed to a series of spray nozzles. The spray nozzles evenly distribute water atop the 7' to 9' height of packing material where the mass transfer of pollutants in the exhaust air to the water takes place as the water drops through the packing.
- In the scrubber mass-transfer zone, the flow of gas is opposite to the water flow and is very turbulent due to the flow disruption caused by the packing material. The combination of the packing and the water spray nozzles optimize gas-to-liquid mass transfer interaction in which HF and HCl are dissolved in the scrubbing solution.
- The treated exhaust air flows through a fan to the exhaust stack for atmospheric discharge.

The scrubbing solution in the scrubber sump is pH controlled and has recirculation, blowdown, and water make-up rates that have been set by the manufacturer and/or Microchip specifications to assist in soluble gas removal efficiency.

A set of three PES units are located at both Buildings 4-1 and 4-2 and are wet acid scrubbers. All six acid scrubbers use sodium hydroxide to control the pH of the scrubber liquor. Both Building 4-1 and 4-2 also have a wet ammonia scrubber (PEA units) used to control alkali emissions (mostly ammonia). Building 4-2 has the following additional scrubbers:

- A scrubber (PEI) used to abate emissions from the ion implant process area,

- Two scrubbers (PEC) used to control emissions from chemical vapor deposition (CVD) process area, and
- A nitric acid scrubber (PEN) specifically designed to abate nitric acid vapor and nitric acid mist. It uses 25% sodium hydroxide to control the scrubber liquor pH and is equipped with a mist eliminator and a high performance CECO sub-micron, acid mist filter.

2.3 WET SCRUBBER UNITS TESTED

Table 2-1 lists the specific wet scrubbers tested along with the manufacturer and pertinent data.

TABLE 2-1. MICROCHIP WET SCRUBBERS TESTED

Location	Scrubber Name	Unit ID	Design Airflow (CFM)	Process Effluent Type
Building 4-1	PES-002	120-000-1701	28,000	Acid
	PES-005	120-000-0100	36,000	Acid
	PES-006	120-000-0110	16,000	Acid
	PEA-004	120-000-0120	13,500	Ammonia
Building 4-2	PES-001	2-PES-SC-001-2S	42,300	Acid
	PES-002	2-PES-SC-002-2S	42,300	Acid
	PES-003	2-PES-SC-003-2S	42,300	Acid
	PEC-001	2-PEC-SC-001-2S	30,000	CVD
	PEC-002	2-PEC-SC-002-2S	30,000	CVD
	PEA-001	2-PEA-SC-001-2S	26,900	Ammonia
	PEN-001	2-PEN-SC-001-2S	7,400	Nitric Acid
	PEI-001	2-PEI-SC-001-2S	14,500	Ion Implant

All wet scrubbers manufactured by Harrington Industrial Plastics

2.4 FACILITY PROCESS MONITORS

The wet scrubbers are equipped with several process monitors used to track and optimize performance. Additionally, these operational parameters were used to demonstrate that the scrubbers operated under normal conditions during the compliance testing. The scrubber water pH and recirculation rate were continuously monitored for this testing using in-line monitors. This data is read and transmitted to the site's data acquisition system where it is recorded and stored. The scrubber water pH and recirculation rate were monitored during testing and the results were provided by Microchip.

2.5 TEST CHRONOLOGY

Testing began at the Building 4-2, scrubber PEI-001 on February 29th and ended on March 6th. Table 2-1 presents the activities performed as a function of day.

TABLE 2-5. CHRONOLOGICAL NARRATIVE OF SCRUBBER TESTING

Date	Onsite Activities
2/29/2024	CTS, HCl spike, Completed three 1-hr Tests and flowrates at PEI-001.
3/1/2024	CTS, HCl spike, Completed three 1-hr Tests and flowrates at PES-002 and PES-003.
3/2/2024	CTS, Completed three 1-hr Tests and flowrates at PES-001 and PEC-002.
3/4/2024	CTS, Completed three 1-hr Tests and flowrates at PEC-001, PEA-001, and PEN, HCl spike.
3/5/2024	Moved from Building 4-2 to Building 4-1, CTS, Completed three 1-hr Tests and flowrates at PEA-004 and PES-005.
3/6/2024	CTS, Completed three 1-hr Tests and flowrates at PES-006, HF spike. Completed three 1-hr Tests and flowrates at PES-002, Post-CTS, HCl spike, HF spike

2.6 SCRUBBER OUTLET SAMPLING LOCATION

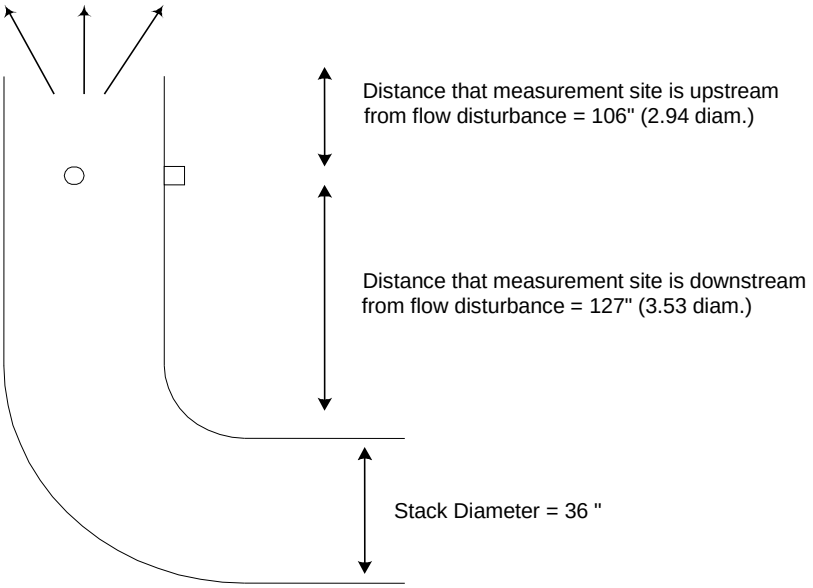
Each scrubber exhaust stack is circular and has a minimum of two sample ports set at 90° from each other. Table 2-6 presents the location and dimensions of each scrubber sampled during the test campaign. As an example, Figure 2-1 shows a schematic of a wet scrubber sampled from Building 4-2.

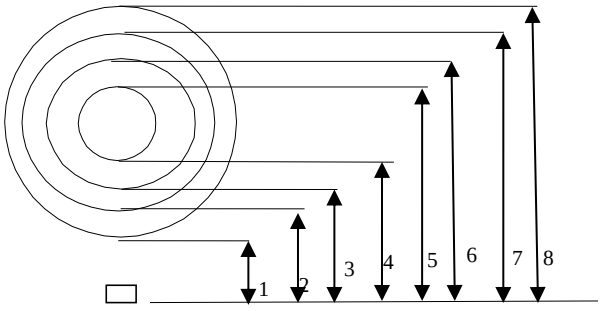
All but one of the scrubber sample locations met the minimum up- and down-stream disturbance requirements of EPA Method 1. PEA-004 had a down-stream disturbance that was slightly outside of the two-duct diameter requirement. This was brought to the attention of ODEQ and it was decided that should the scrubber pass its cyclonic flow check, it was acceptable for testing. The cyclonic flow check on this unit passed and testing continued. For wet scrubber PEN-001, a 16-point velocity traverse (8 per diameter) was attempted on the vertical port but only 6 points were successfully recorded due to water being present in the horizontal stack. For all other units, the maximum number of traverse points per EPA Method 1 were performed: a 16-point traverse (8 per diameter).

TABLE 2-6. SUMMARY OF SOURCE MEASUREMENTS

Location	Wet Scrubber Name	Unit ID	Internal Diameter (inches)	Cross Sectional Area (square inches)	Upstream Distance		Downstream Distance	
					Inches	Equivalent Diameter	Inches	Equivalent Diameter
Building 4-1	PES-002	120-000-1701	35.5	989.30	33.0	0.93	240.0	6.76
	PES-005	120-000-0100	48.0	1808.64	47.0	0.98	240.0	5.00
	PES-006	120-000-0110	41.5	1351.97	125.0	3.01	396.0	9.54
	PEA-004	120-000-0120	36.0	1017.36	43.0	1.19	60.0	1.67
Building 4-2	PES-001	2-PES-SC-001-2S	53.0	2205.07	106.0	2.00	127.0	2.40
	PES-002	2-PES-SC-002-2S	53.0	2205.07	106.0	2.00	127.0	2.40
	PES-003	2-PES-SC-003-2S	53.0	2205.07	106.0	2.00	127.0	2.40
	PEC-001	2-PEC-SC-001-2S	54.0	2289.06	124.0	2.30	123.0	2.28
	PEC-002	2-PEC-SC-002-2S	53.0	2205.07	36.0	0.68	127.0	2.40
	PEA-001	2-PEA-SC-001-2S	51.5	2082.02	91.5	1.78	144.0	2.80
	PEN-001	2-PEN-SC-001-2S	23.8	442.79	29.0	1.22	48.0	2.02
	PEI-001	2-PEI-SC-001-2S	36.0	1017.36	106.0	2.94	127.0	3.53

Figure 2-1. Wet Scrubber Sampling Location and Traverse Points





Traverse Point	Distance From Wall (in.)
1	1.13
2	3.75
3	7.00
4	11.63
5	24.38
6	29.0
7	32.25
8	34.88

2.7 SAMPLING EQUIPMENT DESCRIPTION

Sample gas was continuously pulled at ~5 lpm through a heated sample system using a diaphragm pump. All wetted parts of the heated sample system were constructed using Teflon™ tubing and stainless-steel fittings. The wet scrubbers used a 50’ heated sample line. The sample probe was a heated 3/8” diameter Teflon™ tubing and it was simply the heated end extraction line that was inserted into each wet scrubber. During CTS and analyte spiking, a heated 3/8” stainless steel probe connected to a spiking “T” was attached to the end of the sample line with the heated (121 °C) probe inserted into the stack gas flow. Note that the probe was not usually heated during the

CTS delivery but always was during the analyte HF and HCl spiking. The heated probe was necessary as the sample line with the "T" and calibration line would not slide through the scrubber ports easily. An unheated calibration line was connected to the spiking "T" and used to deliver CTS or analyte spike gas as required. The sample line was heated at approximately 121 °C. The heated sample line delivered gas to the heated (150 °C) FTIR sample cell where it was analyzed for moisture, HF, HCl and CO_2.

2.7.1 GAS VELOCITY MONITORING EQUIPMENT

The flow monitoring equipment for each location consisted of an S-Type Pitot tube connected to an electronic manometer (Gray Wolf Model Zephyr™III) and a K-type thermocouple. The gas velocity was measured as a pressure differential on the manometer at each traverse point. Since the thermocouple probe collocated with the Pitot tubes, the gas temperature was also recorded at each traverse point. The gas velocity measurements were conducted once per 1-hr run for a total of three measurements per tested scrubber. Additionally, a barometric pressure measurement was also required as it is used in the flow calculation. The barometric pressure sensor used was manufactured by Traceable (MarketLab model) and NIST traceable. The S/N is 230600150 and it is not due for re-certification until September 2025.

2.7.1.1 OXYGEN ANALYZER

The O_2 concentration of each wet scrubber outlet was analyzed using a Testo Model 340 analyzer. This analyzer type used an electrochemical cell specific to oxygen. For sampling, the analyzer used an internal pump to extract sample gas directly from each scrubber effluent. The O_2 measurements were performed as part of each the flow measurement where a gab sample of gas was extracted from each duct. The Testo O_2 analyzer produces concentration measurements on a dry basis by incorporating a wetted wick in the sample extraction path. The O_2 concentration as read from the Testo analyzer was recorded once for each run and used in the molecular weight calculation for the gas flowrate.

2.7.2 FTIR SPECTROMETER

A Spectrum-produced WaveRunIR™-EXT FTIR with a heated (150°C) 9.8 m sample cell was employed to quantify the concentration of HF, HCl, CO_2, and moisture in the wet scrubber effluents. Since the gas samples were delivered to the FTIR sample cell at levels slightly below ambient pressure, cell pressure was continuously recorded during measurement periods using a pressure sensor calibrated over the 0 – 1000 torr range. These pressures, along with the cell temperature as read by a K-Type thermocouple were used in the quantification of each spectrum collected.

An infrared spectrum analysis is performed by matching the features of an observed spectrum to those of reference standards. If more than one feature is present in the same region, a linear combination of references is used to match the compound features. The standards are scaled to match the observed band intensities; this scaling also matches the unknown concentrations.

The scaled references are added together to produce a composite that represents the best match with the sample. A classical least squares mathematical technique is used to match the reference standards' absorption profiles with those of the observed sample spectrum in specified spectral regions. Compounds of interest and any known compounds expected to present spectral interference (water for this data set) are included in the analysis regions. The analysis method for this sampling was optimized for analysis during sampling and later refined to best fit the interferences within the sample matrix.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

The following EPA test methods were performed during the compliance test program: EPA Method 1 for sampling point determination, EPA Method 2 for the determination of velocity and flow rate, and ASTM D6348-12 for determination of HF, HCl, CO_2, and moisture concentration using FTIR. The source test methods used to conduct this compliance testing followed the approved Source Test Protocol.

Compliance testing was performed over three, one-hr runs. Sample gas was extracted and delivered to the FTIR on a continuous basis at approximately 5-10 lpm. The FTIR produced concentration results at a one-minute frequency and each one-minute data point is the average of several individual concentration measurements collected (co-added) at much shorter frequencies.

3.1 TOTAL VOLUMETRIC FLOW MEASUREMENTS

Flow measurements of each scrubber exhaust were performed concurrent with the FTIR measurements. A flow measurement was performed one per one-hr test for a total of three flow measurements for each wet scrubber. Each flowrate was measured in accordance with EPA Reference Methods 1-2 and a modified Method 3. Measurements of moisture and CO_2 used for MW calculation were performed by FTIR at all wet scrubber locations.

3.1.1 EPA METHOD 1: SAMPLING AND VELOCITY TRAVERSE POINT LOCATIONS

EPA Method 1, "Sampling and Velocity Traverse Point Locations," was used to determine the number and position of the traverse points within each wet scrubber stack. Figure 1-2 and Table 1-2 of the EPA Method 1 were followed to determine the number and location of each traverse point for each wet scrubber. Examples of the determination of number and location of traverse points are presented in Figure 2-1 of this document. The complete data sheets for all sources are in Appendix B.

Each sample location was checked for the absence of cyclonic flow per EPA Method 1. In summary, the Pitot tube was placed at each traverse point perpendicular to the flow then rotated into and out of the flow until a null reading of differential pressure was measured. The angle of rotation (yaw angle) was then recorded for each traverse point and the absolute average of the yaw angles was calculated. An average of less than 20° is verification that the flow is not cyclonic and EPA Method 2 can be used. Every sample location demonstrated an average yaw angle less than 20°, allowing for the use of EPA Method 2. Documentation of the cyclonic flow (or absence thereof) of each scrubber can be found in Appendix B.

3.1.2 EPA METHOD 2: DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

The gas velocity at each scrubber outlet was determined in accordance to EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (S-Type Pitot Tube)". An S-Type Pitot tube was positioned parallel to the gas flow at each traverse point and the pressure differential was read/recorded from an electronic manometer (Grey Wolf Model Zephyr™III) and transcribed onto a data sheet. The temperature was also read (using a K-Type thermocouple) at each point during the velocity traverse and recorded on the velocity data log sheet. The Pitot tube used for testing was assigned the default correction factor of 0.84. The flow-associated data sheets are presented in Appendix B.

The barometric pressure was measured using a digital barometric pressure sensor. The sensor reports barometric pressure in inHg (inches of mercury) and was read and written on the data sheet at the time of the flow measurement. The digital barometric pressure sensor was carried to each sample location therefore not requiring altitude adjustments.

3.1.3 MODIFIED EPA METHOD 3: DRY MOLECULAR WEIGHT

Oxygen measurements were performed and used for molecular weight determination that was then used in the calculation of the volumetric flow rate. A Testo Model 340 combustion analyzer was used to measure O_2 on a dry basis. A grab sample was collected from the scrubber effluent, delivered to the Testo analyzer via internal pump, and analyzed for % O_2. The O_2 measurements loosely followed a modified version of EPA Method 3A, "Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)". The method was modified in that data (concentration measurements) were not continuously performed and recorded, and that a full calibration per EPA Method 3A was not performed on the Testo. However, the Testo analyzer response was verified prior to use at concentrations of 0 and 21% O_2 using nitrogen and ambient air, respectively. The analyzer responded appropriately to these concentration checks.

Since the Testo measures on a dry basis, moisture concentrations as determined by FTIR and were used to convert data between to a wet basis as needed.

3.1.4 ASTM METHOD D6348-12: FTIR DETERMINATION OF HF, HCL, CO_2, AND MOISTURE CONCENTRATION

Fourier Transform Infrared Spectroscopy (FTIR) was used to determine the HF, HCl, CO_2, and moisture composition of each wet scrubber outlet gas stream. A fully integrated FTIR continuously measured (data point every 1 minute) these target analytes in the extracted gas sample from the scrubber effluent. ASTM Method D6348-12 was followed with HF and HCl being the target

analytes used for the QA Spikes. Spectrum targeted an analyte spike of HF and HCl at 1 ppm or less to demonstrate the capability of the FTIR and sampling system to quantify and transport all the target analytes. Per the ASTM Method, a single analyte spike is required at the onset of testing. However, ODEQ required a second round of analyte spiking to occur on all FTIR sampling systems used following the completion of testing to bracket the sampling and ensure significant deterioration has not occurred. Since the move between building was a significant effort, Spectrum bracketed each building with analyte spikes. In total two HCl spikes were performed at the onset of testing at Building 4-2, another HCl spike was performed prior to testing at Building 4-1 and a final HCl spike was completed at the end of testing at Building 4-1 (which was also the end of the compliance testing). Unfortunately, the HF calibration gas was not available at the onset of testing so just HCl was spiked at Building 4-2. The late arrival of the HF cylinder was discussed with ODEQ and ODEQ accepted that the HF spiking can be performed at Building 4-1, however, if the HF spiking was not successful, all previous tests would have to be repeated. Spiking of HF was done at Building 4-1 near the beginning of the testing and to close the testing to bracket the testing and all HF spikes successfully passed.

Additionally, and as specified by the ASTM D6348-12 method, a calibration transfer standard (CTS) gas was injected to the FTIR on a daily basis to ensure the FTIR was operating correctly. The CTS was injected through the sample system to also demonstrate a leak check as a system with a significant leak would not recover the CTS accurately.

The FTIR references used to build the analysis method were obtained from Spectrum Environmental Solutions, LLC and are commercially available. A linear combination of individual references was incorporated to develop the calibration ranges for each analyte monitored. These references have been used reliably on many other test campaigns.

ASTM Method D6348-12 was used to determine the scrubber effluent moisture content and CO_2 concentration, and was performed in conjunction with each test run. These measurements were used as part of Method 3 to determine the gas molecular weight.

4.0 WET SCRUBBER EFFLUENT TEST RESULTS

This section presents the data collected during the wet scrubber testing. All the run and test results reported in this section we collected and analyzed compliant with the approved Test Protocol and are deemed suitable for demonstration of compliance with Microchip's permitted HAP levels. All calculations were performed using unrounded data. The results presented in these tables are rounded to present meaningful levels of uncertainty. To reproduce values exactly may require using the raw data presented in the appendices.

4.1 FTIR TEST RESULTS SUMMARY

Tables 4-1 and 4-2 present the HF and HCl emission results for each wet scrubber at Building 4-1 and Building 4-2, respectively. For instances where HF or HCl were observed above and below its respective minimum detection limit (MDL), the MDL was used in place of the below detection result for the purpose of averaging. Table 4-3 presents the facility-wide volumetric flow-weighted average concentrations of HF and HCl. Table 4-also presents the permitted allowable volumetric flow-weighted concentration for these HAPs. The HCl and HF MDLs for applicable runs are presented in Table 4-4 and Table 4-5 for Building 4-1 and Building 4-2, respectively.

4.2 WET SCRUBBER OPERATIONAL PARAMETERS

Several operational parameters required monitoring during the compliance testing to demonstrate the wet scrubbers were running under normal conditions. Specifically, the pH of the scrubber water and the scrubber water recirculation rates were monitored using in-line sensors. The sensor data was transferred to the Microchip SCADA system and averaged over each run as well as the three-run test averages. Ther pH and recirculation rates are presented in Tables 4-5 and 4-6.

Per Condition 6.1. of Microchip's Standards ACDP, compliance testing must be conducted while the facility is operating within 90% of its normal operating capacity at the time of the test. Prior to conducting these tests, Microchip verified with Oregon DEQ that a 12-month rolling period of production could be used to represent normal operating capacity and that during the test day(s), Microchip was operating at approximately 90% capacity of the normal daily production for the previous 12-month period.

4.3 TEST CRITIQUE

The results listed in Table 4-3 demonstrate that the measured sitewide volumetric flow-averaged concentration criteria were below the permitted allowance thereby demonstrating compliance.

Additionally, operational parameters listed in Tables 4-5 and 4-6 demonstrate that the wet scrubbers were operated in an acceptable and normal fashion during the testing.

All reported data are within method guidelines unless otherwise noted. The data herein are considered to be usable for the intended purpose of demonstrating ongoing compliance with the emission limits listed in the Microchip Permit No. 26-3240-ST-01.

TABLE 4-1. SUMMARY OF BUILDING 4-1 HF AND HCL EMISSIONS

Scrubber	PES-002			PES-005			PES-006			PEA-004		
Date	3/6/2024			3/5/2024			3/6/2024			3/5/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	18:21-19:36	19:39-20:36	20:36-21:36	18:51-19:51	19:51-20:51	20:51-21:51	10:22-11:22	11:22-12:22	12:22-13:22	15:21-16:21	16:21-17:21	17:21-19:23
Flow rate (scfm)	18,134	17,871	17,921	27,175	27,288	28,035	12,324	12,657	12,787	5,785	5,156	5,714
Average Concentrations (ppm)[1]												
HF (ppmv)	0.0315	0.0315	0.0315	0.1047	0.2240	0.2443	0.0675	0.0554	0.0885	0.0519	0.0516	0.0517
HCl (ppmv)	0.0221	0.0221	0.0221	0.0374	0.0569	0.0522	0.0428	0.0541	0.0554	0.0219	0.0219	0.0219
Test Average HF (ppmv)	0.0315			0.1916			0.0705			0.0518		
Test Average HCl (ppmv)	0.0221			0.0489			0.0508			0.0219		

[1]If analyte was observed above and below the MDL, MDL was used for averaging purpose

TABLE 4-2. SUMMARY OF BUILDING 4-2 HF AND HCL EMISSIONS

Scrubber	PES-001			PES-002			PES-003			PEC-001		
Date	3/2/2024			3/1/2024			3/1/2024			3/4/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	10:14-12:07	12:07-14:00	14:00-15:00	18:36-19:36	19:36-20:36	20:36-21:36	15:30-16:30	16:30-17:30	17:30-18:30	09:18-10:18	10:18-11:18	11:18-12:18
Flow rate (scfm)	23,097	21,614	22,473	16,432	16,592	16,322	31,035	29,971	29,980	23,593	24,096	23,328
Average Concentrations (ppm)[1]												
HF (ppmv)	0.0571	0.0571	0.0571	0.0417	0.0417	0.0417	0.0334	0.0334	0.0334	0.0457	0.0457	0.0457
HCl (ppmv)	0.0219	0.0219	0.0219	0.0196	0.0196	0.0196	0.0707	0.0366	0.0598	0.1130	0.0778	0.0605
Test Average HF (ppmv)	0.0571			0.0417			0.0334			0.0457		
Test Average HCl (ppmv)	0.0219			0.0196			0.0559			0.0838		

[1]If analyte was observed above and below the MDL, MDL was used for averaging purpose

TABLE 4-2. SUMMARY OF BUILDING 4-2 HF AND HCL EMISSIONS (CONTINUED)

Scrubber	PEC-002			PEA-001			PEN-001			PEI-001		
Date	3/2/2024			3/4/2024			3/4/2024			2/29/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	16:10-17:10	17:10-18:10	18:10-19:10	12:56-13:56	13:56-14:56	14:56-15:56	16:16-17:16	17:16-18:16	18:16-19:16	14:05-15:07	15:07-16:09	16:09-17:11
Flow rate (scfm)	21,858	19,546	19,788	17,528	18,948	17,653	3,240	3,240	3,032	9,989	10,980	10,529
Average Concentrations (ppm)[1]												
HF (ppmv)	0.0720	0.0915	0.0939	0.0332	0.0332	0.0332	0.0209	0.0536	0.0770	0.0295	0.0295	0.0295
HCl (ppmv)	0.1696	0.2503	0.2010	0.0469	0.0469	0.0472	0.0228	0.0222	0.0222	0.0231	0.0231	0.0231
Test Average HF (ppmv)	0.0853			0.0332			0.0499			0.0295		
Test Average HCl (ppmv)	0.2055			0.0470			0.0224			0.0231		

[1]If analyte was observed above and below the MDL, MDL was used for averaging purpose

TABLE 4-3. FACILITY-WIDE CONCENTRATIONS OF HF AND HCL

Facility-Wide Average		Permit Emission Criteria
HF (ppmv)	0.067	< 1ppmv average flow-weighted sitewide concentration
HCl (ppmv)	0.059	< 1ppmv average flow-weighted sitewide concentration

TABLE 4-3. BUILDING 4-1 HF AND HCL MDLS

Scrubber	PES-002			PES-005			PES-006			PEA-004		
Date	3/6/2024			3/5/2024			3/6/2024			3/5/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	18:21-19:36	19:39-20:36	20:36-21:36	18:51-19:51	19:51-20:51	20:51-21:51	10:22-11:22	11:22-12:22	12:22-13:22	15:21-16:21	16:21-17:21	17:21-19:23
HF MDL (ppmv)	0.0315	0.0315	0.0315	0.0895	0.0895	NA	NA	NA	NA	0.0516	0.0516	0.0516
HCl MDL (ppmv)	0.0221	0.0221	0.0221	0.0149	NA	NA	NA	NA	NA	0.0219	0.0219	0.0219

NA – Not Applicable – Analyte was present throughout the run

TABLE 4-4. BUILDING 4-2 HF AND HCL MDLS

Scrubber	PES-001			PES-002			PES-003			PEC-001		
Date	3/2/2024			3/1/2024			3/1/2024			3/4/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	10:14-12:07	12:07-14:00	14:00-15:00	18:36-19:36	19:36-20:36	20:36-21:36	15:30-16:30	16:30-17:30	17:30-18:30	09:18-10:18	10:18-11:18	11:18-12:18
HF MDL (ppmv)	0.0571	0.0571	0.0571	0.0417	0.0417	0.0417	0.0334	0.0334	0.0334	0.0457	0.0457	0.0457
HCl MDL (ppmv)	0.0219	0.0219	0.0219	0.0196	0.0196	0.0196	NA	0.0245	0.0245	NA	NA	NA

NA – Not Applicable – Analyte was present throughout the run

TABLE 4-4. BUILDING 4-2 HF AND HCL MDLS (CONTINUED)

Scrubber	PEC-002			PEA-001			PEN-001			PEI-001		
Date	3/2/2024			3/4/2024			3/4/2024			2/29/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	16:10-17:10	17:10-18:10	18:10-19:10	12:56-13:56	13:56-14:56	14:56-15:56	16:16-17:16	17:16-18:16	18:16-19:16	14:05-15:07	15:07-16:09	16:09-17:11
HF MDL (ppmv)	0.0571	0.0571	0.0571	0.0332	0.0332	0.0332	0.0188	0.0188	NA	0.0295	0.0295	0.0295
HCl MDL(ppmv)	NA	NA	NA	0.0469	0.0469	0.0469	0.0222	0.0222	0.0222	0.0231	0.0231	0.0231

NA – Not Applicable – Analyte was present throughout the run

TABLE 4-5. BUILDING 4-1 WET SCRUBBERS OPERATING PARAMETERS DURING TESTING

Scrubber	PES-002			PES-005			PES-006			PEA-004		
Date	3/6/2024			3/5/2024			3/6/2024			3/5/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	18:21-19:36	19:39-20:36	20:36-21:36	18:51-19:51	19:51-20:51	20:51-21:51	10:22-11:22	11:22-12:22	12:22-13:22	15:21-16:21	16:21-17:21	17:21-19:23
Average Recirculation Rate (gal/min)	115.4	116.0	115.6	327.8	327.0	326.3	164.08	163.13	163.82	256.4	257.7	258.5
Average pH	7.4	7.4	7.5	7.0	7.1	7.0	7.16	7.21	7.20	9.0	9.3	9.4
Total Testing Average Recirculation Rate (gal/min)	115.7			327.0			137.52			257.5		
Total Testing Average pH	7.4			7.0			7.19			9.2		

TABLE 4-6. BUILDING 4-2 WET SCRUBBERS OPERATING PARAMETERS DURING TESTING

Scrubber	PES-001			PES-002			PES-003			PEC-001		
Date	3/2/2024			3/1/2024			3/1/2024			3/4/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	10:14-12:07	12:07-14:00	14:00-15:00	18:36-19:36	19:36-20:36	20:36-21:36	15:30-16:30	16:30-17:30	17:30-18:30	09:18-10:18	10:18-11:18	11:18-12:18
Average Recirculation Rate (gal/min)	275.7	274.9	274.5	321.2	322.1	321.0	263.6	263.0	262.4	200.3	199.3	197.6
Average pH	7.01	7.02	7.04	7.23	7.23	7.23	7.42	7.52	7.50	7.52	7.52	7.52
Total Testing Average Recirculation Rate (gal/min)	275.0			321.4			263.0			199.1		
Total Testing Average pH	7.02			7.23			7.48			7.52		

TABLE 4-6. BUILDING 4-2 WET SCRUBBERS OPERATING PARAMETERS DURING TESTING (CONTINUED)

Scrubber	PEC-002			PEA-001			PEN-001			PEI-001		
Date	3/2/2024			3/4/2024			3/4/2024			2/29/2024		
Run	1	2	3	1	2	3	1	2	3	1	2	3
Run Time	16:10-17:10	17:10-18:10	18:10-19:10	12:56-13:56	13:56-14:56	14:56-15:56	16:16-17:16	17:16-18:16	18:16-19:16	14:05-15:07	15:07-16:09	16:09-17:11
Average Recirculation Rate (gal/min)	219.8	219.1	217.2	304.1	305.1	303.4	74.2	74.1	74.2	91.0	91.2	90.9
Average pH	7.77	7.87	7.81	8.16	8.17	8.27	9.58	9.81	9.69	8.53	8.54	8.53
Total Testing Average Recirculation Rate (gal/min)	218.7			304.2			74.2			91.0		
Total Testing Average pH	7.82			8.20			9.69			8.54		

4.4 CALCULATIONS

This section presents the calculations used in generating the finalized data sets. The actual velocity of the outlet gas based on EPA Method 2 was calculated as:

$$v_s = K_p \times C_p \times \sqrt{\frac{\Delta P_{avg} \times T_s}{P_s \times M_s}}$$

Where:

V_S = Velocity of the outlet duct (ft/sec);
ΔP = Root mean square average differential pressure measured by S-Type pitot (in. H_2O);
T_s = Average gas temperature in duct (^oR);
P_s = Absolute duct pressure (in. Hg);
M_w = Wet gas molecular weight (lb/lb-mole); and
C_p = Type-S pitot correction factor (0.84).

The volumetric flow rate of the outlet duct at actual conditions based on EPA Method 2 was calculated as:

$$Q_{ac} = 60\ (V_s)(A)$$

Where:

Q_{ac} = Actual volumetric flowrate (acfm);
V_s = Velocity of the outlet gas (ft/sec);
A = Cross-sectional area of the outlet duct (ft^2); and
60 = Conversion from second to minutes.

The volumetric flow rate of the outlet duct at dry standard conditions based on EPA Method 2 was calculated as:

$$Q_{sd} = (1 - B_w)(Q_{ac})\left(\frac{528}{T_s}\right)\left(\frac{P_s}{29.92}\right)$$

Where:

Q_{sd} = Dry volumetric flowrate at standard conditions (dscfm);
Q_{ac} = Actual volumetric flowrate (acfm);
B_w = Moisture fraction;
528 = Standard temperature (^oR);
T_s = Average gas temperature in outlet duct (^oR);
29.92 = Standard pressure (in. Hg); and

P_s = Absolute stack pressure (in. Hg).

The facility-wide volumetric flow-weighted average emission concentration for each HAP of the scrubber effluents being monitored was calculated as follows:

$$\mathbf{FWAC} = \frac{\sum_{i=1}^{n} \boldsymbol{F_i} \times \boldsymbol{C_i}}{\sum_{i=1}^{n} \boldsymbol{F_i}} \times \mathbf{100}$$

Where:

FWAC = flow-weighted average HAP emission concentration (ppmv)
F_i = Scrubber flow rate (scfm)
C_i = Scrubber HAP concentration (ppmv)
n = Number of scrubber runs

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5.0 QUALITY ASSURANCE AND QUALITY CONTROL

5.1 ASTM D6348-12 QA/QC

As part of quality assurance procedures of the FTIR ASTM methodology, system recovery checks or QA spikes of the target analytes (HCl and HF) were performed. These spikes also act as a surrogate for moisture and CO_2 concentration as quantified by FTIR. The ASTM Method requires this once per source type, however several QA spikes of HCl and HF were performed. Of specific importance was the QA spikes at the completion of testing at each building. These spikes demonstrate that at the time the testing was completed at the building, the system was in good working order. These QA spikes challenge the instrumentation for accuracy of target analyte quantification while simultaneously verifying that the extractive system and analyzer are unreactive with the target compounds. The spiking procedure for the system recovery is described in detail in the ASTM FTIR method and summarized as follows.

A direct inject test was performed. This is a once-only test in which the gas standard is introduced directly into the heated sample cell (bypassing the extractive assembly). In addition to the target analyte, the gas cylinder also contained a spectroscopic tracer (a broad, strong IR absorber which behaves linearly over a large concentration range) used to calculate dilution factors. Sulfur hexafluoride (SF_6) was the tracer contained in both the HCl and HF QA spike gas cylinders. After the cell was sufficiently purged with the gas standard, the analysis method returned values ($SF6_{cylinder}$ & $HF_{cylinder}$) which represented the concentration of SF_6 and HF in the gas cylinder as measured by the FTIR. These calculations also hold true for the spiking of HCl; however, an HF spike was used in test as the example.

The gas standard was then injected into the heated spiking "T" downstream of the heated probe as the stack effluent was drawn through the FTIR system. The gas standard injection flow was maintained at a constant rate using the cylinder regulator and a metering valve. After the FTIR cell was sufficiently purged with the gas standard/stack effluent mix, the FTIR analysis produced a stable sample tracer concentration which represents the concentration of SF_6 after dilution by the stack effluent ($SF6_{sample}$). The dilution factor (DF) is determined by dividing the $SF6_{sample}$ by the $SF6_{direct}$.

The expected concentration of HF ($HF_{Theoretical}$) was also diluted by the stack effluent under the same proportion as SF_6 and was calculated as follows:

$$HF_{Theoretical} = \left(\frac{SF6sample}{SF6direct}\right)(HF_{direct}) + \left[1 - \left(\frac{SF6sample}{SF6direct}\right)\right](HF_{stack})$$

Where:

$HF_{Theoretical}$ = Expected HF concentration (ppm);

$SF6_{sample}$ = SF_6 concentration (ppm) as seen by the FTIR during QA spiking;

$SF6_{direct}$ = SF_6 concentration (ppm) recorded during direct injection of the QA standard gas into the FTIR cell;

HF_{direct} = HF concentration (ppm) recorded during direct injection of the QA standard gas into the FTIR cell; and

HF_{stack} = HF concentration (ppm) of the stack gas during stable conditions.

Table 5-1 and Table 5-2 presents the direct inject results of HCl and HF as well as the certified concentration of the cylinder, respectively. A passing criterion of ±30% of the expected concentration is required per the ASTM method for spiking recovery therefore all QA HCl and HF spikes passed. The results of the HCL and HF spiking recovery is presented in Table 5-3 and Table 5-4, respectively. All the raw concentration data is presented in Appendix H and the QA gas cylinder standard certificate of analysis' are in Appendix G.

TABLE 5-1. SUMMARY OF DIRECT INJECTION RESULTS OF HCL

	Cylinder Certificated Concentration[1]		Direct Inject FTIR Concentration Result	
	SF_6 (ppm)	**HCl (ppm)**	**SF_6 (ppm)**	**HCl (ppm)**
HCl Cylinder	4.40	12.47	4.28	10.89

[1]Airgas Cylinder number CC482208

TABLE 5-2. SUMMARY OF DIRECT INJECTION RESULTS OF HF

	Cylinder Certificated Concentration[1]		Direct Inject FTIR Concentration Result	
	SF_6 (ppm)	**HF (ppm)**	**SF_6 (ppm)**	**HF (ppm)**
HF Cylinder	4.40	12.9	4.59	8.49

[1]Airgas Cylinder number CC501438

TABLE 5-3. SUMMARY OF HCL ASTM D6348-12 QA SPIKES

Date	Scrubber	Dilution Factor	HCl Observed Spike (ppmv)	HCl Expected Spike (ppmv)	Percent Recovery (%)	Comment
2/29/2024	PEI-001	0.084	0.672	0.933	72.0	Pass
3/1/2024	PES-003	0.071	0.690	0.806	85.6	Pass
3/2/2024	PEC-002	1.158	1.090	1.158	94.1	Pass
3/4/2024	PEC-001	0.907	0.944	0.907	104.0	Pass
3/6/2024	PES-002 (4-1)	0.736	0.642	0.736	87.2	Pass

TABLE 5-4. SUMMARY OF HF ASTM D6846-12 QA SPIKES

Date	Scrubber	Dilution Factor	HF Observed Spike (ppmv)	HF Expected Spike (ppmv)	Percent Recovery (%)	Comment
3/6/2024	PES-006	0.067	0.733	0.913	80.2	Pass
3/6/2024	PES-002 (4-1)	0.067	0.399	0.431	92.5	Pass

5.2 ASTM CTS CHALLENGES

ASTM D6348-12 also requires a calibration transfer standard (CTS) challenge to be performed daily at a minimum. Per method, the CTS challenges were performed before each day of testing. This was commonly run by flowing the CTS gas (ethylene) through the sample system and FTIR cell. Ethylene was chosen as the CTS and a passing criteria for the CTS is 5% of the bottle certified value. Table 5-3 presents the results of the CTS challenge results. All CTS challenges passed and the raw data are presented in Appendix H.

TABLE 5-5. SUMMARY OF CTS RESULTS

Scrubber CTS Results		Ethylene		
Cy. No CC105191				
Date	**Unit**	**Certified Value (ppmv)**	**Measured Value (ppmv)**	**Difference (%) [1]**
2/29/2024	PEI-001	9.718	9.40	3.27
3/1/2024	PES-003		9.91	1.93
3/2/2024	PES-001		9.34	3.85
3/4/2024	PEC-001		9.43	2.93
3/5/2024	PEA-004		9.45	2.79
3/6/2024	PES-006		9.52	2.06
3/6/2024	PES-002 (4-1)		9.56	1.64

[1]< 5% is considered acceptable by ASTM 6348

5.3 FTIR MECHANICAL AND EQUILIBRIUM RESPONSE CHECKS

Two response time checks are required per the ASTM method:

1. A Mechanical Response Time determination in which the CTS (ethylene) is injected through the system and the time to reach 95% of bottle value is determined.
2. An Equilibrium Response Time determination in which the time to reach 95% of spike analyte is determined.

The equilibrium response test was performed using HF and the mechanical response test was performed using ethylene. The calibration gas was injected through the sample system and the time it took to reach 95% of the stable value was recorded. The results are as follows:

- Mechanical response time = <1.5 minutes.
- Equilibrium response (HF) time = <2.5 minutes.

The response time raw FTIR data is presented in Appendix H and is the same data as the CTS results (mechanical) and the HF direct inject results (equilibrium).

5.4 CALIBRATIONS AND DOCUMENTATION

Emissions testing was conducted on the wet scrubber effluents consistent with the applicable requirements of ODEQ Air Operating Permit and approve Test Protocol. This test was conducted under the ODEQ Permit No. 26-3240-ST-01 which is presented in Appendix D. To ensure accurate and defensible results, strict quality assurance and control measures were followed. All testing was performed following the Test Protocol and standard EPA or ASTM methods. All test criteria were thoroughly documented and checked for completeness.

6.0 REFERENCES

1. EPA Title 40, Code of Federal Regulations, Part 60"Standards of Performance New Stationary Sources", Appendix A to Part 60 "Test Methods"

2. EPA-600/R93/224, "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards"

3. ASTM Method 6348-03 Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy

4. Source Sampling Manual, ODEQ "https://www.oregon.gov/deq/FilterDocs/SSMI.pdf"

Appendix A

Summary Data and Calculations

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**			
Project Number				
Facility	**Gresham**			
Sample Type	Flow	Flow	Flow	Averages
Source	PEA-001	PEA-001	PEA-001	
Run	1	2	3	
Date	3/4/2024	3/4/2024	3/4/2024	
Time Start	13:07	14:23	15:30	
Time Stop	13:07	14:23	15:30	
	13:07-13:07	14:23-14:23	15:30-15:30	
Duct Diameter (ft) *(equivalent if square duct)*	4.29	4.29	4.29	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.67	29.63	29.62	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.67	29.63	29.62	
Average Stack Temperature (°F)	60.3	59.6	59.6	59.9
Test Duration (minutes)	653	577	510	
Static Pressure ("H_2O)	-4.39	-4.37	-4.36	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.05	0.05	0.05	
Oxygen (O_2) Content (%)	20.92	20.92	20.92	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.03	79.03	79.03	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.359	0.388	0.362	
Absolute Stack Pressure ("Hg)	29.35	29.31	29.30	
Absolute Stack Temperature (°R)	520.3	519.6	519.6	519.9
Flue Gas Moisture (%)	1.65	1.65	1.71	1.67
Moisture at saturation	2.08	2.06	2.06	
Moisture used in Calculation	1.65	1.65	1.71	1.67
Gas Molecular Weight (Wet) (g/g-mole)	28.66	28.67	28.66	
Average Gas Velocity (ft/sec)	20.29	21.93	20.44	20.89
Avg Flow Rate (acfh)	1,056,618	1,142,149	1,064,438	1,087,735
Avg Flow Rate (acfm)	17,610	19,036	17,741	18,129
Avg Flow Rate (scfh)	1,051,695	1,136,854	1,059,160	1,082,570
Avg Flow Rate (scfm)	17,528	18,948	17,653	18,043
Avg Flow Rate (dscfh)	1,034,312	1,118,081	1,041,052	1,064,482
Avg Flow Rate (dscfm)	17,239	18,635	17,351	17,741
Avg Flow Rate (scmm)	496.34	536.53	499.87	511

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEA-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.67**	Entered By (initials)	*af*
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-4.393	Corrected by (initials)	
Duct Diameter (ft)	4.291666667	% CO			
Duct Depth (ft)		% CO_2	0.045430178		
Duct Width (ft)		% O_2	20.92		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	13:07	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	653	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.14		60		0.3593

Individual	0.08	55		0.27386128
Readings	0.11	61		0.32403703
	0.16	60		0.40496913
	0.14	60		0.37947332
	0.13	60		0.35496479
	0.12	61		0.34496377
	0.07	61		0.26457513
	0.03	60		0.17029386
	0.08	60		0.27748874
	0.11	61		0.33615473
	0.15	61		0.39115214
	0.20	61		0.44384682
	0.28	60		0.53103672
	0.17	62		0.407430976
	0.24	61		0.488876262
	0.13	61		0.354964787

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEA-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.63	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-4.367	Corrected by (initials)	
Duct Diameter (ft)	4.291666667	% CO			
Duct Depth (ft)		% CO_2	0.045529357		
Duct Width (ft)		% O_2	20.92		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)	Initial	Final
start	14:23	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	577	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.16		60		0.3883
Individual Readings	0.04		59		0.19235384
	0.16		60		0.39496835
	0.18		60		0.42426407
	0.18		60		0.42308392
	0.29		60		0.53851648
	0.15		60		0.38600518
	0.12		60		0.3391165
	0.17		60		0.41593269
	0.09		55		0.29154759
	0.12		59		0.34351128
	0.19		60		0.44045431
	0.21		60		0.46151923
	0.16		60		0.39749214
	0.17		61		0.411096096
	0.15		60		0.380788655
	0.14		60		0.372827038

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEA-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.62	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-4.36	Corrected by (initials)	
Duct Diameter (ft)	4.291666667	% CO			
Duct Depth (ft)		% CO_2	0.045505507		
Duct Width (ft)		% O_2	20.92		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	15:30	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	510	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.13		60		0.3618
Individual Readings	0.15		54		0.39115214
	0.14		59		0.36742346
	0.19		60		0.43931765
	0.20		61		0.45166359
	0.16		60		0.40249224
	0.18		61		0.42426407
	0.11		61		0.32403703
	0.13		61		0.36469165
	0.12		56		0.34785054
	0.12		59		0.34928498
	0.13		61		0.35637059
	0.13		61		0.35496479
	0.09		60		0.30659419
	0.15		60		0.386005181
	0.06		60		0.250998008
	0.07		60		0.27202941

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**
Project Number	
Facility	**Gresham**

Sample Type	Flow	Flow	Flow	Averages
Source	PEA-004	PEA-004	PEA-004	
Run	1	2	3	
Date	3/5/2024	3/5/2024	3/5/2024	
Time Start	15:55	17:00	18:05	
Time Stop	15:55	17:00	18:05	
	15:55-15:55	17:00-17:00	18:05-18:05	
Duct Diameter (ft) *(equivalent if square duct)*	3.00	3.00	3.00	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.63	29.63	29.63	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.63	29.63	29.63	
Average Stack Temperature (°F)	56.4	55.6	54.6	55.5
Test Duration (minutes)	485	420	355	
Static Pressure ("H_2O)	-5.54	-5.65	-5.68	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.05	0.04	0.05	
Oxygen (O_2) Content (%)	20.90	20.90	20.90	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.05	79.06	79.05	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.242	0.216	0.239	
Absolute Stack Pressure ("Hg)	29.22	29.21	29.21	
Absolute Stack Temperature (°R)	516.4	515.6	514.6	515.5
Flue Gas Moisture (%)	1.59	1.58	1.59	1.58
Moisture at saturation	1.97	1.95	1.93	
Moisture used in Calculation	1.59	1.58	1.59	1.58
Gas Molecular Weight (Wet) (g/g-mole)	28.67	28.67	28.67	
Average Gas Velocity (ft/sec)	13.66	12.16	13.45	13.09
Avg Flow Rate (acfh)	347,565	309,351	342,252	333,056
Avg Flow Rate (acfm)	5,793	5,156	5,704	5,551
Avg Flow Rate (scfh)	347,108	309,346	342,842	333,099
Avg Flow Rate (scfm)	5,785	5,156	5,714	5,552
Avg Flow Rate (dscfh)	341,589	304,462	337,406	327,819
Avg Flow Rate (dscfm)	5,693	5,074	5,623	5,464
Avg Flow Rate (scmm)	163.82	145.99	161.80	157

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEA-004	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.63**	Entered By (initials)	*af*
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	*knb*
Date	5-Mar	Static Press ("H_2O)	-5.538	Corrected by (initials)	
Duct Diameter (ft)	3	% CO			
Duct Depth (ft)		% CO_2	0.04529125		
Duct Width (ft)		% O_2	20.9		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	15:55	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	485	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.06		56		0.2423
Individual Readings	0.02		55		0.1224745
	0.01		55		0.1140175
	0.03		56		0.1581139
	0.10		57		0.317805
	0.09		57		0.3016621
	0.10		57		0.3209361
	0.11		57		0.324037
	0.08		57		0.2792848
	0.06		55		0.250998
	0.09		55		0.2915476
	0.09		56		0.2966479
	0.08		57		0.275681
	0.07		57		0.254951
	0.06		57		0.244948974
	0.04		57		0.204939015
	0.01		57		0.118321596

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEA-004	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.63	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	5-Mar	Static Press ("H_2O)	-5.647	Corrected by (initials)	
Duct Diameter (ft)	3	% CO			
Duct Depth (ft)		% CO_2	0.04490867		
Duct Width (ft)		% O_2	20.9		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	17:00	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	420	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.06		56		0.2158
Individual Readings	0.00		57		0.0632456
	0.00		50		0.0447214
	0.00		53		0.0316228
	0.01		57		0.0774597
	0.11		57		0.3255764
	0.10		57		0.3114482
	0.12		57		0.3464102
	0.11		57		0.3286335
	0.06		49		0.250998
	0.07		55		0.2626785
	0.10		56		0.3162278
	0.07		56		0.2607681
	0.05		57		0.2213594
	0.05		57		0.230217289
	0.03		57		0.164316767
	0.05		57		0.216794834

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEA-004	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.63	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	5-Mar	Static Press ("H_2O)	-5.679	Corrected by (initials)	
Duct Diameter (ft)	3	% CO			
Duct Depth (ft)		% CO_2	0.04512559		
Duct Width (ft)		% O_2	20.9		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	18:05	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	355	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.06		55		0.2389
Individual Readings	0.02		47		0.130384
	0.01		49		0.1095445
	0.01		53		0.0894427
	0.06		55		0.2366432
	0.09		56		0.3
	0.12		56		0.3405877
	0.11		56		0.3376389
	0.12		57		0.3435113
	0.06		53		0.2387467
	0.08		53		0.2738613
	0.08		55		0.2792848
	0.08		56		0.2810694
	0.05		57		0.2302173
	0.06		57		0.236643191
	0.05		57		0.228035085
	0.03		57		0.167332005

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**
Project Number	
Facility	**Gresham**

Sample Type	Flow	Flow	Flow	Averages
Source	PEC-001	PEC-001	PEC-001	
Run	1	2	3	
Date	3/4/2024	3/4/2024	3/4/2024	
Time Start	09:33	10:40	11:53	
Time Stop	09:33	10:40	11:53	
	09:33-09:33	10:40-10:40	11:53-11:53	
Duct Diameter (ft) *(equivalent if square duct)*	4.50	4.50	4.50	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.69	29.69	29.69	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.69	29.69	29.69	
Average Stack Temperature (°F)	59.4	59.1	59.3	59.3
Test Duration (minutes)	867	800	727	
Static Pressure ("H_2O)	-7.07	-7.06	-7.28	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.11	0.11	0.11	
Oxygen (O_2) Content (%)	20.63	20.63	20.63	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.26	79.26	79.26	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.441	0.450	0.436	
Absolute Stack Pressure ("Hg)	29.17	29.17	29.16	
Absolute Stack Temperature (°R)	519.4	519.1	519.3	519.3
Flue Gas Moisture (%)	1.80	1.80	1.79	1.80
Moisture at saturation	2.06	2.05	2.06	
Moisture used in Calculation	1.80	1.80	1.79	1.80
Gas Molecular Weight (Wet) (g/g-mole)	28.65	28.65	28.65	
Average Gas Velocity (ft/sec)	24.95	25.46	24.67	25.03
Avg Flow Rate (acfh)	1,428,254	1,457,745	1,412,775	1,432,925
Avg Flow Rate (acfm)	23,804	24,296	23,546	23,882
Avg Flow Rate (scfh)	1,415,590	1,445,733	1,399,682	1,420,335
Avg Flow Rate (scfm)	23,593	24,096	23,328	23,672
Avg Flow Rate (dscfh)	1,390,102	1,419,745	1,374,608	1,394,818
Avg Flow Rate (dscfm)	23,168	23,662	22,910	23,247
Avg Flow Rate (scmm)	668.08	682.31	660.58	670

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEC-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.69**	Entered By (initials)	***af***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	4-Mar	Static Press ("H_2O)	-7.068	Corrected by (initials)	
Duct Diameter (ft)	4.5	% CO			
Duct Depth (ft)		% CO_2	0.110787167		
Duct Width (ft)		% O_2	20.63		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	09:33	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	867	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.20		59		0.4406
Individual Readings	0.16		55		0.4024922
	0.18		59		0.4195235
	0.19		60		0.4312772
	0.16		60		0.4049691
	0.21		59		0.4560702
	0.25		60		0.498999
	0.18		60		0.427785
	0.09		60		0.2915476
	0.14		56		0.372827
	0.24		60		0.4878524
	0.32		60		0.5621388
	0.28		60		0.5282045
	0.26		60		0.5118594
	0.28		61		0.528204506
	0.19		60		0.431277173
	0.09		60		0.294957624

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEC-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.69	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-7.056	Corrected by (initials)	
Duct Diameter (ft)	4.5	% CO			
Duct Depth (ft)		% CO_2	0.110007517		
Duct Width (ft)		% O_2	20.63		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	10:40	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	800	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.21		59		0.4499
Individual Readings	0.18		54		0.4195235
	0.21		55		0.4626013
	0.19		60		0.4393177
	0.19		60		0.4370355
	0.19		60		0.432435
	0.25		61		0.501996
	0.17		60		0.4135215
	0.10		61		0.3146427
	0.15		55		0.3807887
	0.26		60		0.5138093
	0.32		60		0.5683309
	0.27		60		0.522494
	0.30		59		0.551362
	0.17		60		0.412310563
	0.28		60		0.531036722
	0.09		60		0.296647939

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEC-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.69	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-7.276	Corrected by (initials)	
Duct Diameter (ft)	4.5	% CO			
Duct Depth (ft)		% CO_2	0.109567367		
Duct Width (ft)		% O_2	20.63		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	11:53	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	727	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.20		59		0.4358
Individual Readings	0.13		57		0.3619392
	0.15		57		0.3834058
	0.19		59		0.4347413
	0.22		60		0.4636809
	0.22		60		0.4636809
	0.22		60		0.4636809
	0.16		60		0.398748
	0.09		60		0.2949576
	0.17		56		0.4147288
	0.24		59		0.4929503
	0.31		60		0.559464
	0.29		60		0.5338539
	0.31		59		0.559464
	0.18		62		0.418330013
	0.15		60		0.380788655
	0.12		60		0.347850543

Flow Calculation Summary

Project Name	**2024 Intel Compliance**
Project Number	
Facility	**Ocotillo**

Sample Type	Flow	Flow	Flow	Averages
Source	PEC-002	PEC-002	PEC-002	
Run	1	2	3	
Date	3/2/2024	3/2/2024	3/2/2024	
Time Start	16:10	17:12	18:51	
Time Stop	16:10	17:12	18:51	
	16:10-16:10	17:12-17:12	18:51-18:51	
Duct Diameter (ft) *(equivalent if square duct)*	4.42	4.42	4.42	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.26	29.28	29.30	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.26	29.28	29.3	
Average Stack Temperature (°F)	58.4	58.4	59.9	58.9
Test Duration (minutes)	470	408	309	
Static Pressure ("H_2O)	-6.80	-6.85	-6.80	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.10	0.10	0.09	
Oxygen (O_2) Content (%)	20.70	20.70	20.70	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.20	79.20	79.21	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.426	0.381	0.386	
Absolute Stack Pressure ("Hg)	28.76	28.78	28.80	
Absolute Stack Temperature (°R)	518.4	518.4	519.9	518.9
Flue Gas Moisture (%)	1.78	1.80	1.73	1.77
Moisture at saturation	2.06	2.06	2.11	
Moisture used in Calculation	1.78	1.80	1.73	1.77
Gas Molecular Weight (Wet) (g/g-mole)	28.65	28.65	28.66	
Average Gas Velocity (ft/sec)	24.29	21.71	22.02	22.67
Avg Flow Rate (acfh)	1,339,683	1,197,298	1,214,639	1,250,540
Avg Flow Rate (acfm)	22,328	19,955	20,244	20,842
Avg Flow Rate (scfh)	1,311,496	1,172,771	1,187,301	1,223,856
Avg Flow Rate (scfm)	21,858	19,546	19,788	20,398
Avg Flow Rate (dscfh)	1,288,140	1,151,609	1,166,733	1,202,160
Avg Flow Rate (dscfm)	21,469	19,193	19,446	20,036
Avg Flow Rate (scmm)	618.96	553.49	560.34	578

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEC-002	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.26**	Entered By (initials)	***seh***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	2-Mar	Static Press ("H_2O)	-6.8	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.101581256		
Duct Width (ft)		% O_2	20.7		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	16:10	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	470	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.19		58		0.4264
Individual Readings	0.18		51		0.41833
	0.16		59		0.3937004
	0.22		60		0.4636809
	0.27		60		0.5196152
	0.54		60		0.7314369
	0.24		60		0.4898979
	0.17		61		0.4123106
	0.15		60		0.3872983
	0.12		53		0.3391165
	0.21		52		0.4527693
	0.08		59		0.2738613
	0.14		60		0.3674235
	0.12		60		0.3464102
	0.17		60		0.40620192
	0.23		60		0.474341649
	0.12		60		0.346410162

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEC-002	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.28	Entered By (initials)	***seh***
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	***knb***
Date	2-Mar	Static Press ("H_2O)	-6.85	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.100758993		
Duct Width (ft)		% O_2	20.7		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	17:12	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	408	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.15		58		0.3812
Individual Readings	0.18		57		0.41833
	0.11		54		0.3316625
	0.15		60		0.3872983
	0.15		61		0.3807887
	0.15		60		0.3872983
	0.26		61		0.509902
	0.18		60		0.41833
	0.08		53		0.2738613
	0.09		53		0.3
	0.04		54		0.2
	0.08		59		0.2738613
	0.13		60		0.3605551
	0.20		60		0.4472136
	0.23		62		0.482700735
	0.22		61		0.469041576
	0.21		60		0.458257569

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEC-002	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.3	Entered By (initials)	***seh***
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	***knb***
Date	2-Mar	Static Press ("H_2O)	-6.8	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.093530581		
Duct Width (ft)		% O_2	20.7		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	18:51	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	309	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.15		60		0.3864
Individual Readings	0.21		52		0.4527693
	0.11		59		0.3316625
	0.09		60		0.3
	0.14		61		0.3674235
	0.15		61		0.3872983
	0.16		61		0.3937004
	0.23		61		0.4795832
	0.24		61		0.4939636
	0.10		56		0.3082207
	0.12		61		0.3507136
	0.12		61		0.3391165
	0.13		61		0.3605551
	0.19		61		0.4312772
	0.25		61		0.5
	0.17		61		0.40620192
	0.08		61		0.279284801

Flow Calculation Summary

Project Name	**2024 Intel Compliance**
Project Number	
Facility	**Ocotillo**

Sample Type	Flow	Flow	Flow	Averages
Source	PEI-001	PEI-001	PEI-001	
Run	1	2	3	
Date	2/29/2024	2/29/2024	2/29/2024	
Time Start	13:50	15:20	16:34	
Time Stop	13:50	15:20	16:34	
	13:50-13:50	15:20-15:20	16:34-16:34	
Duct Diameter (ft) *(equivalent if square duct)*	3.00	3.00	3.00	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.26	29.28	29.29	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.26	29.28	29.29	
Average Stack Temperature (°F)	62.1	57.1	58.3	59.2
Test Duration (minutes)	610	520	446	
Static Pressure ("H_2O)	-8.60	-8.70	-8.90	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.04	0.04	0.04	
Oxygen (O_2) Content (%)	20.93	20.93	20.93	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.03	79.03	79.03	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.425	0.465	0.446	
Absolute Stack Pressure ("Hg)	28.63	28.64	28.64	
Absolute Stack Temperature (°R)	522.1	517.1	518.3	519.2
Flue Gas Moisture (%)	1.80	1.79	1.80	1.80
Moisture at saturation	2.21	2.03	2.06	
Moisture used in Calculation	1.80	1.79	1.80	1.80
Gas Molecular Weight (Wet) (g/g-mole)	28.65	28.65	28.65	
Average Gas Velocity (ft/sec)	24.34	26.49	25.46	25.43
Avg Flow Rate (acfh)	619,452	674,042	647,899	647,131
Avg Flow Rate (acfm)	10,324	11,234	10,798	10,786
Avg Flow Rate (scfh)	599,365	658,781	631,752	629,966
Avg Flow Rate (scfm)	9,989	10,980	10,529	10,499
Avg Flow Rate (dscfh)	588,594	646,962	620,398	618,652
Avg Flow Rate (dscfm)	9,810	10,783	10,340	10,311
Avg Flow Rate (scmm)	282.87	310.91	298.15	297

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEI-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.26**	Entered By (initials)	***seh***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	29-Feb	Static Press ("H_2O)	-8.6	Corrected by (initials)	
Duct Diameter (ft)	3	% CO			
Duct Depth (ft)		% CO_2	0.04445574		
Duct Width (ft)		% O_2	20.93		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	13:50	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	610	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.19		62		0.4249
Individual Readings	0.22		55		0.4690416
	0.18		66		0.41833
	0.23		66		0.4795832
	0.27		66		0.5196152
	0.35		66		0.591608
	0.21		66		0.4582576
	0.18		66		0.4242641
	0.22		66		0.4690416
	0.19		57		0.4358899
	0.11		61		0.3316625
	0.17		56		0.4123106
	0.12		55		0.3464102
	0.12		59		0.3464102
	0.14		63		0.374165739
	0.13		63		0.360555128
	0.13		63		0.360555128

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEI-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.28	Entered By (initials)	***seh***
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	***knb***
Date	29-Feb	Static Press ("H_2O)	-8.7	Corrected by (initials)	
Duct Diameter (ft)	3	% CO			
Duct Depth (ft)		% CO_2	0.044721548		
Duct Width (ft)		% O_2	20.93		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	15:20	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	520	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.22		57		0.4646
Individual Readings	0.36		48		0.6
	0.22		54		0.4636809
	0.19		59		0.4301163
	0.23		59		0.4795832
	0.31		59		0.5567764
	0.27		59		0.5196152
	0.39		59		0.6244998
	0.22		57		0.4690416
	0.16		57		0.4
	0.15		57		0.3872983
	0.20		59		0.4472136
	0.20		59		0.4472136
	0.20		57		0.4472136
	0.22		57		0.469041576
	0.12		57		0.346410162
	0.12		57		0.346410162

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEI-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.29	Entered By (initials)	*seh*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	29-Feb	Static Press ("H_2O)	-8.9	Corrected by (initials)	
Duct Diameter (ft)	3	% CO			
Duct Depth (ft)		% CO_2	0.044354303		
Duct Width (ft)		% O_2	20.93		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	16:34	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	446	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.21		58		0.4461
Individual Readings	0.16		57		0.4
	0.14		57		0.3741657
	0.21		59		0.4582576
	0.26		59		0.509902
	0.38		59		0.6164414
	0.26		59		0.509902
	0.30		59		0.543139
	0.27		59		0.5196152
	0.26		54		0.509902
	0.11		57		0.3316625
	0.14		58		0.3674235
	0.15		59		0.3872983
	0.16		59		0.4
	0.20		59		0.441588043
	0.15		59		0.380788655
	0.15		59		0.387298335

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**
Project Number	
Facility	**Gresham**

Sample Type	Flow	Flow	Flow	Averages
Source	=I4	PEN	PEN	
Run	1	2	3	
Date	3/4/2024	3/4/2024	3/4/2024	
Time Start	17:00	17:55	18:37	
Time Stop	17:00	17:55	18:37	
	17:00-17:00	17:55-17:55	18:37-18:37	
Duct Diameter (ft) *(equivalent if square duct)*	1.98	1.98	1.98	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.61	29.62	29.62	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.61	29.62	29.62	
Average Stack Temperature (°F)	53.8	53.6	53.2	53.5
Test Duration (minutes)	420	365	323	
Static Pressure ("H_2O)	-17.46	-18.50	-17.95	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.05	0.05	0.05	
Oxygen (O_2) Content (%)	20.96	20.96	20.96	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	78.99	78.99	78.99	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.366	0.367	0.343	
Absolute Stack Pressure ("Hg)	28.33	28.26	28.30	
Absolute Stack Temperature (°R)	513.8	513.6	513.2	513.5
Flue Gas Moisture (%)	1.51	1.45	1.47	1.48
Moisture at saturation	1.97	1.98	1.97	
Moisture used in Calculation	1.51	1.45	1.47	1.48
Gas Molecular Weight (Wet) (g/g-mole)	28.68	28.69	28.69	
Average Gas Velocity (ft/sec)	20.91	20.95	19.56	20.47
Avg Flow Rate (acfh)	199,805	200,220	186,948	195,658
Avg Flow Rate (acfm)	3,330	3,337	3,116	3,261
Avg Flow Rate (scfh)	194,408	194,426	181,929	190,254
Avg Flow Rate (scfm)	3,240	3,240	3,032	3,171
Avg Flow Rate (dscfh)	191,466	191,614	179,256	187,445
Avg Flow Rate (dscfm)	3,191	3,194	2,988	3,124
Avg Flow Rate (scmm)	91.75	91.76	85.86	90

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEN	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.61**	Entered By (initials)	*af*
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-17.459	Corrected by (initials)	
Duct Diameter (ft)	1.979166667	% CO			
Duct Depth (ft)		% CO_2	0.045318198		
Duct Width (ft)		% O_2	20.96		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	17:00	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	420	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.14		54		0.3661
Individual Readings	0.18		49		0.4195235
	0.16		50		0.3937004
	0.16		53		0.3974921
	0.06		55		0.248998
	0.13		55		0.363318
	0.13		55		0.3619392
	0.14		55		0.3741657
	0.16		55		0.3974921
	0.14		54		0.3714835
	0.31		48		0.5540758
	0.10		55		0.3162278
	0.13		55		0.3591657
	0.11		56		0.3376389
	0.11		55		0.324037035
	0.10		55		0.32249031
	0.10		55		0.316227766

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEN	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.62	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-18.501	Corrected by (initials)	
Duct Diameter (ft)	1.979166667	% CO			
Duct Depth (ft)		% CO_2	0.045584885		
Duct Width (ft)		% O_2	20.96		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	17:55	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	365	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.14		54		0.3666
Individual Readings	0.18		48		0.4230839
	0.13		48		0.3535534
	0.14		52		0.3687818
	0.06		55		0.2529822
	0.11		56		0.334664
	0.12		56		0.3464102
	0.12		56		0.3521363
	0.15		56		0.3847077
	0.22		47		0.4722288
	0.25		50		0.5
	0.16		54		0.3962323
	0.15		55		0.3860052
	0.10		56		0.3130495
	0.11		56		0.33015148
	0.11		56		0.33015148
	0.10		56		0.320936131

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PEN	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.62	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	4-Mar	Static Press ("H_2O)	-17.953	Corrected by (initials)	
Duct Diameter (ft)	1.979166667	% CO			
Duct Depth (ft)		% CO_2	0.046680352		
Duct Width (ft)		% O_2	20.96		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	18:37	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	323	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.12		53		0.3426
Individual Readings	0.08		51		0.2898275
	0.08		48		0.2774887
	0.08		52		0.2880972
	0.08		55		0.2828427
	0.12		55		0.3391165
	0.13		55		0.3577709
	0.14		55		0.372827
	0.16		55		0.3962323
	0.15		50		0.3911521
	0.25		49		0.501996
	0.11		52		0.3376389
	0.14		54		0.3714835
	0.10		55		0.3162278
	0.11		55		0.324037035
	0.11		55		0.328633535
	0.09		55		0.306594194

Flow Calculation Summary

Project Name	**2024 Intel Compliance**
Project Number	
Facility	**Ocotillo**

Sample Type	Flow	Flow	Flow	Averages
Source	PES-001	PES-001	PES-001	
Run	1	2	3	
Date	3/2/2024	3/2/2024	3/2/2024	
Time Start	11:00	12:10	13:18	
Time Stop	11:00	12:10	13:18	
	11:00-11:00	12:10-12:10	13:18-13:18	
Duct Diameter (ft) *(equivalent if square duct)*	4.42	4.42	4.42	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.25	29.26	29.24	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.25	29.26	29.24	
Average Stack Temperature (°F)	56.8	58.1	57.3	57.4
Test Duration (minutes)	780	710	642	
Static Pressure ("H_2O)	-8.32	-8.30	-8.40	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.05	0.05	0.05	
Oxygen (O_2) Content (%)	20.92	20.92	20.92	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.03	79.03	79.03	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.451	0.422	0.439	
Absolute Stack Pressure ("Hg)	28.64	28.65	28.62	
Absolute Stack Temperature (°R)	516.8	518.1	517.3	517.4
Flue Gas Moisture (%)	1.65	1.74	1.65	1.68
Moisture at saturation	2.02	2.05	2.03	
Moisture used in Calculation	1.65	1.74	1.65	1.68
Gas Molecular Weight (Wet) (g/g-mole)	28.67	28.66	28.67	
Average Gas Velocity (ft/sec)	25.69	24.10	25.04	24.94
Avg Flow Rate (acfh)	1,417,168	1,329,028	1,380,973	1,375,723
Avg Flow Rate (acfm)	23,619	22,150	23,016	22,929
Avg Flow Rate (scfh)	1,385,820	1,296,857	1,348,372	1,343,683
Avg Flow Rate (scfm)	23,097	21,614	22,473	22,395
Avg Flow Rate (dscfh)	1,362,887	1,274,247	1,326,175	1,321,103
Avg Flow Rate (dscfm)	22,715	21,237	22,103	22,018
Avg Flow Rate (scmm)	654.03	612.05	636.36	634

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.25**	Entered By (initials)	***seh***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	2-Mar	Static Press ("H_2O)	-8.32	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.05132965		
Duct Width (ft)		% O_2	20.92		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	11:00	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	780	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.21		57		0.4510
Individual Readings	0.19		46		0.4358899
	0.13		57		0.3605551
	0.14		58		0.3741657
	0.18		58		0.4242641
	0.25		57		0.5
	0.25		58		0.5029911
	0.25		58		0.5
	0.22		58		0.4690416
	0.28		53		0.5291503
	0.14		58		0.3741657
	0.16		58		0.4
	0.18		58		0.41833
	0.15		58		0.3807887
	0.30		57		0.547722558
	0.28		59		0.529150262
	0.22		58		0.469041576

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.26	Entered By (initials)	***seh***
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	***knb***
Date	2-Mar	Static Press ("H_2O)	-8.3	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.051425442		
Duct Width (ft)		% O_2	20.92		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	12:10	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	710	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.18		58		0.4224
Individual Readings	0.15		56		0.3872983
	0.14		56		0.3741657
	0.11		58		0.3316625
	0.15		59		0.3807887
	0.28		58		0.5291503
	0.15		60		0.3872983
	0.16		59		0.4
	0.17		59		0.4123106
	0.27		53		0.5196152
	0.16		59		0.4
	0.20		59		0.4472136
	0.18		59		0.4242641
	0.15		58		0.3807887
	0.16		59		0.393700394
	0.24		59		0.489897949
	0.25		59		0.5

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-001	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.24	Entered By (initials)	*seh*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	2-Mar	Static Press ("H_2O)	-8.4	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.051008764		
Duct Width (ft)		% O_2	20.92		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	13:18	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	642	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.20		57		0.4391
Individual Readings	0.18		56		0.41833
	0.20		58		0.4472136
	0.20		58		0.4472136
	0.18		58		0.4242641
	0.18		58		0.4242641
	0.19		58		0.4358899
	0.18		58		0.4242641
	0.20		58		0.4472136
	0.31		48		0.5567764
	0.12		57		0.3464102
	0.18		58		0.4242641
	0.14		58		0.3674235
	0.18		58		0.41833
	0.27		59		0.519615242
	0.25		59		0.5
	0.18		58		0.424264069

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**
Project Number	
Facility	**Gresham**

Sample Type	Flow	Flow	Flow	Averages
Source	PES-002 (4-1)	PES-002 (4-1)	PES-002 (4-1)	
Run	1	2	3	
Date	3/7/2024	3/7/2024	3/7/2024	
Time Start	19:02	19:53	20:55	
Time Stop	19:02	19:53	20:55	
	19:02-19:02	19:53-19:53	20:55-20:55	
Duct Diameter (ft) *(equivalent if square duct)*	3.46	3.46	3.46	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.83	29.84	29.84	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.83	29.84	29.84	
Average Stack Temperature (°F)	60.4	60.3	59.9	60.2
Test Duration (minutes)	298	247	185	
Static Pressure ("H_2O)	-8.62	-8.65	-8.68	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.05	0.05	0.05	
Oxygen (O_2) Content (%)	20.68	20.68	20.68	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.27	79.27	79.27	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.574	0.565	0.567	
Absolute Stack Pressure ("Hg)	29.20	29.20	29.20	
Absolute Stack Temperature (°R)	520.4	520.3	519.9	520.2
Flue Gas Moisture (%)	1.63	1.65	1.65	1.64
Moisture at saturation	2.10	2.09	2.08	
Moisture used in Calculation	1.63	1.65	1.65	1.64
Gas Molecular Weight (Wet) (g/g-mole)	28.66	28.66	28.66	
Average Gas Velocity (ft/sec)	32.50	32.01	32.08	32.20
Avg Flow Rate (acfh)	1,098,902	1,082,431	1,084,867	1,088,734
Avg Flow Rate (acfm)	18,315	18,041	18,081	18,146
Avg Flow Rate (scfh)	1,088,024	1,072,255	1,075,249	1,078,510
Avg Flow Rate (scfm)	18,134	17,871	17,921	17,975
Avg Flow Rate (dscfh)	1,070,257	1,054,572	1,057,544	1,060,791
Avg Flow Rate (dscfm)	17,838	17,576	17,626	17,680
Avg Flow Rate (scmm)	513.49	506.05	507.46	509

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-002 (4-1)	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.83**	Entered By (initials)	*af*
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	*knb*
Date	7-Mar	Static Press ("H_2O)	-8.622	Corrected by (initials)	
Duct Diameter (ft)	3.458333333	% CO			
Duct Depth (ft)		% CO_2	0.046057578		
Duct Width (ft)		% O_2	20.68		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	19:02	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	298	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.33		60		0.5738
Individual Readings	0.20		69		0.4494441
	0.29		63		0.5338539
	0.36		60		0.5966574
	0.39		60		0.6244998
	0.37		59		0.6074537
	0.35		59		0.594138
	0.31		59		0.560357
	0.27		59		0.5234501
	0.32		62		0.56921
	0.33		60		0.5779273
	0.38		60		0.6188699
	0.40		60		0.6308724
	0.36		59		0.6016644
	0.35		59		0.589067059
	0.33		59		0.577061522
	0.28		59		0.526307895

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-002 (4-1)	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.84	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	7-Mar	Static Press ("H_2O)	-8.654	Corrected by (initials)	
Duct Diameter (ft)	3.458333333	% CO			
Duct Depth (ft)		% CO_2	0.046350695		
Duct Width (ft)		% O_2	20.68		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	19:53	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	247	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.32		60		0.5653
Individual Readings	0.27		62		0.5234501
	0.30		61		0.543139
	0.37		60		0.6074537
	0.39		60		0.621289
	0.37		60		0.6041523
	0.32		60		0.56921
	0.31		59		0.559464
	0.28		59		0.5244044
	0.20		62		0.4483302
	0.29		62		0.5357238
	0.36		61		0.6024948
	0.35		60		0.5899152
	0.38		60		0.6123724
	0.36		59		0.600832755
	0.35		59		0.588217647
	0.27		60		0.514781507

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-002 (4-1)	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.84	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	7-Mar	Static Press ("H_2O)	-8.678	Corrected by (initials)	
Duct Diameter (ft)	3.458333333	% CO			
Duct Depth (ft)		% CO_2	0.046146842		
Duct Width (ft)		% O_2	20.68		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	20:55	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	185	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.32		60		0.5668
Individual Readings	0.22		64		0.4732864
	0.31		62		0.5531727
	0.35		60		0.594979
	0.37		59		0.6107373
	0.37		59		0.60663
	0.33		59		0.5727128
	0.32		59		0.5621388
	0.27		59		0.5215362
	0.25		62		0.5029911
	0.33		61		0.5770615
	0.38		60		0.6131884
	0.38		59		0.6180615
	0.35		59		0.5932959
	0.35		59		0.587367006
	0.33		59		0.577927331
	0.25		59		0.502991054

Flow Calculation Summary

Project Name	**2024 Intel Compliance**
Project Number	
Facility	**Ocotillo**

Sample Type	Flow	Flow	Flow	Averages
Source	PES-002	PES-002	PES-002	
Run	1	2	3	
Date	3/1/2024	3/1/2024	3/1/2024	
Time Start	18:38	20:40	21:00	
Time Stop	18:38	20:40	21:00	
	18:38-18:38	20:40-20:40	21:00-21:00	
Duct Diameter (ft) *(equivalent if square duct)*	4.42	4.42	4.42	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.11	29.05	29.01	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.11	29.05	29.01	
Average Stack Temperature (°F)	54.8	58.8	58.3	57.3
Test Duration (minutes)	322	200	180	
Static Pressure ("H_2O)	-8.50	-8.40	-8.40	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.06	0.06	0.06	
Oxygen (O_2) Content (%)	20.89	20.89	20.89	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.05	79.05	79.05	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.321	0.326	0.320	
Absolute Stack Pressure ("Hg)	28.49	28.43	28.39	
Absolute Stack Temperature (°R)	514.8	518.8	518.3	517.3
Flue Gas Moisture (%)	1.84	1.81	1.81	1.82
Moisture at saturation	1.98	2.09	2.08	
Moisture used in Calculation	1.84	1.81	1.81	1.82
Gas Molecular Weight (Wet) (g/g-mole)	28.65	28.65	28.65	
Average Gas Velocity (ft/sec)	18.30	18.66	18.37	18.44
Avg Flow Rate (acfh)	1,009,602	1,029,350	1,012,966	1,017,306
Avg Flow Rate (acfm)	16,827	17,156	16,883	16,955
Avg Flow Rate (scfh)	985,921	995,492	979,330	986,914
Avg Flow Rate (scfm)	16,432	16,592	16,322	16,449
Avg Flow Rate (dscfh)	967,821	977,501	961,630	968,984
Avg Flow Rate (dscfm)	16,130	16,292	16,027	16,150
Avg Flow Rate (scmm)	465.30	469.82	462.19	466

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-002	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.11**	Entered By (initials)	***seh***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	1-Mar	Static Press ("H_2O)	-8.5	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.059070583		
Duct Width (ft)		% O_2	20.89		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	18:38	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	322	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.13		55		0.3209
Individual Readings	0.03		45		0.1732051
	0.02		46		0.1396424
	0.07		50		0.2645751
	0.09		54		0.3
	0.11		54		0.324037
	0.10		54		0.3193744
	0.09		54		0.3
	0.08		54		0.2828427
	0.08		52		0.2828427
	0.07		59		0.254951
	0.75		59		0.8660254
	0.11		59		0.3316625
	0.11		59		0.3316625
	0.10		59		0.316227766
	0.10		59		0.316227766
	0.11		59		0.331662479

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-002	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.05	Entered By (initials)	***seh***
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	***knb***
Date	1-Mar	Static Press ("H_2O)	-8.4	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.059482677		
Duct Width (ft)		% O_2	20.89		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	20:40	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	200	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.11		59		0.3256
Individual Readings	0.09		60		0.2915476
	0.09		59		0.2915476
	0.09		59		0.3
	0.10		60		0.3162278
	0.11		58		0.3316625
	0.11		59		0.324037
	0.11		59		0.334664
	0.09		59		0.3
	0.12		58		0.3391165
	0.19		55		0.4358899
	0.14		55		0.3741657
	0.10		60		0.3162278
	0.10		60		0.3209361
	0.10		60		0.316227766
	0.10		60		0.3082207
	0.10		60		0.309838668

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-002	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.01	Entered By (initials)	*seh*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	1-Mar	Static Press ("H_2O)	-8.4	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.059015502		
Duct Width (ft)		% O_2	20.89		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	21:00	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	180	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.11		58		0.3204
Individual Readings	0.14		54		0.3741657
	0.08		54		0.2863564
	0.09		59		0.2966479
	0.10		59		0.3162278
	0.11		59		0.3316625
	0.10		60		0.3162278
	0.11		60		0.3316625
	0.09		59		0.2915476
	0.26		56		0.509902
	0.08		57		0.2738613
	0.07		58		0.2626785
	0.10		60		0.3162278
	0.11		59		0.3316625
	0.10		60		0.3082207
	0.09		59		0.296647939
	0.08		59		0.282842712

Flow Calculation Summary

Project Name	**2024 Intel Compliance**
Project Number	
Facility	**Ocotillo**

Sample Type	Flow	Flow	Flow	Averages
Source	PES-003	PES-003	PES-003	
Run	1	2	3	
Date	3/1/2024	3/1/2024	3/1/2024	
Time Start	15:15	16:59	17:45	
Time Stop	15:15	16:59	17:45	
	15:15-15:15	16:59-16:59	17:45-17:45	
Duct Diameter (ft) *(equivalent if square duct)*	4.42	4.42	4.42	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.24	29.11	29.11	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.24	29.11	29.11	
Average Stack Temperature (°F)	57.2	56.6	55.9	56.6
Test Duration (minutes)	525	421	375	
Static Pressure ("H_2O)	-8.50	-8.40	-8.34	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.05	0.05	0.05	
Oxygen (O_2) Content (%)	20.80	20.80	20.80	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.15	79.15	79.15	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.606	0.586	0.586	
Absolute Stack Pressure ("Hg)	28.62	28.49	28.50	
Absolute Stack Temperature (°R)	517.2	516.6	515.9	516.6
Flue Gas Moisture (%)	1.79	1.80	1.80	1.80
Moisture at saturation	2.03	2.02	2.00	
Moisture used in Calculation	1.79	1.80	1.80	1.80
Gas Molecular Weight (Wet) (g/g-mole)	28.65	28.65	28.64	
Average Gas Velocity (ft/sec)	34.58	33.50	33.46	33.85
Avg Flow Rate (acfh)	1,907,175	1,847,478	1,845,477	1,866,710
Avg Flow Rate (acfm)	31,786	30,791	30,758	31,112
Avg Flow Rate (scfh)	1,862,124	1,798,279	1,798,786	1,819,730
Avg Flow Rate (scfm)	31,035	29,971	29,980	30,329
Avg Flow Rate (dscfh)	1,828,773	1,765,939	1,766,374	1,787,029
Avg Flow Rate (dscfm)	30,480	29,432	29,440	29,784
Avg Flow Rate (scmm)	878.82	848.69	848.93	859

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-003	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.24**	Entered By (initials)	***seh***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	1-Mar	Static Press ("H_2O)	-8.5	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.050060577		
Duct Width (ft)		% O_2	20.8		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	15:15	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	525	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.37		57		0.6062
Individual Readings	0.38		45		0.6164414
	0.26		50		0.5049752
	0.29		57		0.5338539
	0.30		57		0.5477226
	0.35		57		0.587367
	0.58		57		0.7615773
	0.48		57		0.6892024
	0.36		57		0.6
	0.24		59		0.484768
	0.31		59		0.5522681
	0.30		59		0.543139
	0.34		59		0.5830952
	0.50		59		0.7071068
	0.50		61		0.707106781
	0.41		61		0.640312424
	0.41		61		0.640312424

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-003	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.11	Entered By (initials)	***seh***
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	***knb***
Date	1-Mar	Static Press ("H_2O)	-8.4	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.05054356		
Duct Width (ft)		% O_2	20.8		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	16:59	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	421	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.36		57		0.5863
Individual Readings	0.27		48		0.5196152
	0.28		57		0.5291503
	0.29		57		0.5385165
	0.27		57		0.5196152
	0.30		57		0.5477226
	0.58		59		0.7615773
	0.27		57		0.5196152
	0.26		57		0.509902
	0.24		55		0.4898979
	0.21		57		0.4527693
	0.24		57		0.4898979
	0.32		57		0.5656854
	0.57		57		0.7516648
	0.52		59		0.717635005
	0.60		57		0.771362431
	0.49		57		0.696419414

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-003	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.11	Entered By (initials)	*seh*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	1-Mar	Static Press ("H_2O)	-8.34	Corrected by (initials)	
Duct Diameter (ft)	4.416666667	% CO			
Duct Depth (ft)		% CO_2	0.050915785		
Duct Width (ft)		% O_2	20.8		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	17:45	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	375	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.36		56		0.5861
Individual Readings	0.28		48		0.5291503
	0.27		57		0.522494
	0.29		57		0.5385165
	0.30		57		0.5477226
	0.35		59		0.591608
	0.40		59		0.6284903
	0.41		59		0.6403124
	0.51		57		0.7141428
	0.15		48		0.3872983
	0.23		52		0.4795832
	0.31		57		0.5522681
	0.40		57		0.6324555
	0.64		57		0.8
	0.61		57		0.777817459
	0.15		57		0.387298335
	0.42		57		0.64807407

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**
Project Number	
Facility	**Gresham**

Sample Type	Flow	Flow	Flow	Averages
Source	PES-005	PES-005	PES-005	
Run	1	2	3	
Date	3/5/2024	3/5/2024	3/5/2024	
Time Start	19:30	20:20	21:35	
Time Stop	19:30	20:20	21:35	
	19:30-19:30	20:20-20:20	21:35-21:35	
Duct Diameter (ft) *(equivalent if square duct)*	4.00	4.00	4.00	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.62	29.62	29.63	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.62	29.62	29.63	
Average Stack Temperature (°F)	56.7	56.9	56.9	56.8
Test Duration (minutes)	270	220	145	
Static Pressure ("H_2O)	-8.54	-8.53	-5.68	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.08	0.09	0.09	
Oxygen (O_2) Content (%)	20.66	20.66	20.66	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.26	79.25	79.25	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.643	0.646	0.661	
Absolute Stack Pressure ("Hg)	28.99	28.99	29.21	
Absolute Stack Temperature (°R)	516.7	516.9	516.9	516.8
Flue Gas Moisture (%)	1.60	1.64	1.64	1.63
Moisture at saturation	1.99	2.00	1.98	
Moisture used in Calculation	1.60	1.64	1.64	1.63
Gas Molecular Weight (Wet) (g/g-mole)	28.67	28.66	28.66	
Average Gas Velocity (ft/sec)	36.40	36.57	37.28	36.75
Avg Flow Rate (acfh)	1,646,569	1,654,254	1,686,514	1,662,446
Avg Flow Rate (acfm)	27,443	27,571	28,109	27,707
Avg Flow Rate (scfh)	1,630,422	1,637,277	1,682,072	1,649,923
Avg Flow Rate (scfm)	27,174	27,288	28,035	27,499
Avg Flow Rate (dscfh)	1,604,255	1,610,470	1,654,429	1,623,051
Avg Flow Rate (dscfm)	26,738	26,841	27,574	27,051
Avg Flow Rate (scmm)	769.47	772.71	793.85	779

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-005	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.62**	Entered By (initials)	***af***
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	***knb***
Date	5-Mar	Static Press ("H_2O)	-8.543	Corrected by (initials)	
Duct Diameter (ft)	4	% CO			
Duct Depth (ft)		% CO_2	0.082557564		
Duct Width (ft)		% O_2	20.66		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	19:30	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	270	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.41		57		0.6428
Individual Readings	0.31		54		0.5558777
	0.38		57		0.6164414
	0.40		57		0.6340347
	0.43		57		0.6526868
	0.45		57		0.6678323
	0.48		57		0.694982
	0.45		57		0.669328
	0.46		57		0.6774954
	0.34		55		0.5865151
	0.37		56		0.6058052
	0.38		57		0.6156298
	0.44		57		0.660303
	0.45		57		0.6708204
	0.43		57		0.657267069
	0.44		57		0.664078309
	0.43		58		0.655743852

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-005	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.62	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	5-Mar	Static Press ("H_2O)	-8.534	Corrected by (initials)	
Duct Diameter (ft)	4	% CO			
Duct Depth (ft)		% CO_2	0.086376262		
Duct Width (ft)		% O_2	20.66		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	20:20	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	220	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.42		57		0.6456
Individual Readings	0.37		56		0.6107373
	0.43		57		0.6565059
	0.42		57		0.6449806
	0.43		57		0.6526868
	0.46		57		0.678233
	0.46		57		0.6774954
	0.46		57		0.678233
	0.46		59		0.676757
	0.37		56		0.6107373
	0.45		57		0.6685806
	0.38		57		0.6196773
	0.40		57		0.6356099
	0.40		57		0.6300794
	0.37		57		0.609097693
	0.42		57		0.64807407
	0.40		56		0.632455532

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-005	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.63	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	5-Mar	Static Press ("H_2O)	-5.679	Corrected by (initials)	
Duct Diameter (ft)	4	% CO			
Duct Depth (ft)		% CO_2	0.087466122		
Duct Width (ft)		% O_2	20.66		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	21:35	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	145	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.44		57		0.6607
Individual Readings	0.41		57		0.6387488
	0.41		57		0.6426508
	0.42		57		0.6457554
	0.45		57		0.6723095
	0.43		57		0.6549809
	0.46		56		0.6789698
	0.42		58		0.6457554
	0.47		56		0.6819091
	0.32		55		0.5674504
	0.43		56		0.6587868
	0.46		57		0.6797058
	0.45		57		0.6685806
	0.47		57		0.6884766
	0.47		57		0.682641927
	0.51		58		0.716240183
	0.42		58		0.648845128

Flow Calculation Summary

Project Name	**2024 Microchip Compliance**
Project Number	
Facility	**Gresham**

Sample Type	Flow	Flow	Flow	Averages
Source	PES-006	PES-006	PES-006	
Run	1	2	3	
Date	3/7/2024	3/7/2024	3/7/2024	
Time Start	10:45	11:55	13:05	
Time Stop	10:45	11:55	13:05	
	10:45-10:45	11:55-11:55	13:05-13:05	
Duct Diameter (ft) *(equivalent if square duct)*	2.96	2.96	2.96	
Pitot Tube Correction Factor	0.84	0.84	0.84	
Standard Temperature (°F)	68	68	68	
Barometric Pressure Measured (" Hg)	29.80	29.80	29.80	
Stack Elevation (ft) (relative to Barometer)	0	0	0	
Barometric Pressure ("Hg)	29.8	29.8	29.8	
Average Stack Temperature (°F)	58.1	57.1	57.2	57.5
Test Duration (minutes)	795	725	655	
Static Pressure ("H_2O)	-6.17	-6.16	-6.13	
Carbon Monoxide (CO) Content (%)	0	0	0	
Carbon Dioxide (CO_2) Content (%)	0.09	0.09	0.09	
Oxygen (O_2) Content (%)	20.68	20.68	20.68	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	79.23	79.23	79.23	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.531	0.544	0.550	
Absolute Stack Pressure ("Hg)	29.35	29.35	29.35	
Absolute Stack Temperature (°R)	518.1	517.1	517.2	517.5
Flue Gas Moisture (%)	1.56	1.57	1.56	1.56
Moisture at saturation	2.01	1.98	1.98	
Moisture used in Calculation	1.56	1.57	1.56	1.56
Gas Molecular Weight (Wet) (g/g-mole)	28.67	28.67	28.67	
Average Gas Velocity (ft/sec)	29.90	30.64	30.96	30.50
Avg Flow Rate (acfh)	739,819	758,293	766,108	754,740
Avg Flow Rate (acfm)	12,330	12,638	12,768	12,579
Avg Flow Rate (scfh)	739,466	759,421	767,199	755,362
Avg Flow Rate (scfm)	12,324	12,657	12,787	12,589
Avg Flow Rate (dscfh)	727,915	747,516	755,252	743,561
Avg Flow Rate (dscfm)	12,132	12,459	12,588	12,393
Avg Flow Rate (scmm)	348.99	358.41	362.08	356

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-006	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	**29.8**	Entered By (initials)	*af*
Run	1	Meter Elev (ft) (rel to Brmtr)	**0**	Checked by (initials)	*knb*
Date	7-Mar	Static Press ("H_2O)	-6.169	Corrected by (initials)	
Duct Diameter (ft)	2.958333333	% CO			
Duct Depth (ft)		% CO_2	0.088086535		
Duct Width (ft)		% O_2	20.68		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	10:45	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	795	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.28		58		0.5306
Individual Readings	0.22		61		0.4690416
	0.24		58		0.4909175
	0.30		58		0.5495453
	0.36		58		0.5966574
	0.35		59		0.594138
	0.32		59		0.5683309
	0.29		60		0.5357238
	0.26		59		0.5069517
	0.18		55		0.4266146
	0.23		56		0.4743416
	0.29		57		0.5375872
	0.36		58		0.6
	0.36		58		0.6024948
	0.22		58		0.470106371
	0.34		58		0.57965507
	0.24		58		0.486826458

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-006	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.8	Entered By (initials)	*af*
Run	2	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	7-Mar	Static Press ("H_2O)	-6.156	Corrected by (initials)	
Duct Diameter (ft)	2.958333333	% CO			
Duct Depth (ft)		% CO_2	0.088569395		
Duct Width (ft)		% O_2	20.68		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	11:55	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	725	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.30		57		0.5443
Individual Readings	0.22		54		0.4669047
	0.27		56		0.5157519
	0.34		57		0.5796551
	0.36		58		0.5991661
	0.35		58		0.591608
	0.32		58		0.56921
	0.33		58		0.5700877
	0.23		58		0.4827007
	0.26		54		0.5059644
	0.25		56		0.4949747
	0.31		57		0.5585696
	0.33		58		0.5779273
	0.34		58		0.5865151
	0.33		58		0.577061522
	0.30		58		0.549545267
	0.23		58		0.483735465

Flow Calculation Summary

Data Entry Area

Sample Type	Flow	Nozzle Diameter (in)			
Source	PES-006	Std Temp (°F)	68		
Condition		Bar Press ("Hg, meas)	29.8	Entered By (initials)	*af*
Run	3	Meter Elev (ft) (rel to Brmtr)	0	Checked by (initials)	*knb*
Date	7-Mar	Static Press ("H_2O)	-6.133	Corrected by (initials)	
Duct Diameter (ft)	2.958333333	% CO			
Duct Depth (ft)		% CO_2	0.088262502		
Duct Width (ft)		% O_2	20.68		
Pitot Tube Correction Factor	0.84	% H_2			
DGMCF		% CH_4			

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	13:05	start		1		
stop		stop		2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
				Total Wt Gain		0.0
Duration	655	Total	0.000			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	$(\sqrt{\Delta P})_{avg}$
Averages	0.30		57		0.5499
Individual Readings	0.22		55		0.4690416
	0.25		56		0.501996
	0.31		57		0.5576737
	0.36		58		0.6008328
	0.36		58		0.6016644
	0.33		58		0.5735852
	0.31		58		0.560357
	0.26		58		0.5128353
	0.25		53		0.4949747
	0.23		56		0.4816638
	0.33		58		0.5774946
	0.36		58		0.5974948
	0.37		58		0.60663
	0.34		58		0.584807661
	0.32		58		0.561248608
	0.27		58		0.516720427

Appendix B

Field Data Sheets and Site Logbooks

Analyzer Negative Pressure Leak Check

Project	225-01-2303 M
Facility	Microchip
Source	Multiple
Operator	J. Johnson
Date	02-23-29

Analyzer Serial Number:	8750123
Initial (-)	0.0 @ 0.0 psi

Analyzer Serial Number:	8760123
Initial (-)	0.0 @ 0.0 psi

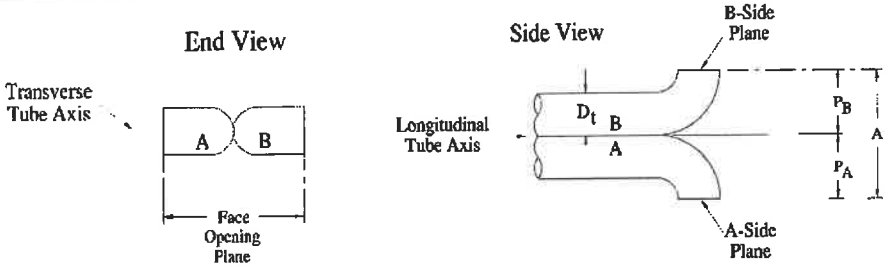
Spectrum ENVIRONMENTAL SOLUTIONS

S-Type Pitot Tube Inspection

Probe ID	PT1
Pitot ID	PT1
Caliper ID	JLP-1
Caliper Calibration Expiration Date	

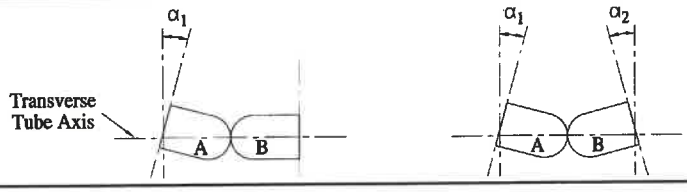
Calibrated by	Initials	JKY
	Date	4/25/24
Reviewed by	Initials	
	Date	

General Pitot Tube Alignment

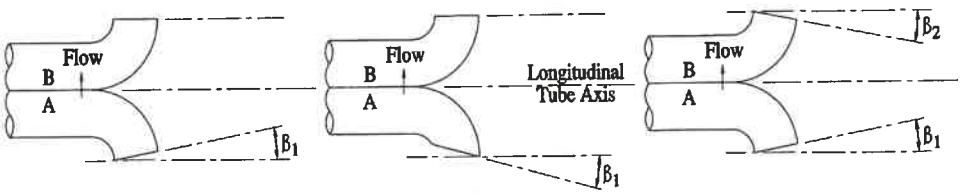


A = 0.935 "
D_t = 0.350 "
$0.188" \le D_t \le 0.375"$? Y (y/n)
$1.05 \le A/2D_t \le 1.50$? Y (y/n)

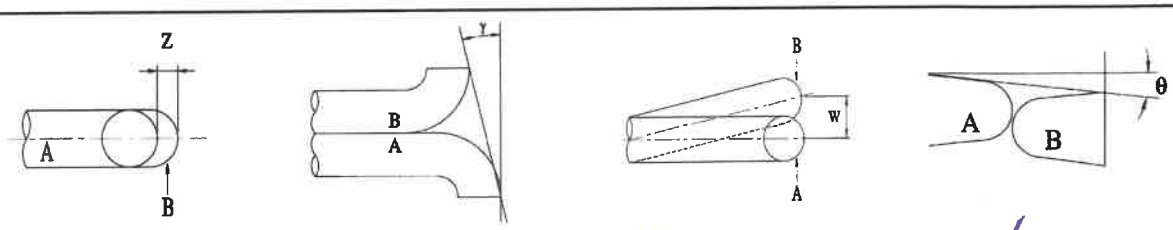
Misalignment



α_1 = 2.2 °
α_2 = 3.1 °
$\alpha_1 \le 10°$? Y (y/n)
$\alpha_2 \le 10°$? Y (y/n)



β_1 = 0.4
β_2 = 0.3
$\beta_1 \le 5°$? Y (y/n)
$\beta_2 \le 5°$? Y (y/n)



γ = 1.8 °
θ = 0.2 °
$Z = A \tan(\gamma)$ = 0.08
$W = A \tan(\theta)$ = 0.01
$Z \le 0.125"$? Y (y/n)
$W \le 0.031"$? Y (y/n)

Acceptability for Use (Circle Selection)	If all answers are "Y", this pitot tube is available for use, and may be assigned a correction factor of 0.84	If all answers except the first (D_t) are "Y", this pitot tube is available for use, but needs to be calibrated using a wind tunnel.	Any other situation, the pitot tube must be removed from service.

Stack Thermocouple Calibration

Thermometer (or Readout/TC)	ID	Mercury Thermometer
	Calibration Expiration Date	
Temperature Readout	ID	Digital TC1
	Calibration Expiration Date	

Calibrated by	Initials	JKY
	Date	4/25/24
Reviewed by	Initials	
	Date	

Reference Thermometer	Thermocouple Readout	Compare readings	Calculate applicability range for thermocouple	
T_F = 100 °F	T_F = 102 °F	$\frac{T_{abs,TC}}{T_{abs,RT}}$ = 0.996	$Min_{abs} = 0.9 \times T_{abs,TC}$	$Min_F = Min_{abs} - 460$
$T_{abs,RT}$ = 560 °R	$T_{abs,TC}$ = 562 °R	Is this between 0.985 and 1.015? Y (y/n)	505.8 °R	45.8 °F
			$Max_{abs} = 1.1 \times T_{abs,TC}$	$Max_F = Max_{abs} - 460$
			618.2 °R	158.2 °F

Spectrum

EPA Method 1
Circular Duct – Determination of Traverse Points

Project: 225-01-2303 M	
Facility: Microchip, Gresham OR	
Source: RTO	
Operator: J. Johnson	
Date: 2-26-24	

☒ Velocity Only ☐ Isokinetic Sampling	Upstream Distance (ft/in) 8'4" Upstream Distance (diameters) 2.11 ☒ Measurement ☐ Plant Information
Number of Ports to be sampled 2	
Duct Diameter (in) 47 3/8" ☒ Measurement ☐ Plant Information	Downstream Distance (ft/in) 12'10 1/2" Downstream Distance (diameters) 3.26 ☒ Measurement ☐ Plant Information

Total number of Traverse Points (from Figure 2 (velocity) or 1 (all isokinetic sampling))	16
Number of traverse points per port	8
Port Depth	3 3/4

Traverse Point	Percent of Diameter	Distance from Wall [1] (in)	Marking Location (in)
1	3.2	1 1/2	5 1/4
2	10.5	5	8 3/4
3	19.4	9 3/16	12 15/16
4	32.3	15 5/16	19 1/16
5	67.7	32 1/16	35 13/16
6	80.6	38 3/16	41 15/16
7	89.5	42 3/8	46 1/8
8	96.8	45 7/8	49 5/8
9			
10			
11			
12			

Traverse Point	Percent of Diameter	Distance from Wall (in)	Marking Location (in)
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Prepare a drawing of the source, showing the ports, disturbances, and the distances

[1] According to Method 1, for stacks between 12 and 24", no point may be within ½ inch of the wall. For stacks greater than 24", no point may be within 1 inch of the wall.

Spectrum ENVIRONMENTAL SOLUTIONS

Determination of Cyclonic Flow
EPA Method 1

Project	225-01-2303 M
Facility	Microchip, Gresham OR
Source	RCO
Operator	J. Johnson, S. Springer
Date	2/27/24
Pitot Tube No.	PT-1

Pitot Tube Leak Check ("H_2O@"H_2O)		
Initial (-)	0.0	@ 24.038
Initial (+)	0.0	@ 22.807
Final (-)	0.0	@ 17.253
Final (+)	0.0	@ 18.915

Traverse Point	Yaw Angle (°)
A 1	0
2	3
3	0
4	3
5	0
6	0
7	-5
8	0

Traverse Point	Yaw Angle (°)
B 1	0
2	0
3	5
4	0
5	0
6	3
7	0
8	0

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	RCO - Run 1
Date	2/27/24
Time	1230 - 1250
Operator	J. Johnson, S. Spurgeon
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.91
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1		
Static Pressure (" wc)	0.13		
Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.368	77
2	0.349	81
3	0.419	82
4	0.364	82
5	0.449	82
6	0.446	82
7	0.502	82
8	0.488	82

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.290	79
2	0.255	81
3	0.265	81
4	0.302	81
5	0.493	82
6	0.522	82
7	0.476	82
8	0.508	82

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	RCO - Run 2
Date	2/27/24
Time	1645-1655
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.80
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1
Static Pressure (" wc)	-0.19

Pitot Tube Leak Check ("H_2O@"H_2O)

Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.329	72
2	0.431	72
3	0.381	72
4	0.410	72
5	0.431	72
6	0.502	72
7	0.501	72
8	0.489	72

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.220	73
2	0.270	73
3	0.226	73
4	0.276	73
5	0.497	73
6	0.490	73
7	0.545	73
8	0.505	73

Spectrum

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	RCO - Run 3
Date	2/27/24
Time	1740 - 1746
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.78
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1	
Static Pressure (" wc)	0.13	
Pitot Tube Leak Check ("H_2O@"H_2O)		
Initial (-)	0.0	@ 24.038
Initial (+)	0.0	@ 22.807
Final (-)	0.0	@ 17.253
Final (+)	0.0	@ 18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.369	70
2	0.372	70
3	0.412	70
4	0.439	72
5	0.472	72
6	0.513	72
7	0.488	72
8	0.504	72

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.257	70
2	0.267	72
3	0.306	72
4	0.341	73
5	0.469	73
6	0.483	73
7	0.505	73
8	0.485	73

Spectrum

EPA Method 1
Circular Duct – Determination of Traverse Points

Project: 225-01-2303M	☒ Velocity Only ☐ Isokinetic Sampling
Facility: Microchip, Gresham OR	Number of Ports to be sampled: 2
Source: TO	Duct Diameter (in): 17 3/4" ☒ Measurement ☐ Plant Information
Operator: J. Johnson	
Date: 2-26-24	

Upstream Distance (ft/in): 2'8"	
Upstream Distance (diameters): 1.80	
☒ Measurement ☐ Plant Information	
Downstream Distance (ft/in): 10'5"	
Downstream Distance (diameters): 7.04	
☒ Measurement ☐ Plant Information	

Total number of Traverse Points (from Figure 2 (velocity) or 1 (all isokinetic sampling))	16
Number of traverse points per port	8
Port Depth	3 1/2"

Traverse Point	Percent of Diameter	Distance from Wall [1] (in)	Marking Location (in)
1	3.2	9/16	4 1/16
2	10.5	1 7/8	5 3/8
3	19.4	3 7/16	6 15/16
4	32.3	5 3/4	9 7/8 1/8
5	67.7	12	15 1/2
6	80.6	14 5/16	17 13/16
7	89.5	15 7/8	19 3/8
8	96.8	17 3/16	20 11/16
9			
10			
11			
12			

Traverse Point	Percent of Diameter	Distance from Wall (in)	Marking Location (in)
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Prepare a drawing of the source, showing the ports, disturbances, and the distances

[1] According to Method 1, for stacks between 12 and 24", no point may be within ½ inch of the wall. For stacks greater than 24", no point may be within 1 inch of the wall.

Spectrum ENVIRONMENTAL SOLUTIONS

Determination of Cyclonic Flow
EPA Method 1

Project	225-01-2303 M
Facility	Microchip, Gresham OR
Source	TO
Operator	J. Johnson, S. Spencer
Date	2/27/24
Pitot Tube No.	PT-1

Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Yaw Angle (°)
A1	-5
2	-5
3	0
4	0
5	0
6	0
7	-5
8	-5

Traverse Point	Yaw Angle (°)
B1	-5
2	0
3	0
4	0
5	0
6	0
7	-5
8	-5

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	TO - Run 1
Date	2/27/24
Time	1425 - 1430
Operator	J. Johnson, S. Spranger
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.83
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC - 1		
Static Pressure (" wc)	-0.17		
Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A 1	0.180	752
2	0.244	759
3	0.201	749
4	0.192	752
5	0.220	756
6	0.253	761
7	0.251	757
8	0.250	756

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B 1	0.183	743
2	0.253	763
3	0.233	765
4	0.245	772
5	0.209	763
6	0.213	765
7	0.240	766
8	0.238	763

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	TO8 - Run 2
Date	2/27/24
Time	1630 - 1640
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.80
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1	
Static Pressure (" wc)	-0.19	
Pitot Tube Leak Check ("H_2O@"H_2O)		
Initial (-)	0.0	@ 24.038
Initial (+)	0.0	@ 22.807
Final (-)	0.0	@ 17.253
Final (+)	0.0	@ 18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.191	667
2	0.186	745
3	0.214	748
4	0.190	761
5	0.181	750
6	0.242	750
7	0.246	750
8	0.261	750

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.241	696
2	0.243	745
3	0.254	748
4	0.249	757
5	0.231	759
6	0.235	759
7	0.259	757
8	0.242	755

Spectrum

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	TO - Run 3
Date	2/27/24
Time	1753 - 1800
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.76
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1
Static Pressure (" wc)	-0.16

Pitot Tube Leak Check ("H_2O@"H_2O)

Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.228	749
2	0.223	757
3	0.181	754
4	0.210	756
5	0.201	759
6	0.238	759
7	0.277	761
8	0.280	757

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.215	684
2	0.234	738
3	0.257	756
4	0.263	763
5	0.211	765
6	0.218	763
7	0.233	765
8	0.231	759

Spectrum

EPA Method 1
Circular Duct – Determination of Traverse Points

Project: 225-01-2303 M	☒ Velocity Only ☐ Isokinetic Sampling Number of Ports to be sampled: 2
Facility: Microchip, Gresham OR	Upstream Distance (ft/in): 8' 8 3/8" Upstream Distance (diameters): 4.35 ☒ Measurement ☐ Plant Information
Source: 4-1 Inlet	Duct Diameter (in): 24 ☐ Measurement ☐ Plant Information
Operator: J. Johnson	Downstream Distance (ft/in): 26' 8 1/4" Downstream Distance (diameters): 13.34 ☒ Measurement ☐ Plant Information
Date: 2-26-24	

Total number of Traverse Points (from Figure 2 (velocity) or 1 (all isokinetic sampling))	16
Number of traverse points per port	8
Port Depth	3 1/4"

Traverse Point	Percent of Diameter	Distance from Wall [1] (in)	Marking Location (in)
1	3.2	3/4	4
2	10.5	2 1/2	5 3/4
3	19.4	4 5/8	7 7/8
4	32.3	7 3/4	11
5	67.7	16 1/4	19 1/2
6	80.6	19 3/8	22 5/8
7	89.5	21 1/2	24 3/8
8	96.8	23 1/4	26 1/2
9			
10			
11			
12			

Traverse Point	Percent of Diameter	Distance from Wall (in)	Marking Location (in)
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Prepare a drawing of the source, showing the ports, disturbances, and the distances

[1] According to Method 1, for stacks between 12 and 24", no point may be within ½ inch of the wall. For stacks greater than 24", no point may be within 1 inch of the wall.

Spectrum ENVIRONMENTAL SOLUTIONS

Determination of Cyclonic Flow
EPA Method 1

Project	225-01-2303 M
Facility	Microchip, Gresham OR
Source	4-1 Inlet
Operator	J. Johnson, S. Sprenger
Date	2/27/24
Pitot Tube No.	PT-1

Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Yaw Angle (°)
A1	5
2	5
3	0
4	0
5	0
6	5
7	3
8	0

Traverse Point	Yaw Angle (°)
B 1	-5
2	0
3	0
4	0
5	0
6	0
7	0
8	5

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	4-1 Inlet - Run 1
Date	2/27/24
Time	1450 - 1455
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.81
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1
Static Pressure (" wc)	-3.54

Pitot Tube Leak Check ("H_2O@"H_2O)

Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.402	63
2	0.625	63
3	0.621	66
4	0.658	70
5	0.787	70
6	0.626	70
7	0.754	70
8	0.763	70

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.530	68
2	0.839	70
3	0.675	68
4	0.644	72
5	0.702	72
6	0.645	72
7	0.686	71
8	0.660	70

Wet Bulb: 59 °F

Spectrum

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	4-1 Inlet - Run2
Date	2/27/24
Time	1545 - 1605
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.87
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1
Static Pressure (" wc)	-3.47

Pitot Tube Leak Check ("H_2O@"H_2O)

Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.516	68
2	0.596	68
3	0.584	68
4	0.664	68
5	0.789	70
6	0.799	70
7	0.682	70
8	0.615	70

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.655	68
2	0.550	66
3	0.610	68
4	0.585	68
5	0.713	68
6	0.782	68
7	0.582	70
8	0.519	70

WET Bulb = 58 °F

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	4-1 Inlet - Run 3
Date	2/27/24
Time	1825-1835
Operator	J. Johnson, S. Spainger
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.78
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1	
Static Pressure (" wc)	-3.50	
Pitot Tube Leak Check ("H_2O@"H_2O)		
Initial (-)	0.0	@ 24.038
Initial (+)	0.0	@ 22.807
Final (-)	0.0	@ 17.253
Final (+)	0.0	@ 18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.600	64
2	0.652	66
3	0.664	66
4	0.672	64
5	0.720	66
6	0.741	64
7	0.672	66
8	0.591	66

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.560	64
2	0.597	66
3	0.657	66
4	0.518	66
5	0.645	66
6	0.707	66
7	0.667	66
8	0.621	66

Wet Bulb = 52° F

Spectrum

EPA Method 1
Circular Duct – Determination of Traverse Points

Project: 225-01-2303M	
Facility: Microchip, Hasham OR	
Source: 4-2 Inlet	
Operator: J. Johnson	
Date: 2-26-24	

☒ Velocity Only ☐ Isokinetic Sampling	Upstream Distance (ft/in) 7'11 1/2" Upstream Distance (diameters) 2.01 ☒ Measurement ☐ Plant Information
Number of Ports to be sampled 2	
Duct Diameter (in) 47 1/2 ☒ Measurement ☐ Plant Information	Downstream Distance (ft/in) 1'2 3/8" Downstream Distance (diameters) 0.40 ☒ Measurement ☐ Plant Information

Total number of Traverse Points (from Figure 2 (velocity) or 1 (all isokinetic sampling))	16
Number of traverse points per port	8
Port Depth	3 3/8"

Traverse Point	Percent of Diameter	Distance from Wall [1] (in)	Marking Location (in)
1	3.2	1 1/2	4 7/8
2	10.5	5	8 3/8
3	19.4	9 3/16	12 9/16
4	32.3	15 5/16	18 11/16
5	67.7	32 3/16	35 9/16
6	80.6	38 5/16	41 11/16
7	89.5	42 1/2	45 7/8
8	96.8	46	49 3/8
9			
10			
11			
12			

Traverse Point	Percent of Diameter	Distance from Wall (in)	Marking Location (in)
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Prepare a drawing of the source, showing the ports, disturbances, and the distances

[1] According to Method 1, for stacks between 12 and 24", no point may be within ½ inch of the wall. For stacks greater than 24", no point may be within 1 inch of the wall.

Spectrum ENVIRONMENTAL SOLUTIONS

Determination of Cyclonic Flow
EPA Method 1

Project	225-01-2303 M
Facility	Microchip Gresham OR
Source	4-2 Inlet
Operator	J. Johnson, S. Sprague
Date	2/27/24
Pitot Tube No.	PT-1

Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Yaw Angle (°)
A1	0
2	0
3	0
4	0
5	0
6	0
7	5
8	5

Traverse Point	Yaw Angle (°)
B 1	5
2	0
3	0
4	-3
5	0
6	0
7	0
8	0

Spectrum ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	4-2 INLET - Run 1
Date	2/27/24
Time	1435 - 1440
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.82
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1	
Static Pressure (" wc)	-3.65	
Pitot Tube Leak Check ("H_2O@"H_2O)		
Initial (-)	0.0	@ 24.038
Initial (+)	0.0	@ 22.807
Final (-)	0.0	@ 17.253
Final (+)	0.0	@ 18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.242	63
2	0.129	72
3	0.163	82
4	0.211	81
5	0.237	82
6	0.217	81
7	0.209	82
8	0.228	81

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.110	70
2	0.144	72
3	0.171	75
4	0.223	77
5	0.251	81
6	0.218	82
7	0.304	84
8	0.249	84

Wet Bulb = 61°F

Spectrum
ENVIRONMENTAL SOLUTIONS

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	4-2 Inlet - Run 2
Date	2/27/24
Time	1615 - 1625
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.84
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1	
Static Pressure (" wc)	-3.63	
Pitot Tube Leak Check ("H_2O@"H_2O)		
Initial (-)	0.0	@ 24.038
Initial (+)	0.0	@ 22.807
Final (-)	0.0	@ 17.253
Final (+)	0.0	@ 18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.130	63
2	0.162	66
3	0.166	73
4	0.232	79
5	0.244	78
6	0.192	77
7	0.229	75
8	0.223	75

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.124	64
2	0.121	68
3	0.155	72
4	0.211	73
5	0.234	77
6	0.249	79
7	0.281	79
8	0.255	77

Wet Bulb = 59°F

Spectrum

EPA Method 2
Velocity/Temperature Traverse

Facility	SAS
Source	4-2 Inlet - Run 3
Date	2/27/24
Time	1805 - 1815
Operator	J. Johnson, S. Springer
Elevation (Relative to Barometer) (ft)	0
Barometric Pressure	29.76
Pitot Tube No.	PT-1
PTCF	0.84

Temperature Readout ID	TC-1		
Static Pressure (" wc)	-3.70		
Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	0.0	@	24.038
Initial (+)	0.0	@	22.807
Final (-)	0.0	@	17.253
Final (+)	0.0	@	18.915

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A1	0.136	79
2	0.170	79
3	0.197	81
4	0.216	81
5	0.207	77
6	0.197	77
7	0.231	75
8	0.238	75

Traverse Point	Velocity Head (ΔP) (in. wc)	Temperature (°F)
B1	0.133	73
2	0.155	74
3	0.192	73
4	0.220	75
5	0.227	78
6	0.244	79
7	0.266	79
8	0.241	79

Wet Bulb = 59°F

Spectrum
ENVIRONMENTAL SOLUTIONS

microchip gresham or complaince test log
feb 2024

2/26/2024

CTS Cylinder CC105191:
Ethylene 9.718 ppm
Methane 20.56 ppm
R22 20.24 ppm

1720 CTS and Pathlength on both FTIRs.
PL Adjusted to be within 5% of the C2H4 bottle value

1801 Start 1 hr pretest TO Set point = 1425

FTIR 1 on the RCO FTIR 2 on the TO

2003 Probe out of stack

2013 Stopped collection

2020 ran inlet bag

2/27/2024

0843 Began collection on both FTIRs - Flowing N2 through sample systems

0847 Collecting new N2 purged backgrounds. - through Sampling systems on each FTIR

0851 Will continue running while THCs are calibrated
0852 began flowing 10.25 ppm propane
0857 propane gas off
0902 5.981 ppm propane to both FTIRs
0916 shooting 3.86 ppm propane
0924 Stopped collection on FTIRs will set up for CTS and spike
0951 Began collection on both FTIRs for CH4 spike
1000 ran CTS up and down system
1016 began spike at~ 1 lpm
Native methane = 2.03 ppm CH4; R22~0.027 at RCO
Native methane = 0.65 ppm CH4; R22~0.102 at TO
Both spikes pass near perfect - WILL NEED TO ADD an INT TO THE R22 Region USING AN ACTUAL TO SPECTRUM

1220 Start Run #1

134115 this datapoint on the TO got pulled out of the stack to swap ports. Need to remove from data. Be safe to remove a data point on each end
1453 End Run #1 All data for Run 1 was saved in the Spike folder

Ran R1 inlet bag on RCO for CH4 and CO2

1525 Start Run #2
1659 End Run #2

Ran Run2 inlet bag on RCO for CH4 and CO2

1730 Start Run #3
1837 End Run#3

1905 Running CTS 9.718 ppm c2h4
1910 Gas Off both look good

Appendix C

FTIR Data

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PEA_001	Outlet	Scrubber												
60.0 (min)	Run 1	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	445	445	16047	16047	149	149	0.97	0.97
			Maximum	BDL	BDL	BDL	BDL	460	460	16754	16754	152	152	0.97	0.97
			(BDL = 1/2MDL) Average	0.023	0.023	0.017	0.017	454	454	16529	16529	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	454	454	16529	16529	151	151	0.97	0.97
		(Volume)	MDL	0.047	0.047	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	446	446	16361	16361	151	151	0.97	0.97
60.0 (min)	Run 2	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	463	463	16638	16638	151	151	0.97	0.97
			(BDL = 1/2MDL) Average	0.023	0.023	0.017	0.017	455	455	16513	16513	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	455	455	16513	16513	151	151	0.97	0.97
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	449	449	16232	16232	150	150	0.97	0.97
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	0.062	0.062	BDL	BDL	473	473	17538	17538	151	151	0.97	0.97
			(BDL = 1/2MDL) Average	0.024	0.024	0.017	0.017	455	455	17097	17097	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	455	455	17097	17097	151	151	0.97	0.97
		(Volume)	MDL	0.047	0.047	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	445	445	16047	16047	149	149	0.97	0.97
(min)			Maximum	0.062	0.062	BDL	BDL	473	473	17538	17538	152	152	0.97	0.97
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.024	0.024	0.017	0.017	455	455	16713	16713	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	455	455	16713	16713	151	151	0.97	0.97
		(Volume)	MDL	0.047	0.047	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/4/24	12:57:53	R1	0.98	0.023	0.047	0.017	0.033	455	455	16747	16747	151	151	0.97	0.97
	3/4/24	12:58:53	R1	1.00	0.023	0.047	0.017	0.033	453	453	16590	16590	151	151	0.97	0.97
	3/4/24	12:59:51	R1	0.97	0.023	0.047	0.017	0.033	450	450	16590	16590	151	151	0.97	0.97
	3/4/24	13:00:51	R1	1.00	0.023	0.047	0.017	0.033	445	445	16584	16584	150	150	0.97	0.97
	3/4/24	13:01:51	R1	1.00	0.023	0.047	0.017	0.033	451	451	16622	16622	150	150	0.97	0.97
	3/4/24	13:02:51	R1	1.00	0.023	0.047	0.017	0.033	458	458	16619	16619	151	151	0.97	0.97
	3/4/24	13:03:51	R1	1.00	0.023	0.047	0.017	0.033	460	460	16639	16639	151	151	0.97	0.97
	3/4/24	13:04:51	R1	1.00	0.023	0.047	0.017	0.033	457	457	16661	16661	151	151	0.97	0.97
	3/4/24	13:05:54	R1	1.05	0.023	0.047	0.017	0.033	455	455	16652	16652	150	150	0.97	0.97
	3/4/24	13:06:51	R1	0.95	0.023	0.047	0.017	0.033	453	453	16626	16626	149	149	0.97	0.97
	3/4/24	13:07:53	R1	1.03	0.023	0.047	0.017	0.033	455	455	16176	16176	149	149	0.97	0.97
	3/4/24	13:08:51	R1	0.97	0.023	0.047	0.017	0.033	456	456	16265	16265	150	150	0.97	0.97
	3/4/24	13:09:51	R1	1.00	0.023	0.047	0.017	0.033	457	457	16325	16325	151	151	0.97	0.97
	3/4/24	13:10:51	R1	1.00	0.023	0.047	0.017	0.033	456	456	16047	16047	151	151	0.97	0.97
	3/4/24	13:11:51	R1	1.00	0.023	0.047	0.017	0.033	455	455	16374	16374	152	152	0.97	0.97
	3/4/24	13:12:54	R1	1.05	0.023	0.047	0.017	0.033	454	454	16697	16697	152	152	0.97	0.97
	3/4/24	13:13:51	R1	0.95	0.023	0.047	0.017	0.033	455	455	16096	16096	152	152	0.97	0.97
	3/4/24	13:14:51	R1	1.00	0.023	0.047	0.017	0.033	455	455	16470	16470	152	152	0.97	0.97
	3/4/24	13:15:54	R1	1.05	0.023	0.047	0.017	0.033	455	455	16495	16495	152	152	0.97	0.97
	3/4/24	13:16:54	R1	1.00	0.023	0.047	0.017	0.033	454	454	16455	16455	152	152	0.97	0.97
	3/4/24	13:17:51	R1	0.95	0.023	0.047	0.017	0.033	453	453	16475	16475	152	152	0.97	0.97
	3/4/24	13:18:56	R1	1.08	0.023	0.047	0.017	0.033	453	453	16500	16500	152	152	0.97	0.97
	3/4/24	13:19:51	R1	0.92	0.023	0.047	0.017	0.033	454	454	16433	16433	152	152	0.97	0.97
	3/4/24	13:20:54	R1	1.05	0.023	0.047	0.017	0.033	455	455	16473	16473	152	152	0.97	0.97
	3/4/24	13:21:51	R1	0.95	0.023	0.047	0.017	0.033	453	453	16466	16466	152	152	0.97	0.97
	3/4/24	13:22:51	R1	1.00	0.023	0.047	0.017	0.033	451	451	16425	16425	152	152	0.97	0.97
	3/4/24	13:23:51	R1	1.00	0.023	0.047	0.017	0.033	456	456	16417	16417	152	152	0.97	0.97
	3/4/24	13:24:51	R1	1.00	0.023	0.047	0.017	0.033	455	455	16420	16420	151	151	0.97	0.97
	3/4/24	13:25:51	R1	1.00	0.023	0.047	0.017	0.033	457	457	16430	16430	151	151	0.97	0.97
	3/4/24	13:26:51	R1	1.00	0.023	0.047	0.017	0.033	460	460	16567	16567	151	151	0.97	0.97
	3/4/24	13:27:51	R1	1.00	0.023	0.047	0.017	0.033	459	459	16596	16596	151	151	0.97	0.97
	3/4/24	13:28:52	R1	1.02	0.023	0.047	0.017	0.033	458	458	16494	16494	151	151	0.97	0.97
	3/4/24	13:29:54	R1	1.03	0.023	0.047	0.017	0.033	457	457	16500	16500	151	151	0.97	0.97
	3/4/24	13:30:51	R1	0.95	0.023	0.047	0.017	0.033	458	458	16479	16479	151	151	0.97	0.97
	3/4/24	13:31:51	R1	1.00	0.023	0.047	0.017	0.033	459	459	16492	16492	151	151	0.97	0.97
	3/4/24	13:32:51	R1	1.00	0.023	0.047	0.017	0.033	460	460	16456	16456	151	151	0.97	0.97
	3/4/24	13:33:51	R1	1.00	0.023	0.047	0.017	0.033	457	457	16730	16730	151	151	0.97	0.97
	3/4/24	13:34:51	R1	1.00	0.023	0.047	0.017	0.033	455	455	16754	16754	151	151	0.97	0.97
	3/4/24	13:35:51	R1	1.00	0.023	0.047	0.017	0.033	452	452	16725	16725	151	151	0.97	0.97
	3/4/24	13:36:51	R1	1.00	0.023	0.047	0.017	0.033	452	452	16703	16703	151	151	0.97	0.97
	3/4/24	13:37:51	R1	1.00	0.023	0.047	0.017	0.033	450	450	16681	16681	151	151	0.97	0.97
	3/4/24	13:38:51	R1	1.00	0.023	0.047	0.017	0.033	450	450	16680	16680	151	151	0.97	0.97
	3/4/24	13:39:51	R1	1.00	0.023	0.047	0.017	0.033	453	453	16593	16593	151	151	0.97	0.97
	3/4/24	13:40:51	R1	1.00	0.023	0.047	0.017	0.033	449	449	16583	16583	151	151	0.97	0.97
	3/4/24	13:41:52	R1	1.02	0.023	0.047	0.017	0.033	449	449	16567	16567	151	151	0.97	0.97
	3/4/24	13:42:52	R1	1.00	0.023	0.047	0.017	0.033	451	451	16568	16568	151	151	0.97	0.97
	3/4/24	13:43:51	R1	0.98	0.023	0.047	0.017	0.033	453	453	16582	16582	151	151	0.97	0.97
	3/4/24	13:44:51	R1	1.00	0.023	0.047	0.017	0.033	452	452	16514	16514	151	151	0.97	0.97
	3/4/24	13:45:51	R1	1.00	0.023	0.047	0.017	0.033	452	452	16498	16498	151	151	0.97	0.97
	3/4/24	13:46:54	R1	1.05	0.023	0.047	0.017	0.033	453	453	16538	16538	151	151	0.97	0.97
	3/4/24	13:47:51	R1	0.95	0.023	0.047	0.017	0.033	454	454	16584	16584	151	151	0.97	0.97
	3/4/24	13:48:51	R1	1.00	0.023	0.047	0.017	0.033	453	453	16572	16572	151	151	0.97	0.97
	3/4/24	13:49:51	R1	1.00	0.023	0.047	0.017	0.033	455	455	16573	16573	151	151	0.97	0.97
	3/4/24	13:50:51	R1	1.00	0.023	0.047	0.017	0.033	453	453	16571	16571	151	151	0.97	0.97
	3/4/24	13:51:52	R1	1.02	0.023	0.047	0.017	0.033	454	454	16568	16568	151	151	0.97	0.97
	3/4/24	13:52:54	R1	1.03	0.023	0.047	0.017	0.033	453	453	16555	16555	151	151	0.97	0.97
	3/4/24	13:53:51	R1	0.95	0.023	0.047	0.017	0.033	454	454	16543	16543	151	151	0.97	0.97
	3/4/24	13:54:51	R1	1.00	0.023	0.047	0.017	0.033	456	456	16564	16564	151	151	0.97	0.97
	3/4/24	13:55:52	R1	1.02	0.023	0.047	0.017	0.033	453	453	16561	16561	151	151	0.97	0.97
	3/4/24	13:56:51	R1	0.98	0.023	0.047	0.017	0.033	452	452	16572	16572	151	151	0.97	0.97
	3/4/24	13:57:52	R2	1.02	0.023	0.047	0.017	0.033	451	451	16578	16578	151	151	0.97	0.97
	3/4/24	13:58:53	R2	1.02	0.023	0.047	0.017	0.033	446	446	16579	16579	151	151	0.97	0.97
	3/4/24	13:59:51	R2	0.97	0.023	0.047	0.017	0.033	452	452	16611	16611	151	151	0.97	0.97
	3/4/24	14:00:51	R2	1.00	0.023	0.047	0.017	0.033	451	451	16624	16624	151	151	0.97	0.97
	3/4/24	14:01:51	R2	1.00	0.023	0.047	0.017	0.033	451	451	16619	16619	151	151	0.97	0.97
	3/4/24	14:02:53	R2	1.03	0.023	0.047	0.017	0.033	455	455	16586	16586	151	151	0.97	0.97
	3/4/24	14:03:53	R2	1.00	0.023	0.047	0.017	0.033	451	451	16596	16596	151	151	0.97	0.97
	3/4/24	14:04:56	R2	1.05	0.023	0.047	0.017	0.033	452	452	16577	16577	151	151	0.97	0.97
	3/4/24	14:05:51	R2	0.92	0.023	0.047	0.017	0.033	457	457	16615	16615	151	151	0.97	0.97
	3/4/24	14:06:51	R2	1.00	0.023	0.047	0.017	0.033	456	456	16601	16601	151	151	0.97	0.97
	3/4/24	14:07:54	R2	1.05	0.023	0.047	0.017	0.033	457	457	16581	16581	151	151	0.97	0.97
	3/4/24	14:08:53	R2	0.98	0.023	0.047	0.017	0.033	456	456	16600	16600	151	151	0.97	0.97
	3/4/24	14:09:52	R2	0.98	0.023	0.047	0.017	0.033	456	456	16577	16577	151	151	0.97	0.97
	3/4/24	14:10:51	R2	0.98	0.023	0.047	0.017	0.033	459	459	16538	16538	151	151	0.97	0.97
	3/4/24	14:11:51	R2	1.00	0.023	0.047	0.017	0.033	459	459	16550	16550	151	151	0.97	0.97
	3/4/24	14:12:51	R2	1.00	0.023	0.047	0.017	0.033	459	459	16579	16579	151	151	0.97	0.97
	3/4/24	14:13:54	R2	1.05	0.023	0.047	0.017	0.033	455	455	16566	16566	151	151	0.97	0.97
	3/4/24	14:14:53	R2	0.98	0.023	0.047	0.017	0.033	458	458	16574	16574	151	151	0.97	0.97
	3/4/24	14:15:51	R2	0.97	0.023	0.047	0.017	0.033	457	457	16610	16610	151	151	0.97	0.97
	3/4/24	14:16:51	R2	1.00	0.023	0.047	0.017	0.033	456	456	16556	16556	151	151	0.97	0.97
	3/4/24	14:17:56	R2	1.08	0.023	0.047	0.017	0.033	457	457	16638	16638	151	151	0.97	0.97
	3/4/24	14:18:51	R2	0.92	0.023	0.047	0.017	0.033	460	460	16573	16573	151	151	0.97	0.97
	3/4/24	14:19:51	R2	1.00	0.023	0.047	0.017	0.033	459	459	16603	16603	151	151	0.97	0.97
	3/4/24	14:20:55	R2	1.07	0.023	0.047	0.017	0.033	455	455	16631	16631	151	151	0.97	0.97
	3/4/24	14:21:51	R2	0.93	0.023	0.047	0.017	0.033	458	458	16624	16624	151	151	0.97	0.97
	3/4/24	14:22:52	R2	1.02	0.023	0.047	0.017	0.033	455	455	16605	16605	151	151	0.97	0.97
	3/4/24	14:23:53	R2	1.02	0.023	0.047	0.017	0.033	456	456	16552	16552	151	151	0.97	0.97
	3/4/24	14:24:51	R2	0.97	0.023	0.047	0.017	0.033	454	454	16535	16535	151	151	0.97	0.97
	3/4/24	14:25:51	R2	1.00	0.023	0.047	0.017	0.033	453	453	16492	16492	151	151	0.97	0.97
	3/4/24	14:26:51	R2	1.00	0.023	0.047	0.017	0.033	454	454	16527	16527	151	151	0.97	0.97
	3/4/24	14:27:51	R2	1.00	0.023	0.047	0.017	0.033	454	454	16529	16529	151	151	0.97	0.97
	3/4/24	14:28:51	R2	1.00	0.023	0.047	0.017	0.033	454	454	16473	16473	151	151	0.97	0.97
	3/4/24	14:29:51	R2	1.00	0.023	0.047	0.017	0.033	457	457	16458	16458	151	151	0.97	0.97
	3/4/24	14:30:51	R2	1.00	0.023	0.047	0.017	0.033	454	454	16480	16480	151	151	0.97	0.97
	3/4/24	14:31:54	R2	1.05	0.023	0.047	0.017	0.033	457	457	16495	16495	151	151	0.97	0.97
	3/4/24	14:32:51	R2	0.95	0.023	0.047	0.017	0.033	463	463	16475	16475	151	151	0.97	0.97
	3/4/24	14:33:51	R2	1.00	0.023	0.047	0.017	0.033	459	459	16486	16486	151	151	0.97	0.97
	3/4/24	14:34:52	R2	1.02	0.023	0.047	0.017	0.033	460	460	16454	16454	151	151	0.97	0.97
	3/4/24	14:35:52	R2	1.00	0.023	0.047	0.017	0.033	458	458	16434	16434	151	151	0.97	0.97
	3/4/24	14:36:51	R2	0.98	0.023	0.047	0.017	0.033	460	460	16439	16439	151	151	0.97	0.97
	3/4/24	14:37:51	R2	1.00	0.023	0.047	0.017	0.033	459	459	16486	16486	151	151	0.97	0.97
	3/4/24	14:38:51	R2	1.00	0.023	0.047	0.017	0.033	457	457	16433	16433	151	151	0.97	0.97
	3/4/24	14:39:51	R2	1.00	0.023	0.047	0.017	0.033	455	455	16398	16398	151	151	0.97	0.97
	3/4/24	14:40:51	R2	1.00	0.023	0.047	0.017	0.033	457	457	16445	16445	151	151	0.97	0.97
	3/4/24	14:41:51	R2	1.00	0.023	0.047	0.017	0.033	455	455	16431	16431	151	151	0.97	0.97
	3/4/24	14:42:51	R2	1.00	0.023	0.047	0.017	0.033	458	458	16416	16416	151	151	0.97	0.97

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PEA_001	Outlet	Scrubber												
Run Length			Minimum	BDL	BDL	BDL	BDL	445	445	16047	16047	149	149	0.97	0.97
60.0 (min)			Maximum	BDL	BDL	BDL	BDL	460	460	16754	16754	152	152	0.97	0.97
	Run 1	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.023	0.023	0.017	0.017	454	454	16529	16529	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	454	454	16529	16529	151	151	0.97	0.97
		(Volume)	MDL	0.047	0.047	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	446	446	16361	16361	151	151	0.97	0.97
60.0 (min)			Maximum	BDL	BDL	BDL	BDL	463	463	16638	16638	151	151	0.97	0.97
	Run 2	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.023	0.023	0.017	0.017	455	455	16513	16513	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	455	455	16513	16513	151	151	0.97	0.97
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	449	449	16232	16232	150	150	0.97	0.97
60.0 (min)			Maximum	0.062	0.062	BDL	BDL	473	473	17538	17538	151	151	0.97	0.97
	Run 3	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.024	0.024	0.017	0.017	455	455	17097	17097	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	455	455	17097	17097	151	151	0.97	0.97
		(Volume)	MDL	0.047	0.047	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	445	445	16047	16047	149	149	0.97	0.97
(min)			Maximum	0.062	0.062	BDL	BDL	473	473	17538	17538	152	152	0.97	0.97
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.024	0.024	0.017	0.017	455	455	16713	16713	151	151	0.97	0.97
			(BDL = MDL) Average	0.047	0.047	0.033	0.033	455	455	16713	16713	151	151	0.97	0.97
		(Volume)	MDL	0.047	0.047	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/4/24	14:43:52	R2	1.02	0.023	0.047	0.017	0.033	456	456	16423	16423	151	151	0.97	0.97
	3/4/24	14:44:51	R2	0.98	0.023	0.047	0.017	0.033	453	453	16463	16463	151	151	0.97	0.97
	3/4/24	14:45:51	R2	1.00	0.023	0.047	0.017	0.033	455	455	16440	16440	151	151	0.97	0.97
	3/4/24	14:46:54	R2	1.05	0.023	0.047	0.017	0.033	453	453	16430	16430	151	151	0.97	0.97
	3/4/24	14:47:51	R2	0.95	0.023	0.047	0.017	0.033	454	454	16428	16428	151	151	0.97	0.97
	3/4/24	14:48:52	R2	1.02	0.023	0.047	0.017	0.033	458	458	16554	16554	151	151	0.97	0.97
	3/4/24	14:49:51	R2	0.98	0.023	0.047	0.017	0.033	451	451	16368	16368	151	151	0.97	0.97
	3/4/24	14:50:51	R2	1.00	0.023	0.047	0.017	0.033	450	450	16361	16361	151	151	0.97	0.97
	3/4/24	14:51:51	R2	1.00	0.023	0.047	0.017	0.033	451	451	16383	16383	151	151	0.97	0.97
	3/4/24	14:52:54	R2	1.05	0.023	0.047	0.017	0.033	454	454	16400	16400	151	151	0.97	0.97
	3/4/24	14:53:51	R2	0.95	0.023	0.047	0.017	0.033	455	455	16405	16405	151	151	0.97	0.97
	3/4/24	14:54:51	R2	1.00	0.023	0.047	0.017	0.033	452	452	16415	16415	151	151	0.97	0.97
	3/4/24	14:55:51	R2	1.00	0.023	0.047	0.017	0.033	455	455	16431	16431	151	151	0.97	0.97
	3/4/24	14:56:51	R2	1.00	0.023	0.047	0.017	0.033	452	452	16423	16423	151	151	0.97	0.97
	3/4/24	14:57:54	R3	1.05	0.023	0.047	0.017	0.033	453	453	16478	16478	151	151	0.97	0.97
	3/4/24	14:58:52	R3	0.97	0.023	0.047	0.017	0.033	453	453	16498	16498	151	151	0.97	0.97
	3/4/24	14:59:51	R3	0.98	0.023	0.047	0.017	0.033	454	454	16458	16458	151	151	0.97	0.97
	3/4/24	15:00:51	R3	1.00	0.023	0.047	0.017	0.033	452	452	16541	16541	151	151	0.97	0.97
	3/4/24	15:01:52	R3	1.02	0.023	0.047	0.017	0.033	453	453	16570	16570	151	151	0.97	0.97
	3/4/24	15:02:51	R3	0.98	0.023	0.047	0.017	0.033	455	455	16606	16606	151	151	0.97	0.97
	3/4/24	15:03:51	R3	1.00	0.023	0.047	0.017	0.033	457	457	16503	16503	151	151	0.97	0.97
	3/4/24	15:04:54	R3	1.05	0.023	0.047	0.017	0.033	456	456	16232	16232	151	151	0.97	0.97
	3/4/24	15:05:51	R3	0.95	0.023	0.047	0.017	0.033	455	455	16340	16340	151	151	0.97	0.97
	3/4/24	15:06:51	R3	1.00	0.023	0.047	0.017	0.033	454	454	16751	16751	151	151	0.97	0.97
	3/4/24	15:07:51	R3	1.00	0.023	0.047	0.017	0.033	458	458	16330	16330	151	151	0.97	0.97
	3/4/24	15:08:54	R3	1.05	0.023	0.047	0.017	0.033	456	456	16351	16351	151	151	0.97	0.97
	3/4/24	15:09:51	R3	0.95	0.023	0.047	0.017	0.033	457	457	16532	16532	151	151	0.97	0.97
	3/4/24	15:10:51	R3	1.00	0.023	0.047	0.017	0.033	457	457	16415	16415	150	150	0.97	0.97
	3/4/24	15:11:53	R3	1.03	0.023	0.047	0.017	0.033	458	458	17067	17067	151	151	0.97	0.97
	3/4/24	15:12:51	R3	0.97	0.023	0.047	0.017	0.033	457	457	17083	17083	151	151	0.97	0.97
	3/4/24	15:13:51	R3	1.00	0.023	0.047	0.017	0.033	456	456	17049	17049	151	151	0.97	0.97
	3/4/24	15:14:51	R3	1.00	0.023	0.047	0.017	0.033	452	452	17037	17037	150	150	0.97	0.97
	3/4/24	15:15:51	R3	1.00	0.023	0.047	0.017	0.033	450	450	17028	17028	150	150	0.97	0.97
	3/4/24	15:16:52	R3	1.02	0.023	0.047	0.017	0.033	453	453	17051	17051	151	151	0.97	0.97
	3/4/24	15:17:52	R3	1.00	0.023	0.047	0.017	0.033	454	454	17131	17131	151	151	0.97	0.97
	3/4/24	15:18:52	R3	1.00	0.023	0.047	0.017	0.033	455	455	17127	17127	151	151	0.97	0.97
	3/4/24	15:19:52	R3	1.00	0.023	0.047	0.017	0.033	453	453	17099	17099	151	151	0.97	0.97
	3/4/24	15:20:51	R3	0.98	0.023	0.047	0.017	0.033	454	454	17041	17041	151	151	0.97	0.97
	3/4/24	15:21:54	R3	1.05	0.023	0.047	0.017	0.033	453	453	17114	17114	151	151	0.97	0.97
	3/4/24	15:22:52	R3	0.97	0.023	0.047	0.017	0.033	450	450	17131	17131	151	151	0.97	0.97
	3/4/24	15:23:52	R3	1.00	0.023	0.047	0.017	0.033	450	450	17145	17145	151	151	0.97	0.97
	3/4/24	15:24:51	R3	0.98	0.023	0.047	0.017	0.033	449	449	17196	17196	151	151	0.97	0.97
	3/4/24	15:25:51	R3	1.00	0.023	0.047	0.017	0.033	451	451	17209	17209	151	151	0.97	0.97
	3/4/24	15:26:51	R3	1.00	0.023	0.047	0.017	0.033	450	450	17305	17305	151	151	0.97	0.97
	3/4/24	15:27:57	R3	1.10	0.023	0.047	0.017	0.033	452	452	17299	17299	151	151	0.97	0.97
	3/4/24	15:28:53	R3	0.93	0.023	0.047	0.017	0.033	450	450	17283	17283	151	151	0.97	0.97
	3/4/24	15:29:51	R3	0.97	0.023	0.047	0.017	0.033	451	451	17264	17264	151	151	0.97	0.97
	3/4/24	15:30:51	R3	1.00	0.023	0.047	0.017	0.033	451	451	17257	17257	151	151	0.97	0.97
	3/4/24	15:31:51	R3	1.00	0.023	0.047	0.017	0.033	451	451	17300	17300	151	151	0.97	0.97
	3/4/24	15:32:51	R3	1.00	0.023	0.047	0.017	0.033	452	452	17316	17316	150	150	0.97	0.97
	3/4/24	15:33:51	R3	1.00	0.023	0.047	0.017	0.033	452	452	17343	17343	150	150	0.97	0.97
	3/4/24	15:34:51	R3	1.00	0.023	0.047	0.017	0.033	451	451	17369	17369	150	150	0.97	0.97
	3/4/24	15:35:51	R3	1.00	0.062	0.062	0.017	0.033	454	454	17447	17447	150	150	0.97	0.97
	3/4/24	15:36:54	R3	1.05	0.023	0.047	0.017	0.033	454	454	17374	17374	150	150	0.97	0.97
	3/4/24	15:37:51	R3	0.95	0.023	0.047	0.017	0.033	453	453	17376	17376	150	150	0.97	0.97
	3/4/24	15:38:51	R3	1.00	0.023	0.047	0.017	0.033	454	454	17429	17429	150	150	0.97	0.97
	3/4/24	15:39:53	R3	1.03	0.023	0.047	0.017	0.033	456	456	17533	17533	150	150	0.97	0.97
	3/4/24	15:40:51	R3	0.97	0.023	0.047	0.017	0.033	458	458	17538	17538	150	150	0.97	0.97
	3/4/24	15:41:51	R3	1.00	0.023	0.047	0.017	0.033	459	459	17471	17471	150	150	0.97	0.97
	3/4/24	15:42:54	R3	1.05	0.023	0.047	0.017	0.033	456	456	17440	17440	150	150	0.97	0.97
	3/4/24	15:43:51	R3	0.95	0.023	0.047	0.017	0.033	456	456	17422	17422	150	150	0.97	0.97
	3/4/24	15:44:51	R3	1.00	0.023	0.047	0.017	0.033	453	453	17416	17416	150	150	0.97	0.97
	3/4/24	15:45:51	R3	1.00	0.023	0.047	0.017	0.033	455	455	17415	17415	150	150	0.97	0.97
	3/4/24	15:46:51	R3	1.00	0.023	0.047	0.017	0.033	456	456	17413	17413	150	150	0.97	0.97
	3/4/24	15:47:52	R3	1.02	0.023	0.047	0.017	0.033	454	454	17363	17363	150	150	0.97	0.97
	3/4/24	15:48:51	R3	0.98	0.023	0.047	0.017	0.033	455	455	17365	17365	150	150	0.97	0.97
	3/4/24	15:49:51	R3	1.00	0.023	0.047	0.017	0.033	472	472	17384	17384	151	151	0.97	0.97
	3/4/24	15:50:51	R3	1.00	0.023	0.047	0.017	0.033	473	473	17411	17411	151	151	0.97	0.97
	3/4/24	15:51:52	R3	1.02	0.023	0.047	0.017	0.033	462	462	17381	17381	151	151	0.97	0.97
	3/4/24	15:52:51	R3	0.98	0.023	0.047	0.017	0.033	462	462	17366	17366	151	151	0.97	0.97
	3/4/24	15:53:51	R3	1.00	0.023	0.047	0.017	0.033	461	461	17333	17333	151	151	0.97	0.97
	3/4/24	15:54:51	R3	1.00	0.023	0.047	0.017	0.033	458	458	17358	17358	151	151	0.97	0.97
	3/4/24	15:55:55	R3	1.07	0.023	0.047	0.017	0.033	459	459	17378	17378	151	151	0.97	0.97
	3/4/24	15:56:51	R3	0.93	0.023	0.047	0.017	0.033	459	459	17380	17380	151	151	0.97	0.97

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Temp(C) Summary	Press(atm) Summary
	PEA_004	Outlet	Scrubber						
Run Length 60.0 (min)	Run 1	Conc. (ppmv)	Minimum	442	BDL	BDL	15724	151	0.97
			Maximum	458	BDL	0.062	16116	152	0.98
			(BDL = MDL) Average	453	0.022	0.052	15899	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	442	BDL	BDL	15306	151	0.97
			Maximum	457	BDL	BDL	16009	151	0.98
			(BDL = MDL) Average	449	0.022	0.052	15790	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	443	BDL	BDL	15762	151	0.97
			Maximum						
				451	0.022	0.052	15858	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	442	BDL	BDL	15306	151	0.97
			Maximum	458	BDL	0.062	16116	152	0.98
			(BDL = MDL) Average	451	0.022	0.052	15849	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA

Date	Time	Run	Scan Length	CO2 1.1-min data Conc. (ppm) BDL=MDL	HCl 1.1-min data Conc. (ppm) BDL=MDL	HF 1.1-min data Conc. (ppm) BDL=MDL	H2O 1.1-min data Conc. (ppm) BDL=MDL	Temp(C) 1.1-min data Conc. (ppm) BDL=MDL	Press(atm) 1.1-min data Conc. (ppm) BDL=MDL
3/5/24	15:22:16	R1	1.00	458	0.022	0.052	15991	151	0.97
3/5/24	15:23:16	R1	1.00	455	0.022	0.052	15957	152	0.98
3/5/24	15:24:18	R1	1.03	453	0.022	0.052	15957	152	0.98
3/5/24	15:25:19	R1	1.02	452	0.022	0.052	15987	151	0.98
3/5/24	15:26:16	R1	0.95	453	0.022	0.052	15932	151	0.98
3/5/24	15:27:19	R1	1.05	458	0.022	0.052	15899	151	0.98
3/5/24	15:28:17	R1	0.97	452	0.022	0.057	15901	151	0.98
3/5/24	15:29:16	R1	0.98	455	0.022	0.052	15926	151	0.98
3/5/24	15:30:16	R1	1.00	455	0.022	0.052	15922	151	0.98
3/5/24	15:31:16	R1	1.00	452	0.022	0.052	15907	151	0.98
3/5/24	15:32:16	R1	1.00	456	0.022	0.052	15904	151	0.98
3/5/24	15:33:16	R1	1.00	452	0.022	0.052	15955	151	0.98
3/5/24	15:34:16	R1	1.00	455	0.022	0.052	15956	151	0.98
3/5/24	15:35:19	R1	1.05	442	0.022	0.052	15936	151	0.98
3/5/24	15:36:16	R1	0.95	454	0.022	0.052	15884	151	0.98
3/5/24	15:37:16	R1	1.00	457	0.022	0.052	15910	151	0.98
3/5/24	15:38:17	R1	1.02	448	0.022	0.052	15917	151	0.98
3/5/24	15:39:18	R1	1.02	444	0.022	0.052	15944	151	0.98
3/5/24	15:40:16	R1	0.97	449	0.022	0.052	15944	151	0.98
3/5/24	15:41:16	R1	1.00	446	0.022	0.052	16116	151	0.98
3/5/24	15:42:16	R1	1.00	445	0.022	0.052	15982	151	0.98
3/5/24	15:43:18	R1	1.03	442	0.022	0.052	15948	151	0.98
3/5/24	15:44:16	R1	0.97	448	0.022	0.052	15988	151	0.98
3/5/24	15:45:19	R1	1.05	450	0.022	0.052	15947	151	0.98
3/5/24	15:46:16	R1	0.95	446	0.022	0.052	15982	151	0.98
3/5/24	15:47:16	R1	1.00	455	0.022	0.052	16019	151	0.98
3/5/24	15:48:16	R1	1.00	457	0.022	0.052	15977	151	0.98
3/5/24	15:49:16	R1	1.00	456	0.022	0.052	16090	151	0.98
3/5/24	15:50:16	R1	1.00	454	0.022	0.052	15985	151	0.98
3/5/24	15:51:19	R1	1.05	449	0.022	0.052	15979	151	0.98
3/5/24	15:52:16	R1	0.95	451	0.022	0.052	15975	151	0.98
3/5/24	15:53:16	R1	1.00	454	0.022	0.052	16005	151	0.98
3/5/24	15:54:19	R1	1.05	457	0.022	0.052	15980	151	0.98
3/5/24	15:55:16	R1	0.95	449	0.022	0.052	15907	151	0.98
3/5/24	15:56:16	R1	1.00	454	0.022	0.052	15893	151	0.98
3/5/24	15:57:16	R1	1.00	449	0.022	0.052	15879	151	0.98
3/5/24	15:58:17	R1	1.02	454	0.022	0.052	15837	151	0.98
3/5/24	15:59:21	R1	1.07	455	0.022	0.052	15799	151	0.98
3/5/24	16:00:16	R1	0.92	454	0.022	0.053	15783	151	0.98
3/5/24	16:01:16	R1	1.00	458	0.022	0.052	15948	151	0.98
3/5/24	16:02:16	R1	1.00	456	0.022	0.052	15939	151	0.98
3/5/24	16:03:16	R1	1.00	456	0.022	0.052	15918	151	0.98
3/5/24	16:04:16	R1	1.00	454	0.022	0.062	15774	151	0.98
3/5/24	16:05:17	R1	1.02	456	0.022	0.052	15808	151	0.98
3/5/24	16:06:18	R1	1.02	450	0.022	0.052	15801	151	0.98
3/5/24	16:07:16	R1	0.97	457	0.022	0.052	15810	151	0.97
3/5/24	16:08:16	R1	1.00	453	0.022	0.052	15827	151	0.97
3/5/24	16:09:16	R1	1.00	456	0.022	0.052	15789	151	0.98
3/5/24	16:10:16	R1	1.00	453	0.022	0.052	15795	151	0.97
3/5/24	16:11:16	R1	1.00	457	0.022	0.052	15934	151	0.97
3/5/24	16:12:16	R1	1.00	453	0.022	0.052	15753	151	0.98
3/5/24	16:13:16	R1	1.00	452	0.022	0.052	15737	151	0.97
3/5/24	16:14:19	R1	1.05	455	0.022	0.052	15756	151	0.98
3/5/24	16:15:16	R1	0.95	452	0.022	0.052	15768	151	0.98
3/5/24	16:16:16	R1	1.00	454	0.022	0.052	15767	151	0.97
3/5/24	16:17:18	R1	1.03	455	0.022	0.052	15724	151	0.98
3/5/24	16:18:19	R1	1.02	456	0.022	0.052	15872	151	0.98
3/5/24	16:19:16	R1	0.95	458	0.022	0.052	15853	151	0.98
3/5/24	16:20:16	R1	1.00	455	0.022	0.052	15798	151	0.97
3/5/24	16:21:16	R1	1.00	453	0.022	0.052	15747	151	0.98
3/5/24	16:22:18	R2	1.03	454	0.022	0.052	15755	151	0.98
3/5/24	16:23:22	R2	1.07	443	0.022	0.052	15852	151	0.98
3/5/24	16:24:19	R2	0.95	449	0.022	0.052	15691	151	0.98
3/5/24	16:25:16	R2	0.95	452	0.022	0.052	15752	151	0.98
3/5/24	16:26:16	R2	1.00	449	0.022	0.052	15743	151	0.98
3/5/24	16:27:16	R2	1.00	454	0.022	0.052	15721	151	0.98
3/5/24	16:28:18	R2	1.03	443	0.022	0.052	15721	151	0.97
3/5/24	16:29:16	R2	0.97	445	0.022	0.052	15748	151	0.97
3/5/24	16:30:16	R2	1.00	443	0.022	0.052	15720	151	0.98
3/5/24	16:31:16	R2	1.00	450	0.022	0.052	15714	151	0.98
3/5/24	16:32:16	R2	1.00	444	0.022	0.052	15729	151	0.98
3/5/24	16:33:16	R2	1.00	447	0.022	0.052	15728	151	0.98
3/5/24	16:34:16	R2	1.00	450	0.022	0.052	15720	151	0.98
3/5/24	16:35:16	R2	1.00	448	0.022	0.052	15768	151	0.98
3/5/24	16:36:16	R2	1.00	448	0.022	0.052	15779	151	0.98
3/5/24	16:37:16	R2	1.00	453	0.022	0.052	15792	151	0.98
3/5/24	16:38:16	R2	1.00	446	0.022	0.052	15802	151	0.97
3/5/24	16:39:17	R2	1.02	449	0.022	0.052	15771	151	0.97
3/5/24	16:40:17	R2	1.00	451	0.022	0.052	15764	151	0.97
3/5/24	16:41:16	R2	0.98	454	0.022	0.052	15804	151	0.98
3/5/24	16:42:16	R2	1.00	452	0.022	0.052	15813	151	0.97
3/5/24	16:43:19	R2	1.05	453	0.022	0.052	15773	151	0.98
3/5/24	16:44:16	R2	0.95	457	0.022	0.052	15780	151	0.97
3/5/24	16:45:17	R2	1.02	453	0.022	0.052	15893	151	0.97
3/5/24	16:46:16	R2	0.98	442	0.022	0.052	15763	151	0.97
3/5/24	16:47:16	R2	1.00	444	0.022	0.052	15789	151	0.97
3/5/24	16:48:16	R2	1.00	443	0.022	0.052	15746	151	0.97
3/5/24	16:49:16	R2	1.00	442	0.022	0.052	15779	151	0.98
3/5/24	16:50:16	R2	1.00	448	0.022	0.052	15755	151	0.97
3/5/24	16:51:16	R2	1.00	454	0.022	0.052	15759	151	0.97
3/5/24	16:52:18	R2	1.03	448	0.022	0.052	15811	151	0.98
3/5/24	16:53:18	R2	1.00	451	0.022	0.052	15951	151	0.98
3/5/24	16:54:16	R2	0.97	451	0.022	0.052	15777	151	0.97
3/5/24	16:55:16	R2	1.00	448	0.022	0.052	15780	151	0.97
3/5/24	16:56:16	R2	1.00	451	0.022	0.052	15794	151	0.98
3/5/24	16:57:16	R2	1.00	448	0.022	0.052	15821	151	0.97
3/5/24	16:58:18	R2	1.03	451	0.022	0.052	15802	151	0.98
3/5/24	16:59:16	R2	0.97	451	0.022	0.052	15786	151	0.98
3/5/24	17:00:18	R2	1.03	448	0.022	0.052	15778	151	0.97
3/5/24	17:01:18	R2	1.00	452	0.022	0.052	15757	151	0.97
3/5/24	17:02:16	R2	0.97	449	0.022	0.052	15809	151	0.98

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Temp(C) Summary	Press(atm) Summary
	PEA_004	Outlet	Scrubber						
Run Length 60.0 (min)	Run 1	Conc. (ppmv)	Minimum	442	BDL	BDL	15724	151	0.97
			Maximum	458	BDL	0.062	16116	152	0.98
			(BDL = MDL) Average	453	0.022	0.052	15899	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	442	BDL	BDL	15306	151	0.97
			Maximum	457	BDL	BDL	16009	151	0.98
			(BDL = MDL) Average	449	0.022	0.052	15790	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	443	BDL	BDL	15762	151	0.97
			Maximum						
				451	0.022	0.052	15858	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	442	BDL	BDL	15306	151	0.97
			Maximum	458	BDL	0.062	16116	152	0.98
			(BDL = MDL) Average	451	0.022	0.052	15849	151	0.98
			MDL	NA	0.022	0.052	NA	NA	NA

Date	Time	Run	Scan Length	CO2 1.1-min data Conc. (ppm) BDL=MDL	HCl 1.1-min data Conc. (ppm) BDL=MDL	HF 1.1-min data Conc. (ppm) BDL=MDL	H2O 1.1-min data Conc. (ppm) BDL=MDL	Temp(C) 1.1-min data Conc. (ppm) BDL=MDL	Press(atm) 1.1-min data Conc. (ppm) BDL=MDL
3/5/24	17:03:18	R2	1.03	455	0.022	0.052	15813	151	0.98
3/5/24	17:04:16	R2	0.97	452	0.022	0.052	15941	151	0.97
3/5/24	17:05:16	R2	1.00	447	0.022	0.052	15779	151	0.97
3/5/24	17:06:16	R2	1.00	452	0.022	0.052	15788	151	0.97
3/5/24	17:07:17	R2	1.02	451	0.022	0.052	15944	151	0.98
3/5/24	17:08:16	R2	0.98	447	0.022	0.052	15787	151	0.97
3/5/24	17:09:16	R2	1.00	447	0.022	0.052	15818	151	0.98
3/5/24	17:10:16	R2	1.00	449	0.022	0.052	15823	151	0.98
3/5/24	17:11:17	R2	1.02	451	0.022	0.052	15834	151	0.97
3/5/24	17:12:16	R2	0.98	453	0.022	0.052	15822	151	0.98
3/5/24	17:13:16	R2	1.00	447	0.022	0.052	15831	151	0.98
3/5/24	17:14:16	R2	1.00	449	0.022	0.052	15859	151	0.98
3/5/24	17:15:16	R2	1.00	450	0.022	0.052	15836	151	0.98
3/5/24	17:16:19	R2	1.05	446	0.022	0.052	15881	151	0.98
3/5/24	17:17:16	R2	0.95	450	0.022	0.052	15306	151	0.98
3/5/24	17:18:16	R2	1.00	449	0.022	0.052	15775	151	0.97
3/5/24	17:19:21	R2	1.08	449	0.022	0.052	15874	151	0.97
3/5/24	17:20:16	R2	0.92	450	0.022	0.052	16009	151	0.98
3/5/24	17:21:16	R2	1.00	448	0.022	0.052	15885	151	0.98
3/5/24	17:22:16	R3	1.00	445	0.022	0.052	15872	151	0.98
3/5/24	17:23:16	R3	1.00	447	0.022	0.052	15898	151	0.98
3/5/24	17:24:16	R3	1.00	447	0.022	0.052	15846	151	0.97
3/5/24	17:25:16	R3	1.00	449	0.022	0.052	15950	151	0.98
3/5/24	17:26:17	R3	1.02	448	0.022	0.052	15921	151	0.98
3/5/24	17:27:16	R3	0.98	447	0.022	0.052	15887	151	0.98
3/5/24	17:28:19	R3	1.05	451	0.022	0.052	15880	151	0.98
3/5/24	17:29:19	R3	1.00	450	0.022	0.052	15880	151	0.98
3/5/24	17:30:16	R3	0.95	448	0.022	0.052	15891	151	0.98
3/5/24	17:31:16	R3	1.00	446	0.022	0.052	15879	151	0.98
3/5/24	17:32:19	R3	1.05	446	0.022	0.052	15903	151	0.98
3/5/24	17:33:16	R3	0.95	448	0.022	0.052	15973	151	0.98
3/5/24	17:34:16	R3	1.00	443	0.022	0.052	15875	151	0.98
3/5/24	17:35:16	R3	1.00	451	0.022	0.052	15973	151	0.98
3/5/24	17:36:16	R3	1.00	447	0.022	0.052	15972	151	0.98
3/5/24	17:37:19	R3	1.05	445	0.022	0.052	15835	151	0.98
3/5/24	17:38:16	R3	0.95	449	0.022	0.055	15869	151	0.98
3/5/24	17:39:16	R3	1.00	447	0.022	0.052	15979	151	0.98
3/5/24	17:40:18	R3	1.03	449	0.022	0.052	15842	151	0.98
3/5/24	17:41:19	R3	1.02	444	0.022	0.052	15889	151	0.98
3/5/24	17:42:18	R3	0.98	447	0.022	0.052	15938	151	0.97
3/5/24	17:43:16	R3	0.97	449	0.022	0.052	15935	151	0.98
3/5/24	17:44:16	R3	1.00	447	0.022	0.052	15886	151	0.98
3/5/24	17:45:16	R3	1.00	451	0.022	0.052	15855	151	0.98
3/5/24	17:46:16	R3	1.00	448	0.022	0.052	15891	151	0.98
3/5/24	17:47:16	R3	1.00	451	0.022	0.052	15883	151	0.98
3/5/24	17:48:16	R3	1.00	451	0.022	0.052	15941	151	0.98
3/5/24	17:49:16	R3	1.00	450	0.022	0.052	15848	151	0.98
3/5/24	17:50:16	R3	1.00	446	0.022	0.052	15858	151	0.98
3/5/24	17:51:16	R3	1.00	445	0.022	0.052	15812	151	0.98
3/5/24	17:52:18	R3	1.03	453	0.022	0.052	15871	151	0.98
3/5/24	17:53:16	R3	0.97	456	0.022	0.052	15885	151	0.98
3/5/24	17:54:16	R3	1.00	452	0.022	0.052	15852	151	0.98
3/5/24	17:55:16	R3	1.00	449	0.022	0.052	15839	151	0.98
3/5/24	17:56:20	R3	1.07	450	0.022	0.052	15827	151	0.98
3/5/24	17:57:18	R3	0.97	456	0.022	0.052	15873	151	0.98
3/5/24	17:58:16	R3	0.97	457	0.022	0.052	15871	151	0.98
3/5/24	17:59:19	R3	1.05	454	0.022	0.052	15835	151	0.98
3/5/24	18:00:16	R3	0.95	452	0.022	0.052	15819	152	0.98
3/5/24	18:01:18	R3	1.03	452	0.022	0.052	15835	151	0.97
3/5/24	18:02:17	R3	0.98	458	0.022	0.052	15810	151	0.98
3/5/24	18:03:16	R3	0.98	456	0.022	0.052	15847	151	0.98
3/5/24	18:04:16	R3	1.00	455	0.022	0.052	15823	151	0.98
3/5/24	18:05:16	R3	1.00	449	0.022	0.052	15794	151	0.98
3/5/24	18:06:16	R3	1.00	456	0.022	0.052	15804	151	0.98
3/5/24	18:07:18	R3	1.03	453	0.022	0.052	15806	151	0.98
3/5/24	18:08:18	R3	1.00	458	0.022	0.052	15823	151	0.98
3/5/24	18:09:16	R3	0.97	454	0.022	0.052	15814	152	0.98
3/5/24	18:10:16	R3	1.00	454	0.022	0.052	15762	151	0.98
3/5/24	18:11:16	R3	1.00	456	0.022	0.052	15805	151	0.98
3/5/24	18:12:16	R3	1.00	458	0.022	0.052	15798	151	0.98
3/5/24	18:13:18	R3	1.03	458	0.022	0.052	15828	152	0.98
3/5/24	18:14:16	R3	0.97	456	0.022	0.052	15822	152	0.98
3/5/24	18:15:16	R3	1.00	457	0.022	0.052	15846	152	0.98
3/5/24	18:16:16	R3	1.00	452	0.022	0.052	15787	151	0.98
3/5/24	18:17:16	R3	1.00	456	0.022	0.052	15785	152	0.98
3/5/24	18:18:18	R3	1.03	455	0.022	0.052	15762	151	0.98
3/5/24	18:19:16	R3	0.97	457	0.022	0.052	15796	152	0.98
3/5/24	18:20:16	R3	1.00	456	0.022	0.052	15815	152	0.98
3/5/24	18:21:17	R3	1.02	455	0.022	0.052	15789	152	0.98

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PEC_001	Outlet	Scrubber												
60.0 (min)	Run 1	Conc. (ppmv)	Minimum	0.039	0.039	BDL	BDL	1053	1053	17744	17744	151	151	0.96	0.96
			Maximum	0.26	0.26	BDL	BDL	1166	1166	18314	18314	152	152	0.97	0.97
			(BDL = 1/2MDL) Average	0.11	0.11	0.023	0.023	1108	1108	18005	18005	151	151	0.96	0.96
			(BDL = MDL) Average	0.11	0.11	0.046	0.046	1108	1108	18005	18005	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.046	0.046	NA	NA	NA	NA	NA	NA	NA	NA
Run Length															
60.0 (min)	Run 2	Conc. (ppmv)	Minimum	0.047	0.047	BDL	BDL	1057	1057	17691	17691	151	151	0.96	0.96
			Maximum	0.15	0.15	BDL	BDL	1165	1165	18774	18774	152	152	0.96	0.96
			(BDL = 1/2MDL) Average	0.078	0.078	0.023	0.023	1100	1100	17976	17976	151	151	0.96	0.96
			(BDL = MDL) Average	0.078	0.078	0.046	0.046	1100	1100	17976	17976	151	151	0.96	0.96
		(Volume)	MDL												
Run Length				0.041	0.041	BDL	BDL	1048	1048	17619	17619	151	151	0.96	0.96
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	0.11	0.11	BDL	BDL	1156	1156	18333	18333	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.061	0.061	0.023	0.023	1096	1096	17915	17915	151	151	0.96	0.96
			(BDL = MDL) Average	0.061	0.061	0.046	0.046	1096	1096	17915	17915	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.046	0.046	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	0.039	0.039	BDL	BDL	1048	1048	17619	17619	151	151	0.96	0.96
(min)			Maximum	0.26	0.26	BDL	BDL	1166	1166	18774	18774	152	152	0.97	0.97
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.084	0.084	0.023	0.023	1101	1101	17965	17965	151	151	0.96	0.96
			(BDL = MDL) Average	0.084	0.084	0.046	0.046	1101	1101	17965	17965	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.046	0.046	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
3/4/24	9:19:38	R1	1.05	0.043	0.043	0.023	0.046	1095	1095	17887	17887	151	151	0.97	0.97
3/4/24	9:20:35	R1	0.95	0.055	0.055	0.023	0.046	1114	1114	17907	17907	151	151	0.97	0.97
3/4/24	9:21:35	R1	1.00	0.044	0.044	0.023	0.046	1114	1114	17979	17979	152	152	0.96	0.96
3/4/24	9:22:38	R1	1.05	0.053	0.053	0.023	0.046	1096	1096	17917	17917	152	152	0.96	0.96
3/4/24	9:23:35	R1	0.95	0.047	0.047	0.023	0.046	1148	1148	17854	17854	152	152	0.97	0.97
3/4/24	9:24:38	R1	1.05	0.053	0.053	0.023	0.046	1113	1113	17926	17926	152	152	0.96	0.96
3/4/24	9:25:35	R1	0.95	0.047	0.047	0.023	0.046	1061	1061	17882	17882	152	152	0.96	0.96
3/4/24	9:26:35	R1	1.00	0.039	0.039	0.023	0.046	1112	1112	17918	17918	152	152	0.96	0.96
3/4/24	9:27:35	R1	1.00	0.057	0.057	0.023	0.046	1100	1100	17832	17832	152	152	0.96	0.96
3/4/24	9:28:35	R1	1.00	0.096	0.096	0.023	0.046	1065	1065	17864	17864	152	152	0.96	0.96
3/4/24	9:29:38	R1	1.05	0.049	0.049	0.023	0.046	1066	1066	17772	17772	151	151	0.97	0.97
3/4/24	9:30:35	R1	0.95	0.053	0.053	0.023	0.046	1059	1059	17864	17864	151	151	0.96	0.96
3/4/24	9:31:35	R1	1.00	0.047	0.047	0.023	0.046	1110	1110	17999	17999	151	151	0.96	0.96
3/4/24	9:32:37	R1	1.03	0.048	0.048	0.023	0.046	1094	1094	17808	17808	151	151	0.96	0.96
3/4/24	9:33:36	R1	0.98	0.056	0.056	0.023	0.046	1058	1058	17865	17865	151	151	0.96	0.96
3/4/24	9:34:35	R1	0.98	0.056	0.056	0.023	0.046	1053	1053	17887	17887	151	151	0.96	0.96
3/4/24	9:35:35	R1	1.00	0.050	0.050	0.023	0.046	1098	1098	18050	18050	151	151	0.96	0.96
3/4/24	9:36:35	R1	1.00	0.069	0.069	0.023	0.046	1062	1062	18227	18227	151	151	0.96	0.96
3/4/24	9:37:35	R1	1.00	0.060	0.060	0.023	0.046	1111	1111	18241	18241	151	151	0.96	0.96
3/4/24	9:38:36	R1	1.02	0.064	0.064	0.023	0.046	1118	1118	18231	18231	151	151	0.96	0.96
3/4/24	9:39:35	R1	0.98	0.057	0.057	0.023	0.046	1072	1072	18141	18141	152	152	0.96	0.96
3/4/24	9:40:35	R1	1.00	0.11	0.11	0.023	0.046	1061	1061	18278	18278	151	151	0.96	0.96
3/4/24	9:41:36	R1	1.02	0.068	0.068	0.023	0.046	1114	1114	18146	18146	151	151	0.96	0.96
3/4/24	9:42:35	R1	0.98	0.045	0.045	0.023	0.046	1099	1099	18268	18268	151	151	0.96	0.96
3/4/24	9:43:37	R1	1.03	0.052	0.052	0.023	0.046	1103	1103	18172	18172	151	151	0.96	0.96
3/4/24	9:44:38	R1	1.02	0.070	0.070	0.023	0.046	1112	1112	18087	18087	151	151	0.96	0.96
3/4/24	9:45:35	R1	0.95	0.059	0.059	0.023	0.046	1135	1135	17965	17965	151	151	0.96	0.96
3/4/24	9:46:38	R1	1.05	0.068	0.068	0.023	0.046	1080	1080	17953	17953	151	151	0.96	0.96
3/4/24	9:47:36	R1	0.97	0.095	0.095	0.023	0.046	1115	1115	18142	18142	151	151	0.96	0.96
3/4/24	9:48:35	R1	0.98	0.13	0.13	0.023	0.046	1142	1142	18314	18314	151	151	0.96	0.96
3/4/24	9:49:35	R1	1.00	0.13	0.13	0.023	0.046	1085	1085	18173	18173	151	151	0.96	0.96
3/4/24	9:50:38	R1	1.05	0.12	0.12	0.023	0.046	1085	1085	17916	17916	151	151	0.96	0.96
3/4/24	9:51:35	R1	0.95	0.12	0.12	0.023	0.046	1131	1131	17946	17946	151	151	0.96	0.96
3/4/24	9:52:35	R1	1.00	0.26	0.26	0.023	0.046	1086	1086	17985	17985	151	151	0.96	0.96
3/4/24	9:53:37	R1	1.03	0.23	0.23	0.023	0.046	1100	1100	18021	18021	151	151	0.96	0.96
3/4/24	9:54:38	R1	1.02	0.18	0.18	0.023	0.046	1084	1084	17904	17904	151	151	0.96	0.96
3/4/24	9:55:41	R1	1.05	0.23	0.23	0.023	0.046	1086	1086	17893	17893	151	151	0.96	0.96
3/4/24	9:56:35	R1	0.90	0.23	0.23	0.023	0.046	1095	1095	18031	18031	151	151	0.96	0.96
3/4/24	9:57:36	R1	1.02	0.20	0.20	0.023	0.046	1121	1121	17977	17977	151	151	0.96	0.96
3/4/24	9:58:35	R1	0.98	0.18	0.18	0.023	0.046	1130	1130	17968	17968	151	151	0.96	0.96
3/4/24	9:59:37	R1	1.03	0.18	0.18	0.023	0.046	1099	1099	18189	18189	151	151	0.96	0.96
3/4/24	10:00:35	R1	0.97	0.18	0.18	0.023	0.046	1110	1110	18036	18036	151	151	0.96	0.96
3/4/24	10:01:37	R1	1.03	0.18	0.18	0.023	0.046	1112	1112	18025	18025	151	151	0.96	0.96
3/4/24	10:02:35	R1	0.97	0.20	0.20	0.023	0.046	1131	1131	17931	17931	151	151	0.96	0.96
3/4/24	10:03:38	R1	1.05	0.17	0.17	0.023	0.046	1128	1128	17992	17992	151	151	0.96	0.96
3/4/24	10:04:36	R1	0.97	0.17	0.17	0.023	0.046	1129	1129	18032	18032	151	151	0.96	0.96
3/4/24	10:05:35	R1	0.98	0.24	0.24	0.023	0.046	1140	1140	17995	17995	151	151	0.96	0.96
3/4/24	10:06:35	R1	1.00	0.21	0.21	0.023	0.046	1161	1161	17846	17846	151	151	0.96	0.96
3/4/24	10:07:35	R1	1.00	0.17	0.17	0.023	0.046	1121	1121	18046	18046	151	151	0.96	0.96
3/4/24	10:08:35	R1	1.00	0.12	0.12	0.023	0.046	1129	1129	18040	18040	151	151	0.96	0.96
3/4/24	10:09:35	R1	1.00	0.11	0.11	0.023	0.046	1120	1120	18017	18017	151	151	0.96	0.96
3/4/24	10:10:35	R1	1.00	0.13	0.13	0.023	0.046	1140	1140	17951	17951	151	151	0.96	0.96
3/4/24	10:11:36	R1	1.02	0.12	0.12	0.023	0.046	1145	1145	17744	17744	151	151	0.96	0.96
3/4/24	10:12:35	R1	0.98	0.11	0.11	0.023	0.046	1164	1164	17845	17845	151	151	0.96	0.96
3/4/24	10:13:35	R1	1.00	0.12	0.12	0.023	0.046	1154	1154	17886	17886	151	151	0.96	0.96
3/4/24	10:14:37	R1	1.03	0.12	0.12	0.023	0.046	1166	1166	18183	18183	151	151	0.96	0.96
3/4/24	10:15:35	R1	0.97	0.12	0.12	0.023	0.046	1108	1108	18187	18187	151	151	0.96	0.96
3/4/24	10:16:35	R1	1.00	0.11	0.11	0.023	0.046	1089	1089	18104	18104	151	151	0.96	0.96
3/4/24	10:17:35	R1	1.00	0.15	0.15	0.023	0.046	1109	1109	18059	18059	151	151	0.96	0.96
3/4/24	10:18:35	R1	1.00	0.16	0.16	0.023	0.046	1131	1131	18031	18031	151	151	0.96	0.96
3/4/24	10:19:35	R2	1.00	0.12	0.12	0.023	0.046	1109	1109	18178	18178	151	151	0.96	0.96
3/4/24	10:20:36	R2	1.02	0.15	0.15	0.023	0.046	1130	1130	18258	18258	151	151	0.96	0.96
3/4/24	10:21:35	R2	0.98	0.091	0.091	0.023	0.046	1137	1137	17828	17828	151	151	0.96	0.96
3/4/24	10:22:35	R2	1.00	0.078	0.078	0.023	0.046	1153	1153	17739	17739	151	151	0.96	0.96
3/4/24	10:23:35	R2	1.00	0.076	0.076	0.023	0.046	1109	1109	17777	17777	151	151	0.96	0.96
3/4/24	10:24:35	R2	1.00	0.067	0.067	0.023	0.046	1130	1130	17784	17784	151	151	0.96	0.96
3/4/24	10:25:35	R2	1.00	0.069	0.069	0.023	0.046	1145	1145	17823	17823	151	151	0.96	0.96
3/4/24	10:26:35	R2	1.00	0.069	0.069	0.023	0.046	1119	1119	17806	17806	151	151	0.96	0.96
3/4/24	10:27:36	R2	1.02	0.060	0.060	0.023	0.046	1099	1099	17871	17871	151	151	0.96	0.96
3/4/24	10:28:35	R2	0.98	0.080	0.080	0.023	0.046	1110	1110	17829	17829	151	151	0.96	0.96
3/4/24	10:29:35	R2	1.00	0.14	0.14	0.023	0.046	1133	1133	17867	17867	151	151	0.96	0.96
3/4/24	10:30:35	R2	1.00	0.15	0.15	0.023	0.046	1128	1128	17871	17871	151	151	0.96	0.96
3/4/24	10:31:35	R2	1.00	0.081	0.081	0.023	0.046	1081	1081	17812	17812	151	151	0.96	0.96
3/4/24	10:32:35	R2	1.00	0.079	0.079	0.023	0.046	1094	1094	17840	17840	151	151	0.96	0.96
3/4/24	10:33:35	R2	1.00	0.065	0.065	0.023	0.046	1102	1102	17806	17806	151	151	0.96	0.96
3/4/24	10:34:35	R2	1.00	0.058	0.058	0.023	0.046	1111	1111	17809	17809	151	151	0.96	0.96
3/4/24	10:35:35	R2	1.00	0.064	0.064	0.023	0.046	1090	1090	17902	17902	151	151	0.96	0.96
3/4/24	10:36:35	R2	1.00	0.065	0.065	0.023	0.046	1112	1112	17991	17991	151	151	0.96	0.96
3/4/24	10:37:35	R2	1.00	0.066	0.066	0.023	0.046	1165	1165	17815	17815	151	151	0.96	0.96
3/4/24	10:38:35	R2	1.00	0.079	0.079	0.023	0.046	1118	1118	17848	17848	151	151	0.96	0.96
3/4/24	10:39:38	R2	1.05	0.072	0.072	0.023	0.046	1083	1083	17691	17691	151	151	0.96	0.96
3/4/24	10:40:35	R2	0.95	0.075	0.075	0.023	0.046	1076	1076	17702	17702	151	151	0.96	0.96
3/4/24	10:41:36	R2	1.02	0.067	0.067	0.023	0.046	1113	1113	17739	17739	151	151	0.96	0.96
3/4/24	10:42:35	R2	0.98	0.080	0.080	0.023	0.046	1079	1079	17976	17976	151	151	0.96	0.96
3/4/24	10:43:36	R2	1.02	0.088	0.088	0.023	0.046	1079	1079	18167	18167	151	151	0.96	0.96
3/4/24	10:44:38	R2	1.03	0.072	0.072	0.023	0.046	1079	1079	18190	18190	151	151	0.96	0.96
3/4/24	10:45:35	R2	0.95	0.075	0.075	0.023	0.046	1084	1084	18158	18158	151	151	0.96	0.96
3/4/24	10:46:35	R2	1.00	0.072	0.072	0.023	0.046	1063	1063	18133	18133	151	151	0.96	0.96
3/4/24	10:47:35	R2	1.00	0.066	0.066	0.023	0.046	1082	1082	18288	18288	151	151	0.96	0.96
3/4/24	10:48:36	R2	1.02	0.069	0.069	0.023	0.046	1086	1086	18086	18086	151	151	0.96	0.96
3/4/24	10:49:35	R2	0.98	0.071	0.071	0.023	0.046	1124	1124	18118	18118	151	151	0.96	0.96
3/4/24	10:50:38	R2	1.05	0.081	0.081	0.023	0.046	1087	1087	17943	17943	151	151	0.96	0.96
3/4/24	10:51:35	R2	0.95	0.088	0.088	0.023	0.046	1110	1110	17812	17812	151	151	0.96	0.96
3/4/24	10:52:36	R2	1.02	0.078	0.078	0.023	0.046	1111	1111	17796	17796	151	151	0.96	0.96
3/4/24	10:53:35	R2	0.98	0.073	0.073	0.023	0.046	1121	1121	17867	17867	151	151	0.96	0.96
3/4/24	10:54:35	R2	1.00	0.067	0.067	0.023	0.046	1085	1085	17790	17790	151	151	0.96	0.96
3/4/24	10:55:38	R2	1.05	0.12	0.12	0.023	0.046	1114	1114	17749	17749	151	151	0.96	0.96
3/4/24	10:56:35	R2	0.95	0.081	0.081	0.023	0.046	1119	1119	17769	17769	151	151	0.96	0.96
3/4/24	10:57:35	R2	1.00	0.078	0.078	0.023	0.046	1113	1113	17813	17813	151	151	0.96	0.96
3/4/24	10:58:35	R2	1.00	0.070	0.070	0.023	0.046	1068	1068	17939	17939	151	151	0.96	0.96
3/4/24	10:59:35	R2	1.00	0.063	0.063	0.023	0.046	1116	1116	18108	18108	151	151	0.96	0.96
3/4/24	11:00:38	R2	1.05	0.097	0.097	0.023	0.046	1108	1108	17935	17935	151	151	0.96	0.96
3/4/24	11:01:35	R2	0.95	0.11	0.11	0.023	0.046	1088	1088	17893	17893	151	151	0.96	0.96
3/4/24	11:02:35	R2	1.00	0.072	0.072	0.023	0.046	1079	1079	17758	17758	151	151	0.96	0.96
3/4/24	11:03:36	R2	1.02	0.055	0.055	0.023	0.046	1111	1111	17732	17732	151	151	0.96	0.96
3/4/24	11:04:35	R2	0.98	0.069	0.069	0.023	0.046	1092	1092	17907	17907	151	151	0.96	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PEC_001	Outlet	Scrubber												
Run Length			Minimum	0.039	0.039	BDL	BDL	1053	1053	17744	17744	151	151	0.96	0.96
60.0 (min)			Maximum	0.26	0.26	BDL	BDL	1166	1166	18314	18314	152	152	0.97	0.97
	Run 1	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.11	0.11	0.023	0.023	1108	1108	18005	18005	151	151	0.96	0.96
			(BDL = MDL) Average	0.11	0.11	0.046	0.046	1108	1108	18005	18005	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.046	0.046	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	0.047	0.047	BDL	BDL	1057	1057	17691	17691	151	151	0.96	0.96
60.0 (min)			Maximum	0.15	0.15	BDL	BDL	1165	1165	18774	18774	152	152	0.96	0.96
	Run 2	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.078	0.078	0.023	0.023	1100	1100	17976	17976	151	151	0.96	0.96
			(BDL = MDL) Average	0.078	0.078	0.046	0.046	1100	1100	17976	17976	151	151	0.96	0.96
		(Volume)	MDL												
Run Length				0.041	0.041	BDL	BDL	1048	1048	17619	17619	151	151	0.96	0.96
60.0 (min)			Maximum	0.11	0.11	BDL	BDL	1156	1156	18333	18333	151	151	0.96	0.96
	Run 3	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.061	0.061	0.023	0.023	1096	1096	17915	17915	151	151	0.96	0.96
			(BDL = MDL) Average	0.061	0.061	0.046	0.046	1096	1096	17915	17915	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.046	0.046	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	0.039	0.039	BDL	BDL	1048	1048	17619	17619	151	151	0.96	0.96
(min)			Maximum	0.26	0.26	BDL	BDL	1166	1166	18774	18774	152	152	0.97	0.97
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.084	0.084	0.023	0.023	1101	1101	17965	17965	151	151	0.96	0.96
			(BDL = MDL) Average	0.084	0.084	0.046	0.046	1101	1101	17965	17965	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.046	0.046	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/4/24	11:05:35	R2	1.00	0.092	0.092	0.023	0.046	1102	1102	17980	17980	151	151	0.96	0.96
	3/4/24	11:06:35	R2	1.00	0.087	0.087	0.023	0.046	1085	1085	18135	18135	151	151	0.96	0.96
	3/4/24	11:07:38	R2	1.05	0.10	0.10	0.023	0.046	1072	1072	17968	17968	151	151	0.96	0.96
	3/4/24	11:08:38	R2	1.00	0.073	0.073	0.023	0.046	1067	1067	17820	17820	152	152	0.96	0.96
	3/4/24	11:09:36	R2	0.97	0.059	0.059	0.023	0.046	1105	1105	17888	17888	151	151	0.96	0.96
	3/4/24	11:10:35	R2	0.98	0.056	0.056	0.023	0.046	1057	1057	18044	18044	151	151	0.96	0.96
	3/4/24	11:11:35	R2	1.00	0.060	0.060	0.023	0.046	1133	1133	17772	17772	151	151	0.96	0.96
	3/4/24	11:12:35	R2	1.00	0.047	0.047	0.023	0.046	1077	1077	18774	18774	151	151	0.96	0.96
	3/4/24	11:13:35	R2	1.00	0.057	0.057	0.023	0.046	1076	1076	18505	18505	151	151	0.96	0.96
	3/4/24	11:14:35	R2	1.00	0.051	0.051	0.023	0.046	1079	1079	18529	18529	151	151	0.96	0.96
	3/4/24	11:15:35	R2	1.00	0.074	0.074	0.023	0.046	1086	1086	18440	18440	151	151	0.96	0.96
	3/4/24	11:16:35	R2	1.00	0.061	0.061	0.023	0.046	1063	1063	18419	18419	151	151	0.96	0.96
	3/4/24	11:17:37	R2	1.03	0.062	0.062	0.023	0.046	1085	1085	18406	18406	151	151	0.96	0.96
	3/4/24	11:18:36	R2	0.98	0.068	0.068	0.023	0.046	1071	1071	18376	18376	151	151	0.96	0.96
	3/4/24	11:19:35	R3	0.98	0.066	0.066	0.023	0.046	1078	1078	18170	18170	151	151	0.96	0.96
	3/4/24	11:20:35	R3	1.00	0.066	0.066	0.023	0.046	1061	1061	18003	18003	151	151	0.96	0.96
	3/4/24	11:21:36	R3	1.02	0.066	0.066	0.023	0.046	1048	1048	17902	17902	151	151	0.96	0.96
	3/4/24	11:22:35	R3	0.98	0.063	0.063	0.023	0.046	1056	1056	18010	18010	151	151	0.96	0.96
	3/4/24	11:23:35	R3	1.00	0.061	0.061	0.023	0.046	1059	1059	17832	17832	151	151	0.96	0.96
	3/4/24	11:24:35	R3	1.00	0.078	0.078	0.023	0.046	1074	1074	17762	17762	151	151	0.96	0.96
	3/4/24	11:25:35	R3	1.00	0.050	0.050	0.023	0.046	1061	1061	17688	17688	151	151	0.96	0.96
	3/4/24	11:26:37	R3	1.03	0.064	0.064	0.023	0.046	1071	1071	17760	17760	151	151	0.96	0.96
	3/4/24	11:27:37	R3	1.00	0.069	0.069	0.023	0.046	1077	1077	17723	17723	151	151	0.96	0.96
	3/4/24	11:28:35	R3	0.97	0.057	0.057	0.023	0.046	1120	1120	17837	17837	151	151	0.96	0.96
	3/4/24	11:29:37	R3	1.03	0.068	0.068	0.023	0.046	1088	1088	17930	17930	151	151	0.96	0.96
	3/4/24	11:30:36	R3	0.98	0.061	0.061	0.023	0.046	1088	1088	17708	17708	151	151	0.96	0.96
	3/4/24	11:31:35	R3	0.98	0.067	0.067	0.023	0.046	1086	1086	17886	17886	151	151	0.96	0.96
	3/4/24	11:32:35	R3	1.00	0.066	0.066	0.023	0.046	1120	1120	17882	17882	151	151	0.96	0.96
	3/4/24	11:33:36	R3	1.02	0.074	0.074	0.023	0.046	1080	1080	18072	18072	151	151	0.96	0.96
	3/4/24	11:34:35	R3	0.98	0.062	0.062	0.023	0.046	1105	1105	18133	18133	151	151	0.96	0.96
	3/4/24	11:35:36	R3	1.02	0.055	0.055	0.023	0.046	1092	1092	17968	17968	151	151	0.96	0.96
	3/4/24	11:36:35	R3	0.98	0.058	0.058	0.023	0.046	1107	1107	17898	17898	151	151	0.96	0.96
	3/4/24	11:37:35	R3	1.00	0.058	0.058	0.023	0.046	1103	1103	17832	17832	151	151	0.96	0.96
	3/4/24	11:38:35	R3	1.00	0.041	0.041	0.023	0.046	1108	1108	17711	17711	151	151	0.96	0.96
	3/4/24	11:39:35	R3	1.00	0.067	0.067	0.023	0.046	1075	1075	17785	17785	151	151	0.96	0.96
	3/4/24	11:40:35	R3	1.00	0.061	0.061	0.023	0.046	1085	1085	17855	17855	151	151	0.96	0.96
	3/4/24	11:41:35	R3	1.00	0.047	0.047	0.023	0.046	1069	1069	17748	17748	151	151	0.96	0.96
	3/4/24	11:42:35	R3	1.00	0.057	0.057	0.023	0.046	1074	1074	17831	17831	151	151	0.96	0.96
	3/4/24	11:43:35	R3	1.00	0.043	0.043	0.023	0.046	1082	1082	17958	17958	151	151	0.96	0.96
	3/4/24	11:44:35	R3	1.00	0.11	0.11	0.023	0.046	1094	1094	18258	18258	151	151	0.96	0.96
	3/4/24	11:45:42	R3	1.12	0.060	0.060	0.023	0.046	1098	1098	18172	18172	151	151	0.96	0.96
	3/4/24	11:46:35	R3	0.88	0.049	0.049	0.023	0.046	1101	1101	17841	17841	151	151	0.96	0.96
	3/4/24	11:47:38	R3	1.05	0.055	0.055	0.023	0.046	1076	1076	17848	17848	151	151	0.96	0.96
	3/4/24	11:48:35	R3	0.95	0.046	0.046	0.023	0.046	1087	1087	17793	17793	151	151	0.96	0.96
	3/4/24	11:49:38	R3	1.05	0.053	0.053	0.023	0.046	1077	1077	17835	17835	151	151	0.96	0.96
	3/4/24	11:50:35	R3	0.95	0.065	0.065	0.023	0.046	1097	1097	17877	17877	151	151	0.96	0.96
	3/4/24	11:51:44	R3	1.15	0.053	0.053	0.023	0.046	1067	1067	17866	17866	151	151	0.96	0.96
	3/4/24	11:52:36	R3	0.87	0.053	0.053	0.023	0.046	1128	1128	17918	17918	151	151	0.96	0.96
	3/4/24	11:53:35	R3	0.98	0.060	0.060	0.023	0.046	1052	1052	17619	17619	151	151	0.96	0.96
	3/4/24	11:54:35	R3	1.00	0.063	0.063	0.023	0.046	1114	1114	17720	17720	151	151	0.96	0.96
	3/4/24	11:55:37	R3	1.03	0.070	0.070	0.023	0.046	1073	1073	17762	17762	151	151	0.96	0.96
	3/4/24	11:56:39	R3	1.03	0.062	0.062	0.023	0.046	1089	1089	17927	17927	151	151	0.96	0.96
	3/4/24	11:57:41	R3	1.03	0.047	0.047	0.023	0.046	1066	1066	18282	18282	151	151	0.96	0.96
	3/4/24	11:58:35	R3	0.90	0.057	0.057	0.023	0.046	1156	1156	18333	18333	151	151	0.96	0.96
	3/4/24	11:59:35	R3	1.00	0.042	0.042	0.023	0.046	1089	1089	18284	18284	151	151	0.96	0.96
	3/4/24	12:00:35	R3	1.00	0.050	0.050	0.023	0.046	1090	1090	18201	18201	151	151	0.96	0.96
	3/4/24	12:01:36	R3	1.02	0.051	0.051	0.023	0.046	1083	1083	18219	18219	151	151	0.96	0.96
	3/4/24	12:02:35	R3	0.98	0.058	0.058	0.023	0.046	1126	1126	17982	17982	151	151	0.96	0.96
	3/4/24	12:03:36	R3	1.02	0.052	0.052	0.023	0.046	1100	1100	17906	17906	151	151	0.96	0.96
	3/4/24	12:04:41	R3	1.08	0.052	0.052	0.023	0.046	1126	1126	17826	17826	151	151	0.96	0.96
	3/4/24	12:05:35	R3	0.90	0.052	0.052	0.023	0.046	1119	1119	17786	17786	151	151	0.96	0.96
	3/4/24	12:06:35	R3	1.00	0.079	0.079	0.023	0.046	1136	1136	17762	17762	151	151	0.96	0.96
	3/4/24	12:07:35	R3	1.00	0.070	0.070	0.023	0.046	1133	1133	17795	17795	151	151	0.96	0.96
	3/4/24	12:08:35	R3	1.00	0.059	0.059	0.023	0.046	1110	1110	17797	17797	151	151	0.96	0.96
	3/4/24	12:09:35	R3	1.00	0.048	0.048	0.023	0.046	1087	1087	17814	17814	151	151	0.96	0.96
	3/4/24	12:10:38	R3	1.05	0.052	0.052	0.023	0.046	1120	1120	17835	17835	151	151	0.96	0.96
	3/4/24	12:11:35	R3	0.95	0.067	0.067	0.023	0.046	1106	1106	18032	18032	151	151	0.96	0.96
	3/4/24	12:12:35	R3	1.00	0.056	0.056	0.023	0.046	1104	1104	18014	18014	151	151	0.96	0.96
	3/4/24	12:13:35	R3	1.00	0.063	0.063	0.023	0.046	1117	1117	17991	17991	151	151	0.96	0.96
	3/4/24	12:14:35	R3	1.00	0.051	0.051	0.023	0.046	1114	1114	17932	17932	151	151	0.96	0.96
	3/4/24	12:15:35	R3	1.00	0.058	0.058	0.023	0.046	1134	1134	18066	18066	151	151	0.96	0.96
	3/4/24	12:16:35	R3	1.00	0.073	0.073	0.023	0.046	1132	1132	17970	17970	151	151	0.96	0.96
	3/4/24	12:17:35	R3	1.00	0.11	0.11	0.023	0.046	1140	1140	17904	17904	151	151	0.96	0.96
	3/4/24	12:18:38	R3	1.05	0.064	0.064	0.023	0.046	1135	1135	17824	17824	151	151	0.96	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PEC_002	Outlet	Scrubber												
60.0 (min)	Run 1	Conc. (ppmv)	Minimum	0.063	0.063	BDL	BDL	972	972	17422	17422	151	151	0.96	0.96
			Maximum	0.35	0.35	0.15	0.15	1035	1035	17920	17920	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.17	0.17	0.064	0.064	1016	1016	17809	17809	151	151	0.96	0.96
			(BDL = MDL) Average	0.17	0.17	0.072	0.072	1016	1016	17809	17809	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Run Length															
60.0 (min)	Run 2	Conc. (ppmv)	Minimum	0.12	0.12	BDL	BDL	958	958	17874	17874	151	151	0.96	0.96
			Maximum	0.39	0.39	0.18	0.18	1076	1076	18148	18148	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.25	0.25	0.079	0.079	1008	1008	18045	18045	151	151	0.96	0.96
			(BDL = MDL) Average	0.25	0.25	0.091	0.091	1008	1008	18045	18045	151	151	0.96	0.96
		(Volume)	MDL												
Run Length				0.079	0.079	BDL	BDL	859	859	15539	15539	150	150	0.96	0.96
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	0.37	0.37	0.16	0.16	998	998	18576	18576	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.20	0.20	0.085	0.085	935	935	17324	17324	151	151	0.96	0.96
			(BDL = MDL) Average	0.20	0.20	0.094	0.094	935	935	17324	17324	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	0.063	0.063	BDL	BDL	859	859	15539	15539	150	150	0.96	0.96
(min)	Test Results	Conc. (ppmv)	Maximum	0.39	0.39	0.18	0.18	1076	1076	18576	18576	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.21	0.21	0.076	0.076	986	986	17726	17726	151	151	0.96	0.96
			(BDL = MDL) Average	0.21	0.21	0.086	0.086	986	986	17726	17726	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 0.9-min data		HF 0.9-min data		CO2 0.9-min data		H2O 0.9-min data		Temp(C) 0.9-min data		Press(atm) 0.9-min data	
				Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)	Conc. (ppm)
	Date	Time	Run	Scan Length	BDL=1/2MDL	BDL=MDL	BDL=1/2MDL	BDL=MDL	BDL=1/2MDL	BDL=MDL	BDL=1/2MDL	BDL=MDL	BDL=1/2MDL	BDL=MDL	BDL=1/2MDL	BDL=MDL
	3/2/24	16:10:48	R1	0.98	0.23	0.23	0.029	0.057	991	991	17422	17422	151	151	0.96	0.96
	3/2/24	16:11:49	R1	1.02	0.22	0.22	0.062	0.062	972	972	17769	17769	151	151	0.96	0.96
	3/2/24	16:12:52	R1	1.05	0.23	0.23	0.029	0.057	984	984	17757	17757	151	151	0.96	0.96
	3/2/24	16:13:53	R1	1.02	0.21	0.21	0.029	0.057	975	975	17827	17827	151	151	0.96	0.96
	3/2/24	16:14:58	R1	1.08	0.17	0.17	0.029	0.057	988	988	17820	17820	151	151	0.96	0.96
	3/2/24	16:15:54	R1	0.93	0.13	0.13	0.075	0.075	1012	1012	17805	17805	151	151	0.96	0.96
	3/2/24	16:16:54	R1	1.00	0.14	0.14	0.080	0.080	999	999	17838	17838	151	151	0.96	0.96
	3/2/24	16:17:55	R1	1.02	0.14	0.14	0.029	0.057	989	989	17801	17801	151	151	0.96	0.96
	3/2/24	16:18:56	R1	1.02	0.15	0.15	0.075	0.075	1005	1005	17852	17852	151	151	0.96	0.96
	3/2/24	16:19:57	R1	1.02	0.14	0.14	0.059	0.059	984	984	17802	17802	151	151	0.96	0.96
	3/2/24	16:20:59	R1	1.03	0.13	0.13	0.062	0.062	1012	1012	17795	17795	151	151	0.96	0.96
	3/2/24	16:22:01	R1	1.03	0.13	0.13	0.081	0.081	1027	1027	17733	17733	151	151	0.96	0.96
	3/2/24	16:23:00	R1	0.98	0.12	0.12	0.15	0.15	1012	1012	17837	17837	151	151	0.96	0.96
	3/2/24	16:24:01	R1	1.02	0.12	0.12	0.13	0.13	1008	1008	17768	17768	151	151	0.96	0.96
	3/2/24	16:25:02	R1	1.02	0.12	0.12	0.10	0.10	1014	1014	17787	17787	151	151	0.96	0.96
	3/2/24	16:26:03	R1	1.02	0.12	0.12	0.10	0.10	1034	1034	17770	17770	151	151	0.96	0.96
	3/2/24	16:27:04	R1	1.02	0.12	0.12	0.083	0.083	1016	1016	17780	17780	151	151	0.96	0.96
	3/2/24	16:28:05	R1	1.02	0.099	0.099	0.074	0.074	1007	1007	17827	17827	151	151	0.96	0.96
	3/2/24	16:29:07	R1	1.03	0.100	0.100	0.060	0.060	1029	1029	17735	17735	151	151	0.96	0.96
	3/2/24	16:30:10	R1	1.05	0.10	0.10	0.065	0.065	1028	1028	17686	17686	151	151	0.96	0.96
	3/2/24	16:31:08	R1	0.97	0.098	0.098	0.069	0.069	1017	1017	17731	17731	151	151	0.96	0.96
	3/2/24	16:32:09	R1	1.02	0.11	0.11	0.066	0.066	1014	1014	17761	17761	151	151	0.96	0.96
	3/2/24	16:33:10	R1	1.02	0.095	0.095	0.062	0.062	1023	1023	17802	17802	151	151	0.96	0.96
	3/2/24	16:34:11	R1	1.02	0.083	0.083	0.071	0.071	1006	1006	17749	17749	151	151	0.96	0.96
	3/2/24	16:35:12	R1	1.02	0.093	0.093	0.069	0.069	996	996	17742	17742	151	151	0.96	0.96
	3/2/24	16:36:13	R1	1.02	0.095	0.095	0.059	0.059	1018	1018	17799	17799	151	151	0.96	0.96
	3/2/24	16:37:14	R1	1.02	0.31	0.31	0.068	0.068	1019	1019	17861	17861	151	151	0.96	0.96
	3/2/24	16:38:15	R1	1.02	0.33	0.33	0.067	0.067	1017	1017	17832	17832	151	151	0.96	0.96
	3/2/24	16:39:16	R1	1.02	0.32	0.32	0.081	0.081	1000	1000	17905	17905	151	151	0.96	0.96
	3/2/24	16:40:17	R1	1.02	0.34	0.34	0.11	0.11	1022	1022	17899	17899	151	151	0.96	0.96
	3/2/24	16:41:18	R1	1.02	0.33	0.33	0.089	0.089	1022	1022	17920	17920	151	151	0.96	0.96
	3/2/24	16:42:19	R1	1.02	0.34	0.34	0.088	0.088	1023	1023	17908	17908	151	151	0.96	0.96
	3/2/24	16:43:24	R1	1.08	0.34	0.34	0.097	0.097	1020	1020	17890	17890	151	151	0.96	0.96
	3/2/24	16:44:21	R1	0.95	0.35	0.35	0.10	0.10	1032	1032	17825	17825	151	151	0.96	0.96
	3/2/24	16:45:22	R1	1.02	0.34	0.34	0.11	0.11	1033	1033	17859	17859	151	151	0.96	0.96
	3/2/24	16:46:24	R1	1.03	0.34	0.34	0.096	0.096	1031	1031	17912	17912	151	151	0.96	0.96
	3/2/24	16:47:24	R1	1.00	0.32	0.32	0.065	0.065	1026	1026	17842	17842	151	151	0.96	0.96
	3/2/24	16:48:25	R1	1.02	0.23	0.23	0.070	0.070	1031	1031	17817	17817	151	151	0.96	0.96
	3/2/24	16:49:26	R1	1.02	0.19	0.19	0.063	0.063	1033	1033	17815	17815	151	151	0.96	0.96
	3/2/24	16:50:29	R1	1.05	0.16	0.16	0.067	0.067	1017	1017	17842	17842	151	151	0.96	0.96
	3/2/24	16:51:28	R1	0.98	0.14	0.14	0.067	0.067	1017	1017	17879	17879	151	151	0.96	0.96
	3/2/24	16:52:29	R1	1.02	0.13	0.13	0.029	0.057	1020	1020	17897	17897	151	151	0.96	0.96
	3/2/24	16:53:30	R1	1.02	0.12	0.12	0.059	0.059	1030	1030	17817	17817	151	151	0.96	0.96
	3/2/24	16:54:33	R1	1.05	0.12	0.12	0.067	0.067	1013	1013	17827	17827	151	151	0.96	0.96
	3/2/24	16:55:34	R1	1.02	0.11	0.11	0.029	0.057	1018	1018	17827	17827	151	151	0.96	0.96
	3/2/24	16:56:34	R1	1.00	0.15	0.15	0.066	0.066	1034	1034	17863	17863	151	151	0.96	0.96
	3/2/24	16:57:34	R1	1.00	0.11	0.11	0.029	0.057	1022	1022	17835	17835	151	151	0.96	0.96
	3/2/24	16:58:35	R1	1.02	0.095	0.095	0.029	0.057	1022	1022	17826	17826	151	151	0.96	0.96
	3/2/24	16:59:36	R1	1.02	0.11	0.11	0.029	0.057	1008	1008	17794	17794	151	151	0.96	0.96
	3/2/24	17:00:43	R1	1.12	0.11	0.11	0.029	0.057	1016	1016	17817	17817	151	151	0.96	0.96
	3/2/24	17:01:38	R1	0.92	0.091	0.091	0.029	0.057	1019	1019	17806	17806	151	151	0.96	0.96
	3/2/24	17:02:41	R1	1.05	0.072	0.072	0.058	0.058	1023	1023	17913	17913	151	151	0.96	0.96
	3/2/24	17:03:40	R1	0.98	0.094	0.094	0.029	0.057	1028	1028	17800	17800	151	151	0.96	0.96
	3/2/24	17:04:41	R1	1.02	0.076	0.076	0.029	0.057	1028	1028	17773	17773	151	151	0.96	0.96
	3/2/24	17:05:42	R1	1.02	0.074	0.074	0.029	0.057	1035	1035	17755	17755	151	151	0.96	0.96
	3/2/24	17:06:43	R1	1.02	0.063	0.063	0.029	0.057	1025	1025	17766	17766	151	151	0.96	0.96
	3/2/24	17:07:44	R1	1.02	0.22	0.22	0.059	0.059	1031	1031	17804	17804	151	151	0.96	0.96
	3/2/24	17:08:45	R1	1.02	0.087	0.087	0.029	0.057	1028	1028	17735	17735	151	151	0.96	0.96
	3/2/24	17:09:46	R1	1.02	0.30	0.30	0.066	0.066	1028	1028	17865	17865	151	151	0.96	0.96
	3/2/24	17:10:47	R2	1.02	0.38	0.38	0.071	0.071	1045	1045	17874	17874	151	151	0.96	0.96
	3/2/24	17:11:48	R2	1.02	0.39	0.39	0.092	0.092	1057	1057	17905	17905	151	151	0.96	0.96
	3/2/24	17:12:49	R2	1.02	0.39	0.39	0.071	0.071	1046	1046	18014	18014	151	151	0.96	0.96
	3/2/24	17:13:50	R2	1.02	0.37	0.37	0.029	0.057	1049	1049	17955	17955	151	151	0.96	0.96
	3/2/24	17:14:51	R2	1.02	0.30	0.30	0.029	0.057	1041	1041	17891	17891	151	151	0.96	0.96
	3/2/24	17:15:55	R2	1.07	0.24	0.24	0.061	0.061	1042	1042	17977	17977	151	151	0.96	0.96
	3/2/24	17:16:53	R2	0.97	0.22	0.22	0.029	0.057	1049	1049	18068	18068	151	151	0.96	0.96
	3/2/24	17:17:54	R2	1.02	0.18	0.18	0.077	0.077	1076	1076	18116	18116	151	151	0.96	0.96
	3/2/24	17:18:55	R2	1.02	0.17	0.17	0.029	0.057	1048	1048	18056	18056	151	151	0.96	0.96
	3/2/24	17:19:56	R2	1.02	0.14	0.14	0.029	0.057	1031	1031	17995	17995	151	151	0.96	0.96
	3/2/24	17:20:59	R2	1.05	0.13	0.13	0.029	0.057	1030	1030	18035	18035	151	151	0.96	0.96
	3/2/24	17:21:59	R2	1.00	0.13	0.13	0.029	0.057	1054	1054	17992	17992	151	151	0.96	0.96
	3/2/24	17:22:59	R2	1.00	0.13	0.13	0.029	0.057	1040	1040	17957	17957	151	151	0.96	0.96
	3/2/24	17:24:01	R2	1.03	0.13	0.13	0.029	0.057	1031	1031	18050	18050	151	151	0.96	0.96
	3/2/24	17:25:01	R2	1.00	0.13	0.13	0.029	0.057	1016	1016	17993	17993	151	151	0.96	0.96
	3/2/24	17:26:02	R2	1.02	0.14	0.14	0.029	0.057	1033	1033	17964	17964	151	151	0.96	0.96
	3/2/24	17:27:03	R2	1.02	0.34	0.34	0.071	0.071	1050	1050	18063	18063	151	151	0.96	0.96
	3/2/24	17:28:04	R2	1.02	0.35	0.35	0.059	0.059	1036	1036	18087	18087	151	151	0.96	0.96
	3/2/24	17:29:05	R2	1.02	0.35	0.35	0.029	0.057	1023	1023	18108	18108	151	151	0.96	0.96
	3/2/24	17:30:06	R2	1.02	0.36	0.36	0.029	0.057	1038	1038	18058	18058	151	151	0.96	0.96
	3/2/24	17:31:07	R2	1.02	0.35	0.35	0.060	0.060	1043	1043	18100	18100	151	151	0.96	0.96
	3/2/24	17:32:08	R2	1.02	0.35	0.35	0.077	0.077	1037	1037	18128	18128	151	151	0.96	0.96
	3/2/24	17:33:09	R2	1.02	0.36	0.36	0.029	0.057	1025	1025	18148	18148	151	151	0.96	0.96
	3/2/24	17:34:10	R2	1.02	0.34	0.34	0.063	0.063	1019	1019	18068	18068	151	151	0.96	0.96
	3/2/24	17:35:11	R2	1.02	0.32	0.32	0.029	0.057	1035	1035	18061	18061	151	151	0.96	0.96
	3/2/24	17:36:14	R2	1.05	0.34	0.34	0.068	0.068	1036	1036	18120	18120	151	151	0.96	0.96
	3/2/24	17:37:15	R2	1.02	0.35	0.35	0.063	0.063	1026	1026	18095	18095	151	151	0.96	0.96
	3/2/24	17:38:14	R2	0.98	0.34	0.34	0.029	0.057	1014	1014	18044	18044	151	151	0.96	0.96
	3/2/24	17:39:15	R2	1.02	0.29	0.29	0.069	0.069	1011	1011	18049	18049	151	151	0.96	0.96
	3/2/24	17:40:17	R2	1.03	0.27	0.27	0.029	0.057	1010	1010	18086	18086	151	151	0.96	0.96
	3/2/24	17:41:17	R2	1.00	0.24	0.24	0.029	0.057	1000	1000	18009	18009	151	151	0.96	0.96
	3/2/24	17:42:18	R2	1.02	0.22	0.22	0.029	0.057	987	987	18010	18010	151	151	0.96	0.96
	3/2/24	17:43:22	R2	1.07	0.19	0.19	0.029	0.057	983	983	18064	18064	151	151	0.96	0.96
	3/2/24	17:44:20	R2	0.97	0.19	0.19	0.029	0.057	1000	1000	18076	18076	151	151	0.96	0.96
	3/2/24	17:45:21	R2	1.02	0.17	0.17	0.029	0.057	1002	1002	18048	18048	151	151	0.96	0.96
	3/2/24	17:46:23	R2	1.03	0.17	0.17	0.029	0.057	993	993	18003	18003	151	151	0.96	0.96
	3/2/24	17:47:23	R2	1.00	0.15	0.15	0.029	0.057	969	969	18041	18041	151	151	0.96	0.96
	3/2/24	17:48:25	R2	1.03	0.13	0.13	0.029	0.057	970	970	18018	18018	151	151	0.96	0.96
	3/2/24	17:49:26	R2	1.02	0.25	0.25	0.029	0.057	976	976	17995	17995	151	151	0.96	0.96
	3/2/24	17:50:26	R2	1.00	0.24	0.24	0.084	0.084	997	997	18070	18070	151	151	0.96	0.96
	3/2/24	17:51:27	R2	1.02	0.23	0.23	0.11	0.11	983	983	18061	18061	151	151	0.96	0.96
	3/2/24	17:52:28	R2	1.02	0.22	0.22	0.12	0.12	975	975	18017	18017	151	151	0.96	0.96
	3/2/24	17:53:29	R2	1.02	0.24	0.24	0.094	0.094	969	969	18024	18024	151	151	0.96	0.96
	3/2/24	17:54:30	R2	1.02	0.24	0.24	0.11	0.11	976	976	18089	18089	151	151	0.96	0.96
	3/2/24	17:55:31	R2	1.02	0.28	0.28	0.17	0.17	987	987	18116	18116	151	151	0.96	0.96
	3/2/24	17:56:32	R2	1.02	0.31	0.31	0.17	0.17	979	979	18092	18092	151	151	0.96	0.96
	3/2/24	17:57:33	R2	1.02	0.32	0.32	0.17	0.17	977	977	18071	18071	151	151	0.96	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PEC_002	Outlet	Scrubber												
Run Length			Minimum	0.063	0.063	BDL	BDL	972	972	17422	17422	151	151	0.96	0.96
60.0 (min)	Run 1	Conc. (ppmv)	Maximum	0.35	0.35	0.15	0.15	1035	1035	17920	17920	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.17	0.17	0.064	0.064	1016	1016	17809	17809	151	151	0.96	0.96
			(BDL = MDL) Average	0.17	0.17	0.072	0.072	1016	1016	17809	17809	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	0.12	0.12	BDL	BDL	958	958	17874	17874	151	151	0.96	0.96
60.0 (min)	Run 2	Conc. (ppmv)	Maximum	0.39	0.39	0.18	0.18	1076	1076	18148	18148	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.25	0.25	0.079	0.079	1008	1008	18045	18045	151	151	0.96	0.96
			(BDL = MDL) Average	0.25	0.25	0.091	0.091	1008	1008	18045	18045	151	151	0.96	0.96
		(Volume)	MDL												
Run Length				0.079	0.079	BDL	BDL	859	859	15539	15539	150	150	0.96	0.96
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	0.37	0.37	0.16	0.16	998	998	18576	18576	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.20	0.20	0.085	0.085	935	935	17324	17324	151	151	0.96	0.96
			(BDL = MDL) Average	0.20	0.20	0.094	0.094	935	935	17324	17324	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	0.063	0.063	BDL	BDL	859	859	15539	15539	150	150	0.96	0.96
(min)	Test Results	Conc. (ppmv)	Maximum	0.39	0.39	0.18	0.18	1076	1076	18576	18576	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.21	0.21	0.076	0.076	986	986	17726	17726	151	151	0.96	0.96
			(BDL = MDL) Average	0.21	0.21	0.086	0.086	986	986	17726	17726	151	151	0.96	0.96
		(Volume)	MDL	NA	NA	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA

					HCl 0.9-min data		HF 0.9-min data		CO2 0.9-min data		H2O 0.9-min data		Temp(C) 0.9-min data		Press(atm) 0.9-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/2/24	17:58:34	R2	1.02	0.33	0.33	0.17	0.17	1000	1000	18083	18083	151	151	0.96	0.96
	3/2/24	17:59:35	R2	1.02	0.34	0.34	0.18	0.18	987	987	18115	18115	151	151	0.96	0.96
	3/2/24	18:00:40	R2	1.08	0.35	0.35	0.18	0.18	962	962	18097	18097	151	151	0.96	0.96
	3/2/24	18:01:39	R2	0.98	0.35	0.35	0.18	0.18	963	963	18105	18105	151	151	0.96	0.96
	3/2/24	18:02:38	R2	0.98	0.24	0.24	0.18	0.18	972	972	18106	18106	151	151	0.96	0.96
	3/2/24	18:03:39	R2	1.02	0.24	0.24	0.18	0.18	964	964	18094	18094	151	151	0.96	0.96
	3/2/24	18:04:42	R2	1.05	0.18	0.18	0.15	0.15	958	958	18019	18019	151	151	0.96	0.96
	3/2/24	18:05:41	R2	0.98	0.15	0.15	0.15	0.15	963	963	18026	18026	151	151	0.96	0.96
	3/2/24	18:06:44	R2	1.05	0.13	0.13	0.13	0.13	965	965	18009	18009	151	151	0.96	0.96
	3/2/24	18:07:43	R2	0.98	0.13	0.13	0.18	0.18	966	966	18057	18057	151	151	0.96	0.96
	3/2/24	18:08:44	R2	1.02	0.12	0.12	0.16	0.16	966	966	18012	18012	151	151	0.96	0.96
	3/2/24	18:09:45	R2	1.02	0.12	0.12	0.13	0.13	966	966	18060	18060	151	151	0.96	0.96
	3/2/24	18:10:46	R3	1.02	0.12	0.12	0.14	0.14	969	969	18050	18050	151	151	0.96	0.96
	3/2/24	18:11:49	R3	1.05	0.14	0.14	0.16	0.16	987	987	17992	17992	151	151	0.96	0.96
	3/2/24	18:12:50	R3	1.02	0.13	0.13	0.12	0.12	976	976	17995	17995	151	151	0.96	0.96
	3/2/24	18:13:52	R3	1.03	0.15	0.15	0.11	0.11	974	974	18092	18092	151	151	0.96	0.96
	3/2/24	18:14:50	R3	0.97	0.19	0.19	0.13	0.13	978	978	18117	18117	151	151	0.96	0.96
	3/2/24	18:15:53	R3	1.05	0.17	0.17	0.100	0.100	960	960	18399	18399	151	151	0.96	0.96
	3/2/24	18:16:52	R3	0.98	0.16	0.16	0.13	0.13	965	965	18551	18551	151	151	0.96	0.96
	3/2/24	18:17:53	R3	1.02	0.17	0.17	0.11	0.11	962	962	18576	18576	151	151	0.96	0.96
	3/2/24	18:18:54	R3	1.02	0.14	0.14	0.099	0.099	961	961	18474	18474	151	151	0.96	0.96
	3/2/24	18:19:55	R3	1.02	0.13	0.13	0.089	0.089	944	944	18329	18329	151	151	0.96	0.96
	3/2/24	18:20:56	R3	1.02	0.14	0.14	0.12	0.12	968	968	18419	18419	151	151	0.96	0.96
	3/2/24	18:21:57	R3	1.02	0.15	0.15	0.12	0.12	968	968	18261	18261	151	151	0.96	0.96
	3/2/24	18:22:58	R3	1.02	0.18	0.18	0.11	0.11	960	960	18191	18191	151	151	0.96	0.96
	3/2/24	18:24:02	R3	1.07	0.17	0.17	0.077	0.077	962	962	18169	18169	151	151	0.96	0.96
	3/2/24	18:25:00	R3	0.97	0.15	0.15	0.11	0.11	973	973	18186	18186	151	151	0.96	0.96
	3/2/24	18:26:04	R3	1.07	0.32	0.32	0.11	0.11	963	963	18200	18200	151	151	0.96	0.96
	3/2/24	18:27:02	R3	0.97	0.36	0.36	0.13	0.13	966	966	18239	18239	151	151	0.96	0.96
	3/2/24	18:28:03	R3	1.02	0.36	0.36	0.13	0.13	969	969	18257	18257	151	151	0.96	0.96
	3/2/24	18:29:04	R3	1.02	0.36	0.36	0.12	0.12	982	982	18325	18325	151	151	0.96	0.96
	3/2/24	18:30:08	R3	1.07	0.37	0.37	0.14	0.14	989	989	18300	18300	151	151	0.96	0.96
	3/2/24	18:31:06	R3	0.97	0.37	0.37	0.12	0.12	964	964	18219	18219	151	151	0.96	0.96
	3/2/24	18:32:08	R3	1.03	0.37	0.37	0.14	0.14	974	974	18301	18301	151	151	0.96	0.96
	3/2/24	18:33:10	R3	1.03	0.36	0.36	0.15	0.15	979	979	18476	18476	151	151	0.96	0.96
	3/2/24	18:34:09	R3	0.98	0.34	0.34	0.10	0.10	966	966	18207	18207	151	151	0.96	0.96
	3/2/24	18:35:10	R3	1.02	0.34	0.34	0.10	0.10	966	966	18216	18216	150	150	0.96	0.96
	3/2/24	18:36:13	R3	1.05	0.36	0.36	0.13	0.13	978	978	18340	18340	151	151	0.96	0.96
	3/2/24	18:37:12	R3	0.98	0.35	0.35	0.13	0.13	966	966	18282	18282	151	151	0.96	0.96
	3/2/24	18:38:15	R3	1.05	0.36	0.36	0.13	0.13	961	961	18307	18307	151	151	0.96	0.96
	3/2/24	18:39:14	R3	0.98	0.34	0.34	0.15	0.15	992	992	18288	18288	151	151	0.96	0.96
	3/2/24	18:40:15	R3	1.02	0.34	0.34	0.14	0.14	998	998	18290	18290	151	151	0.96	0.96
	3/2/24	18:41:16	R3	1.02	0.28	0.28	0.12	0.12	933	933	17809	17809	151	151	0.96	0.96
	3/2/24	18:42:17	R3	1.02	0.28	0.28	0.10	0.10	868	868	16576	16576	151	151	0.96	0.96
	3/2/24	18:43:21	R3	1.07	0.29	0.29	0.10	0.10	867	867	16137	16137	151	151	0.96	0.96
	3/2/24	18:44:19	R3	0.97	0.30	0.30	0.086	0.086	860	860	16092	16092	151	151	0.96	0.96
	3/2/24	18:45:20	R3	1.02	0.30	0.30	0.074	0.074	870	870	16045	16045	151	151	0.96	0.96
	3/2/24	18:46:22	R3	1.03	0.30	0.30	0.069	0.069	886	886	16090	16090	151	151	0.96	0.96
	3/2/24	18:47:22	R3	1.00	0.21	0.21	0.029	0.057	859	859	16008	16008	151	151	0.96	0.96
	3/2/24	18:48:23	R3	1.02	0.14	0.14	0.061	0.061	869	869	15981	15981	151	151	0.96	0.96
	3/2/24	18:49:27	R3	1.07	0.12	0.12	0.071	0.071	873	873	16036	16036	151	151	0.96	0.96
	3/2/24	18:50:25	R3	0.97	0.12	0.12	0.070	0.070	870	870	15994	15994	151	151	0.96	0.96
	3/2/24	18:51:26	R3	1.02	0.11	0.11	0.063	0.063	886	886	16001	16001	151	151	0.96	0.96
	3/2/24	18:52:27	R3	1.02	0.11	0.11	0.029	0.057	880	880	15949	15949	151	151	0.96	0.96
	3/2/24	18:53:30	R3	1.05	0.098	0.098	0.029	0.057	866	866	15897	15897	151	151	0.96	0.96
	3/2/24	18:54:30	R3	1.00	0.10	0.10	0.029	0.057	882	882	15892	15892	151	151	0.96	0.96
	3/2/24	18:55:30	R3	1.00	0.091	0.091	0.029	0.057	875	875	15888	15888	151	151	0.96	0.96
	3/2/24	18:56:32	R3	1.03	0.090	0.090	0.029	0.057	868	868	15829	15829	151	151	0.96	0.96
	3/2/24	18:57:35	R3	1.05	0.099	0.099	0.029	0.057	890	890	15714	15714	151	151	0.96	0.96
	3/2/24	18:58:33	R3	0.97	0.096	0.096	0.029	0.057	878	878	15539	15539	151	151	0.96	0.96
	3/2/24	18:59:34	R3	1.02	0.083	0.083	0.029	0.057	876	876	15693	15693	151	151	0.96	0.96
	3/2/24	19:00:38	R3	1.07	0.16	0.16	0.029	0.057	906	906	15991	15991	151	151	0.96	0.96
	3/2/24	19:01:36	R3	0.97	0.13	0.13	0.058	0.058	947	947	16502	16502	151	151	0.96	0.96
	3/2/24	19:02:37	R3	1.02	0.11	0.11	0.029	0.057	939	939	16858	16858	151	151	0.96	0.96
	3/2/24	19:03:38	R3	1.02	0.10	0.10	0.029	0.057	946	946	17008	17008	151	151	0.96	0.96
	3/2/24	19:04:39	R3	1.02	0.10	0.10	0.029	0.057	934	934	17092	17092	151	151	0.96	0.96
	3/2/24	19:05:43	R3	1.07	0.079	0.079	0.029	0.057	950	950	17101	17101	151	151	0.96	0.96
	3/2/24	19:06:41	R3	0.97	0.079	0.079	0.029	0.057	941	941	17141	17141	151	151	0.96	0.96
	3/2/24	19:07:43	R3	1.03	0.086	0.086	0.029	0.057	949	949	17198	17198	151	151	0.96	0.96
	3/2/24	19:08:43	R3	1.00	0.084	0.084	0.029	0.057	961	961	17138	17138	151	151	0.96	0.96
	3/2/24	19:09:44	R3	1.02	0.085	0.085	0.029	0.057	935	935	16876	16876	151	151	0.96	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PEI_001	Outlet	Scrubber												
62.1 (min)	Run 1	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	437	437	17705	17705	151	151	0.96	0.96
			Maximum	BDL	BDL	BDL	BDL	452	452	18091	18091	152	152	0.96	0.96
			(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	445	445	17970	17970	151	151	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	445	445	17970	17970	151	151	0.96	0.96
		(Volume)	MDL	0.023	0.023	0.029	0.029	NA	NA	NA	NA	NA	NA	NA	NA
Run Length															
61.9 (min)	Run 2	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	435	435	16777	16777	151	151	0.96	0.96
			Maximum	BDL	BDL	BDL	BDL	457	457	18143	18143	152	152	0.96	0.96
			(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	447	447	17942	17942	151	151	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	447	447	17942	17942	151	151	0.96	0.96
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	435	435	15546	15546	151	151	0.96	0.96
62.0 (min)	Run 3	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	451	451	18150	18150	152	152	0.96	0.96
			(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	444	444	17971	17971	152	152	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	444	444	17971	17971	152	152	0.96	0.96
		(Volume)	MDL	0.023	0.023	0.029	0.029	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	435	435	15546	15546	151	151	0.96	0.96
(min)	Test Results	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	457	457	18150	18150	152	152	0.96	0.96
			(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	445	445	17961	17961	151	151	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	445	445	17961	17961	151	151	0.96	0.96
		(Volume)	MDL	0.023	0.023	0.029	0.029	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	2/29/24	14:06:23	R1	1.02	0.012	0.023	0.015	0.029	444	444	17974	17974	151	151	0.96	0.96
	2/29/24	14:07:23	R1	1.00	0.012	0.023	0.015	0.029	452	452	17991	17991	151	151	0.96	0.96
	2/29/24	14:08:22	R1	0.98	0.012	0.023	0.015	0.029	452	452	18042	18042	152	152	0.96	0.96
	2/29/24	14:09:25	R1	1.05	0.012	0.023	0.015	0.029	444	444	17883	17883	152	152	0.96	0.96
	2/29/24	14:10:22	R1	0.95	0.012	0.023	0.015	0.029	444	444	17913	17913	152	152	0.96	0.96
	2/29/24	14:11:22	R1	1.00	0.012	0.023	0.015	0.029	445	445	18067	18067	151	151	0.96	0.96
	2/29/24	14:12:23	R1	1.02	0.012	0.023	0.015	0.029	449	449	17891	17891	151	151	0.96	0.96
	2/29/24	14:13:22	R1	0.98	0.012	0.023	0.015	0.029	444	444	18050	18050	151	151	0.96	0.96
	2/29/24	14:14:22	R1	1.00	0.012	0.023	0.015	0.029	441	441	17944	17944	151	151	0.96	0.96
	2/29/24	14:15:22	R1	1.00	0.012	0.023	0.015	0.029	444	444	17926	17926	152	152	0.96	0.96
	2/29/24	14:16:22	R1	1.00	0.012	0.023	0.015	0.029	445	445	18091	18091	152	152	0.96	0.96
	2/29/24	14:17:22	R1	1.00	0.012	0.023	0.015	0.029	444	444	17969	17969	151	151	0.96	0.96
	2/29/24	14:18:23	R1	1.02	0.012	0.023	0.015	0.029	449	449	17916	17916	152	152	0.96	0.96
	2/29/24	14:19:25	R1	1.03	0.012	0.023	0.015	0.029	447	447	18055	18055	151	151	0.96	0.96
	2/29/24	14:20:22	R1	0.95	0.012	0.023	0.015	0.029	441	441	17907	17907	151	151	0.96	0.96
	2/29/24	14:21:22	R1	1.00	0.012	0.023	0.015	0.029	444	444	18008	18008	151	151	0.96	0.96
	2/29/24	14:22:25	R1	1.05	0.012	0.023	0.015	0.029	442	442	17891	17891	151	151	0.96	0.96
	2/29/24	14:23:22	R1	0.95	0.012	0.023	0.015	0.029	442	442	18062	18062	151	151	0.96	0.96
	2/29/24	14:24:23	R1	1.02	0.012	0.023	0.015	0.029	443	443	17908	17908	151	151	0.96	0.96
	2/29/24	14:25:22	R1	0.98	0.012	0.023	0.015	0.029	446	446	18067	18067	152	152	0.96	0.96
	2/29/24	14:26:22	R1	1.00	0.012	0.023	0.015	0.029	446	446	18085	18085	152	152	0.96	0.96
	2/29/24	14:27:25	R1	1.05	0.012	0.023	0.015	0.029	444	444	18035	18035	152	152	0.96	0.96
	2/29/24	14:28:22	R1	0.95	0.012	0.023	0.015	0.029	444	444	17902	17902	151	151	0.96	0.96
	2/29/24	14:29:25	R1	1.05	0.012	0.023	0.015	0.029	447	447	18040	18040	151	151	0.96	0.96
	2/29/24	14:30:22	R1	0.95	0.012	0.023	0.015	0.029	447	447	18055	18055	152	152	0.96	0.96
	2/29/24	14:31:23	R1	1.02	0.012	0.023	0.015	0.029	445	445	18013	18013	151	151	0.96	0.96
	2/29/24	14:32:25	R1	1.03	0.012	0.023	0.015	0.029	446	446	18047	18047	151	151	0.96	0.96
	2/29/24	14:33:22	R1	0.95	0.012	0.023	0.015	0.029	447	447	18053	18053	151	151	0.96	0.96
	2/29/24	14:34:22	R1	1.00	0.012	0.023	0.015	0.029	449	449	17864	17864	151	151	0.96	0.96
	2/29/24	14:35:22	R1	1.00	0.012	0.023	0.015	0.029	451	451	17862	17862	151	151	0.96	0.96
	2/29/24	14:36:22	R1	1.00	0.012	0.023	0.015	0.029	447	447	17909	17909	152	152	0.96	0.96
	2/29/24	14:37:22	R1	1.00	0.012	0.023	0.015	0.029	451	451	18054	18054	152	152	0.96	0.96
	2/29/24	14:38:22	R1	1.00	0.012	0.023	0.015	0.029	449	449	18048	18048	152	152	0.96	0.96
	2/29/24	14:39:22	R1	1.00	0.012	0.023	0.015	0.029	446	446	18039	18039	152	152	0.96	0.96
	2/29/24	14:40:22	R1	1.00	0.012	0.023	0.015	0.029	441	441	18046	18046	151	151	0.96	0.96
	2/29/24	14:41:24	R1	1.03	0.012	0.023	0.015	0.029	442	442	18044	18044	151	151	0.96	0.96
	2/29/24	14:42:22	R1	0.97	0.012	0.023	0.015	0.029	447	447	17900	17900	152	152	0.96	0.96
	2/29/24	14:43:25	R1	1.05	0.012	0.023	0.015	0.029	447	447	18019	18019	151	151	0.96	0.96
	2/29/24	14:44:22	R1	0.95	0.012	0.023	0.015	0.029	448	448	18028	18028	151	151	0.96	0.96
	2/29/24	14:45:22	R1	1.00	0.012	0.023	0.015	0.029	442	442	17879	17879	151	151	0.96	0.96
	2/29/24	14:46:22	R1	1.00	0.012	0.023	0.015	0.029	441	441	18036	18036	151	151	0.96	0.96
	2/29/24	14:47:25	R1	1.05	0.012	0.023	0.015	0.029	439	439	17900	17900	151	151	0.96	0.96
	2/29/24	14:48:22	R1	0.95	0.012	0.023	0.015	0.029	437	437	18057	18057	152	152	0.96	0.96
	2/29/24	14:49:22	R1	1.00	0.012	0.023	0.015	0.029	442	442	18070	18070	152	152	0.96	0.96
	2/29/24	14:50:22	R1	1.00	0.012	0.023	0.015	0.029	438	438	17880	17880	152	152	0.96	0.96
	2/29/24	14:51:24	R1	1.03	0.012	0.023	0.015	0.029	442	442	18057	18057	152	152	0.96	0.96
	2/29/24	14:52:25	R1	1.02	0.012	0.023	0.015	0.029	444	444	17864	17864	151	151	0.96	0.96
	2/29/24	14:53:22	R1	0.95	0.012	0.023	0.015	0.029	439	439	18013	18013	152	152	0.96	0.96
	2/29/24	14:54:22	R1	1.00	0.012	0.023	0.015	0.029	441	441	17994	17994	151	151	0.96	0.96
	2/29/24	14:55:22	R1	1.00	0.012	0.023	0.015	0.029	440	440	18022	18022	151	151	0.96	0.96
	2/29/24	14:56:26	R1	1.07	0.012	0.023	0.015	0.029	443	443	17982	17982	151	151	0.96	0.96
	2/29/24	14:57:25	R1	0.98	0.012	0.023	0.015	0.029	443	443	17958	17958	151	151	0.96	0.96
	2/29/24	14:58:22	R1	0.95	0.012	0.023	0.015	0.029	447	447	17958	17958	151	151	0.96	0.96
	2/29/24	14:59:22	R1	1.00	0.012	0.023	0.015	0.029	444	444	17948	17948	151	151	0.96	0.96
	2/29/24	15:00:23	R1	1.02	0.012	0.023	0.015	0.029	443	443	17927	17927	151	151	0.96	0.96
	2/29/24	15:01:22	R1	0.98	0.012	0.023	0.015	0.029	443	443	17936	17936	151	151	0.96	0.96
	2/29/24	15:02:23	R1	1.02	0.012	0.023	0.015	0.029	446	446	17915	17915	152	152	0.96	0.96
	2/29/24	15:03:24	R1	1.02	0.012	0.023	0.015	0.029	448	448	17916	17916	152	152	0.96	0.96
	2/29/24	15:04:22	R1	0.97	0.012	0.023	0.015	0.029	445	445	17887	17887	151	151	0.96	0.96
	2/29/24	15:05:22	R1	1.00	0.012	0.023	0.015	0.029	444	444	17917	17917	151	151	0.96	0.96
	2/29/24	15:06:23	R1	1.02	0.012	0.023	0.015	0.029	444	444	17705	17705	151	151	0.96	0.96
	2/29/24	15:07:25	R1	1.03	0.012	0.023	0.015	0.029	444	444	17725	17725	151	151	0.96	0.96
	2/29/24	15:08:22	R2	0.95	0.012	0.023	0.015	0.029	446	446	17625	17625	151	151	0.96	0.96
	2/29/24	15:09:22	R2	1.00	0.012	0.023	0.015	0.029	446	446	17799	17799	151	151	0.96	0.96
	2/29/24	15:10:22	R2	1.00	0.012	0.023	0.015	0.029	443	443	17846	17846	151	151	0.96	0.96
	2/29/24	15:11:22	R2	1.00	0.012	0.023	0.015	0.029	445	445	17858	17858	151	151	0.96	0.96
	2/29/24	15:12:22	R2	1.00	0.012	0.023	0.015	0.029	443	443	17820	17820	151	151	0.96	0.96
	2/29/24	15:13:28	R2	1.10	0.012	0.023	0.015	0.029	445	445	17772	17772	151	151	0.96	0.96
	2/29/24	15:14:22	R2	0.90	0.012	0.023	0.015	0.029	445	445	17587	17587	151	151	0.96	0.96
	2/29/24	15:15:23	R2	1.02	0.012	0.023	0.015	0.029	443	443	17518	17518	151	151	0.96	0.96
	2/29/24	15:16:22	R2	0.98	0.012	0.023	0.015	0.029	443	443	17599	17599	151	151	0.96	0.96
	2/29/24	15:17:25	R2	1.05	0.012	0.023	0.015	0.029	443	443	17848	17848	151	151	0.96	0.96
	2/29/24	15:18:22	R2	0.95	0.012	0.023	0.015	0.029	448	448	17758	17758	152	152	0.96	0.96
	2/29/24	15:19:22	R2	1.00	0.012	0.023	0.015	0.029	447	447	17769	17769	152	152	0.96	0.96
	2/29/24	15:20:25	R2	1.05	0.012	0.023	0.015	0.029	451	451	16777	16777	152	152	0.96	0.96
	2/29/24	15:21:23	R2	0.97	0.012	0.023	0.015	0.029	452	452	17406	17406	152	152	0.96	0.96
	2/29/24	15:22:22	R2	0.98	0.012	0.023	0.015	0.029	453	453	17829	17829	152	152	0.96	0.96
	2/29/24	15:23:22	R2	1.00	0.012	0.023	0.015	0.029	450	450	17884	17884	152	152	0.96	0.96
	2/29/24	15:24:22	R2	1.00	0.012	0.023	0.015	0.029	445	445	17885	17885	152	152	0.96	0.96
	2/29/24	15:25:24	R2	1.03	0.012	0.023	0.015	0.029	447	447	17932	17932	151	151	0.96	0.96
	2/29/24	15:26:22	R2	0.97	0.012	0.023	0.015	0.029	450	450	17919	17919	151	151	0.96	0.96
	2/29/24	15:27:22	R2	1.00	0.012	0.023	0.015	0.029	447	447	17734	17734	151	151	0.96	0.96
	2/29/24	15:28:22	R2	1.00	0.012	0.023	0.015	0.029	450	450	17947	17947	151	151	0.96	0.96
	2/29/24	15:29:23	R2	1.02	0.012	0.023	0.015	0.029	451	451	18019	18019	151	151	0.96	0.96
	2/29/24	15:30:24	R2	1.02	0.012	0.023	0.015	0.029	453	453	18057	18057	151	151	0.96	0.96
	2/29/24	15:31:24	R2	1.00	0.012	0.023	0.015	0.029	450	450	18097	18097	151	151	0.96	0.96
	2/29/24	15:32:25	R2	1.02	0.012	0.023	0.015	0.029	447	447	18080	18080	151	151	0.96	0.96
	2/29/24	15:33:22	R2	0.95	0.012	0.023	0.015	0.029	449	449	18043	18043	151	151	0.96	0.96
	2/29/24	15:34:22	R2	1.00	0.012	0.023	0.015	0.029	448	448	18108	18108	151	151	0.96	0.96
	2/29/24	15:35:22	R2	1.00	0.012	0.023	0.015	0.029	445	445	18069	18069	151	151	0.96	0.96
	2/29/24	15:36:22	R2	1.00	0.012	0.023	0.015	0.029	448	448	18095	18095	151	151	0.96	0.96
	2/29/24	15:37:22	R2	1.00	0.012	0.023	0.015	0.029	444	444	18062	18062	152	152	0.96	0.96
	2/29/24	15:38:22	R2	1.00	0.012	0.023	0.015	0.029	442	442	18055	18055	151	151	0.96	0.96
	2/29/24	15:39:22	R2	1.00	0.012	0.023	0.015	0.029	444	444	17920	17920	151	151	0.96	0.96
	2/29/24	15:40:22	R2	1.00	0.012	0.023	0.015	0.029	442	442	18066	18066	152	152	0.96	0.96
	2/29/24	15:41:22	R2	1.00	0.012	0.023	0.015	0.029	448	448	17885	17885	152	152	0.96	0.96
	2/29/24	15:42:24	R2	1.03	0.012	0.023	0.015	0.029	446	446	18072	18072	152	152	0.96	0.96
	2/29/24	15:43:24	R2	1.00	0.012	0.023	0.015	0.029	444	444	18038	18038	152	152	0.96	0.96
	2/29/24	15:44:23	R2	0.98	0.012	0.023	0.015	0.029	446	446	18030	18030	152	152	0.96	0.96
	2/29/24	15:45:22	R2	0.98	0.012	0.023	0.015	0.029	446	446	17937	17937	152	152	0.96	0.96
	2/29/24	15:46:23	R2	1.02	0.012	0.023	0.015	0.029	446	446	18003	18003	152	152	0.96	0.96
	2/29/24	15:47:22	R2	0.98	0.012	0.023	0.015	0.029	450	450	18120	18120	152	152	0.96	0.96
	2/29/24	15:48:22	R2	1.00	0.012	0.023	0.015	0.029	447	447	17955	17955	151	151	0.96	0.96
	2/29/24	15:49:25	R2	1.05	0.012	0.023	0.015	0.029	442	442	17932	17932	151	151	0.96	0.96
	2/29/24	15:50:22	R2	0.95	0.012	0.023	0.015	0.029	448	448	18104	18104	152	152	0.96	0.96
	2/29/24	15:51:22	R2	1.00	0.012	0.023	0.015	0.029	450	450	18075	18075	152	152	0.96	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PEI_001	Outlet	Scrubber												
Run Length			Minimum	BDL	BDL	BDL	BDL	437	437	17705	17705	151	151	0.96	0.96
62.1 (min)			Maximum	BDL	BDL	BDL	BDL	452	452	18091	18091	152	152	0.96	0.96
	Run 1	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	445	445	17970	17970	151	151	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	445	445	17970	17970	151	151	0.96	0.96
		(Volume)	MDL	0.023	0.023	0.029	0.029	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	435	435	16777	16777	151	151	0.96	0.96
61.9 (min)			Maximum	BDL	BDL	BDL	BDL	457	457	18143	18143	152	152	0.96	0.96
	Run 2	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	447	447	17942	17942	151	151	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	447	447	17942	17942	151	151	0.96	0.96
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	435	435	15546	15546	151	151	0.96	0.96
62.0 (min)			Maximum	BDL	BDL	BDL	BDL	451	451	18150	18150	152	152	0.96	0.96
	Run 3	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	444	444	17971	17971	152	152	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	444	444	17971	17971	152	152	0.96	0.96
		(Volume)	MDL	0.023	0.023	0.029	0.029	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	435	435	15546	15546	151	151	0.96	0.96
(min)			Maximum	BDL	BDL	BDL	BDL	457	457	18150	18150	152	152	0.96	0.96
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.012	0.012	0.015	0.015	445	445	17961	17961	151	151	0.96	0.96
			(BDL = MDL) Average	0.023	0.023	0.029	0.029	445	445	17961	17961	151	151	0.96	0.96
		(Volume)	MDL	0.023	0.023	0.029	0.029	NA	NA	NA	NA	NA	NA	NA	NA

					HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	2/29/24	15:52:22	R2	1.00	0.012	0.023	0.015	0.029	442	442	18076	18076	151	151	0.96	0.96
	2/29/24	15:53:23	R2	1.02	0.012	0.023	0.015	0.029	447	447	17916	17916	152	152	0.96	0.96
	2/29/24	15:54:22	R2	0.98	0.012	0.023	0.015	0.029	435	435	18093	18093	152	152	0.96	0.96
	2/29/24	15:55:22	R2	1.00	0.012	0.023	0.015	0.029	444	444	18119	18119	152	152	0.96	0.96
	2/29/24	15:56:26	R2	1.07	0.012	0.023	0.015	0.029	445	445	18091	18091	152	152	0.96	0.96
	2/29/24	15:57:22	R2	0.93	0.012	0.023	0.015	0.029	448	448	18122	18122	152	152	0.96	0.96
	2/29/24	15:58:22	R2	1.00	0.012	0.023	0.015	0.029	448	448	18093	18093	152	152	0.96	0.96
	2/29/24	15:59:22	R2	1.00	0.012	0.023	0.015	0.029	451	451	18112	18112	152	152	0.96	0.96
	2/29/24	16:00:22	R2	1.00	0.012	0.023	0.015	0.029	449	449	18041	18041	152	152	0.96	0.96
	2/29/24	16:01:24	R2	1.03	0.012	0.023	0.015	0.029	456	456	18093	18093	152	152	0.96	0.96
	2/29/24	16:02:23	R2	0.98	0.012	0.023	0.015	0.029	448	448	18069	18069	152	152	0.96	0.96
	2/29/24	16:03:23	R2	1.00	0.012	0.023	0.015	0.029	450	450	18126	18126	152	152	0.96	0.96
	2/29/24	16:04:25	R2	1.03	0.012	0.023	0.015	0.029	455	455	18143	18143	152	152	0.96	0.96
	2/29/24	16:05:25	R2	1.00	0.012	0.023	0.015	0.029	457	457	18138	18138	152	152	0.96	0.96
	2/29/24	16:06:22	R2	0.95	0.012	0.023	0.015	0.029	449	449	18128	18128	152	152	0.96	0.96
	2/29/24	16:07:22	R2	1.00	0.012	0.023	0.015	0.029	445	445	17901	17901	152	152	0.96	0.96
	2/29/24	16:08:22	R2	1.00	0.012	0.023	0.015	0.029	449	449	18051	18051	151	151	0.96	0.96
	2/29/24	16:09:22	R2	1.00	0.012	0.023	0.015	0.029	454	454	18133	18133	152	152	0.96	0.96
	2/29/24	16:10:22	R3	1.00	0.012	0.023	0.015	0.029	451	451	18080	18080	152	152	0.96	0.96
	2/29/24	16:11:22	R3	1.00	0.012	0.023	0.015	0.029	437	437	18077	18077	152	152	0.96	0.96
	2/29/24	16:12:22	R3	1.00	0.012	0.023	0.015	0.029	446	446	18106	18106	152	152	0.96	0.96
	2/29/24	16:13:22	R3	1.00	0.012	0.023	0.015	0.029	438	438	18129	18129	152	152	0.96	0.96
	2/29/24	16:14:22	R3	1.00	0.012	0.023	0.015	0.029	448	448	17986	17986	152	152	0.96	0.96
	2/29/24	16:15:22	R3	1.00	0.012	0.023	0.015	0.029	442	442	18137	18137	152	152	0.96	0.96
	2/29/24	16:16:22	R3	1.00	0.012	0.023	0.015	0.029	445	445	18132	18132	152	152	0.96	0.96
	2/29/24	16:17:22	R3	1.00	0.012	0.023	0.015	0.029	445	445	17948	17948	152	152	0.96	0.96
	2/29/24	16:18:22	R3	1.00	0.012	0.023	0.015	0.029	447	447	18096	18096	152	152	0.96	0.96
	2/29/24	16:19:24	R3	1.03	0.012	0.023	0.015	0.029	445	445	18125	18125	152	152	0.96	0.96
	2/29/24	16:20:22	R3	0.97	0.012	0.023	0.015	0.029	442	442	18117	18117	151	151	0.96	0.96
	2/29/24	16:21:22	R3	1.00	0.012	0.023	0.015	0.029	442	442	18118	18118	152	152	0.96	0.96
	2/29/24	16:22:22	R3	1.00	0.012	0.023	0.015	0.029	435	435	18128	18128	151	151	0.96	0.96
	2/29/24	16:23:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	18137	18137	151	151	0.96	0.96
	2/29/24	16:24:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	18144	18144	151	151	0.96	0.96
	2/29/24	16:25:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	17979	17979	151	151	0.96	0.96
	2/29/24	16:26:23	R3	1.02	0.012	0.023	0.015	0.029	443	443	18068	18068	152	152	0.96	0.96
	2/29/24	16:27:23	R3	1.00	0.012	0.023	0.015	0.029	444	444	15546	15546	152	152	0.96	0.96
	2/29/24	16:28:24	R3	1.02	0.012	0.023	0.015	0.029	442	442	17724	17724	151	151	0.96	0.96
	2/29/24	16:29:22	R3	0.97	0.012	0.023	0.015	0.029	442	442	17921	17921	151	151	0.96	0.96
	2/29/24	16:30:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	17967	17967	151	151	0.96	0.96
	2/29/24	16:31:22	R3	1.00	0.012	0.023	0.015	0.029	446	446	18031	18031	151	151	0.96	0.96
	2/29/24	16:32:22	R3	1.00	0.012	0.023	0.015	0.029	446	446	18068	18068	151	151	0.96	0.96
	2/29/24	16:33:22	R3	1.00	0.012	0.023	0.015	0.029	446	446	18037	18037	152	152	0.96	0.96
	2/29/24	16:34:24	R3	1.03	0.012	0.023	0.015	0.029	445	445	18062	18062	152	152	0.96	0.96
	2/29/24	16:35:22	R3	0.97	0.012	0.023	0.015	0.029	442	442	17894	17894	151	151	0.96	0.96
	2/29/24	16:36:24	R3	1.03	0.012	0.023	0.015	0.029	442	442	18055	18055	151	151	0.96	0.96
	2/29/24	16:37:22	R3	0.97	0.012	0.023	0.015	0.029	445	445	18097	18097	152	152	0.96	0.96
	2/29/24	16:38:26	R3	1.07	0.012	0.023	0.015	0.029	445	445	18070	18070	152	152	0.96	0.96
	2/29/24	16:39:22	R3	0.93	0.012	0.023	0.015	0.029	443	443	18093	18093	152	152	0.96	0.96
	2/29/24	16:40:25	R3	1.05	0.012	0.023	0.015	0.029	445	445	17667	17667	152	152	0.96	0.96
	2/29/24	16:41:25	R3	1.00	0.012	0.023	0.015	0.029	443	443	17128	17128	152	152	0.96	0.96
	2/29/24	16:42:22	R3	0.95	0.012	0.023	0.015	0.029	445	445	18055	18055	152	152	0.96	0.96
	2/29/24	16:43:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	18101	18101	152	152	0.96	0.96
	2/29/24	16:44:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	18139	18139	152	152	0.96	0.96
	2/29/24	16:45:22	R3	1.00	0.012	0.023	0.015	0.029	439	439	17966	17966	152	152	0.96	0.96
	2/29/24	16:46:22	R3	1.00	0.012	0.023	0.015	0.029	441	441	18150	18150	151	151	0.96	0.96
	2/29/24	16:47:22	R3	1.00	0.012	0.023	0.015	0.029	443	443	18121	18121	151	151	0.96	0.96
	2/29/24	16:48:27	R3	1.08	0.012	0.023	0.015	0.029	441	441	17991	17991	151	151	0.96	0.96
	2/29/24	16:49:24	R3	0.95	0.012	0.023	0.015	0.029	441	441	17960	17960	151	151	0.96	0.96
	2/29/24	16:50:22	R3	0.97	0.012	0.023	0.015	0.029	440	440	18119	18119	152	152	0.96	0.96
	2/29/24	16:51:22	R3	1.00	0.012	0.023	0.015	0.029	442	442	18081	18081	152	152	0.96	0.96
	2/29/24	16:52:22	R3	1.00	0.012	0.023	0.015	0.029	442	442	18093	18093	152	152	0.96	0.96
	2/29/24	16:53:22	R3	1.00	0.012	0.023	0.015	0.029	443	443	18102	18102	151	151	0.96	0.96
	2/29/24	16:54:22	R3	1.00	0.012	0.023	0.015	0.029	443	443	18056	18056	151	151	0.96	0.96
	2/29/24	16:55:22	R3	1.00	0.012	0.023	0.015	0.029	442	442	18080	18080	151	151	0.96	0.96
	2/29/24	16:56:22	R3	1.00	0.012	0.023	0.015	0.029	441	441	18070	18070	151	151	0.96	0.96
	2/29/24	16:57:22	R3	1.00	0.012	0.023	0.015	0.029	441	441	18041	18041	152	152	0.96	0.96
	2/29/24	16:58:25	R3	1.05	0.012	0.023	0.015	0.029	444	444	18058	18058	152	152	0.96	0.96
	2/29/24	16:59:22	R3	0.95	0.012	0.023	0.015	0.029	443	443	17872	17872	152	152	0.96	0.96
	2/29/24	17:00:22	R3	1.00	0.012	0.023	0.015	0.029	448	448	17883	17883	152	152	0.96	0.96
	2/29/24	17:01:22	R3	1.00	0.012	0.023	0.015	0.029	449	449	18023	18023	152	152	0.96	0.96
	2/29/24	17:02:24	R3	1.03	0.012	0.023	0.015	0.029	447	447	18027	18027	152	152	0.96	0.96
	2/29/24	17:03:22	R3	0.97	0.012	0.023	0.015	0.029	448	448	17866	17866	152	152	0.96	0.96
	2/29/24	17:04:22	R3	1.00	0.012	0.023	0.015	0.029	444	444	18035	18035	152	152	0.96	0.96
	2/29/24	17:05:22	R3	1.00	0.012	0.023	0.015	0.029	442	442	17794	17794	151	151	0.96	0.96
	2/29/24	17:06:23	R3	1.02	0.012	0.023	0.015	0.029	444	444	17811	17811	151	151	0.96	0.96
	2/29/24	17:07:22	R3	0.98	0.012	0.023	0.015	0.029	443	443	18002	18002	152	152	0.96	0.96
	2/29/24	17:08:22	R3	1.00	0.012	0.023	0.015	0.029	445	445	17986	17986	151	151	0.96	0.96
	2/29/24	17:09:25	R3	1.05	0.012	0.023	0.015	0.029	444	444	18018	18018	152	152	0.96	0.96
	2/29/24	17:10:22	R3	0.95	0.012	0.023	0.015	0.029	444	444	17856	17856	152	152	0.96	0.96
	2/29/24	17:11:22	R3	1.00	0.012	0.023	0.015	0.029	443	443	18000	18000	152	152	0.96	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PEN	Outlet	Scrubber												
60.0 (min)	Run 1	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	441	441	14400	14400	149	149	0.93	0.93
			Maximum	0.031	0.031	0.036	0.036	460	460	15843	15843	152	152	0.94	0.94
			(BDL = 1/2MDL) Average	0.013	0.013	0.014	0.014	453	453	15134	15134	150	150	0.93	0.93
			(BDL = MDL) Average	0.023	0.023	0.021	0.021	453	453	15134	15134	150	150	0.93	0.93
		(Volume)	MDL	0.022	0.022	0.019	0.019	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	446	446	14273	14273	150	150	0.93	0.93
60.0 (min)	Run 2	Conc. (ppmv)	Maximum	0.023	0.023	0.084	0.084	468	468	15001	15001	153	153	0.94	0.94
			(BDL = 1/2MDL) Average	0.011	0.011	0.053	0.053	456	456	14463	14463	152	152	0.93	0.93
			(BDL = MDL) Average	0.022	0.022	0.054	0.054	456	456	14463	14463	152	152	0.93	0.93
		(Volume)	MDL												
Run Length				BDL	BDL	0.056	0.056	452	452	13940	13940	152	152	0.93	0.93
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	BDL	BDL	0.097	0.097	482	482	15425	15425	153	153	0.93	0.93
			(BDL = 1/2MDL) Average	0.011	0.011	0.077	0.077	467	467	14695	14695	152	152	0.93	0.93
			(BDL = MDL) Average	0.022	0.022	0.077	0.077	467	467	14695	14695	152	152	0.93	0.93
		(Volume)	MDL	0.022	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	441	441	13940	13940	149	149	0.93	0.93
(min)	Test Results	Conc. (ppmv)	Maximum	0.031	0.031	0.097	0.097	482	482	15843	15843	153	153	0.94	0.94
			(BDL = 1/2MDL) Average	0.012	0.012	0.048	0.048	459	459	14764	14764	151	151	0.93	0.93
			(BDL = MDL) Average	0.022	0.022	0.050	0.050	459	459	14764	14764	151	151	0.93	0.93
		(Volume)	MDL	0.022	0.022	0.019	0.019	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
3/4/24	16:17:31	R1	1.02	0.011	0.022	0.009	0.019	458	458	15568	15568	152	152	0.94	0.94
3/4/24	16:18:30	R1	0.98	0.011	0.022	0.009	0.019	459	459	15577	15577	152	152	0.94	0.94
3/4/24	16:19:28	R1	0.97	0.011	0.022	0.009	0.019	460	460	15584	15584	152	152	0.94	0.94
3/4/24	16:20:29	R1	1.02	0.011	0.022	0.009	0.019	457	457	15619	15619	151	151	0.94	0.94
3/4/24	16:21:28	R1	0.98	0.011	0.022	0.009	0.019	458	458	15604	15604	150	150	0.94	0.94
3/4/24	16:22:28	R1	1.00	0.011	0.022	0.009	0.019	456	456	15690	15690	150	150	0.94	0.94
3/4/24	16:23:28	R1	1.00	0.011	0.022	0.009	0.019	457	457	15741	15741	150	150	0.94	0.94
3/4/24	16:24:28	R1	1.00	0.011	0.022	0.009	0.019	458	458	15843	15843	150	150	0.94	0.94
3/4/24	16:25:28	R1	1.00	0.011	0.022	0.009	0.019	457	457	15839	15839	150	150	0.94	0.94
3/4/24	16:26:28	R1	1.00	0.011	0.022	0.009	0.019	456	456	15774	15774	150	150	0.94	0.94
3/4/24	16:27:30	R1	1.03	0.011	0.022	0.009	0.019	456	456	15717	15717	150	150	0.94	0.94
3/4/24	16:28:31	R1	1.02	0.011	0.022	0.009	0.019	456	456	15656	15656	150	150	0.94	0.94
3/4/24	16:29:28	R1	0.95	0.011	0.022	0.009	0.019	455	455	15606	15606	150	150	0.94	0.94
3/4/24	16:30:30	R1	1.03	0.011	0.022	0.009	0.019	454	454	15567	15567	150	150	0.94	0.94
3/4/24	16:31:28	R1	0.97	0.011	0.022	0.009	0.019	448	448	15567	15567	149	149	0.93	0.93
3/4/24	16:32:28	R1	1.00	0.011	0.022	0.009	0.019	452	452	15550	15550	149	149	0.93	0.93
3/4/24	16:33:28	R1	1.00	0.011	0.022	0.009	0.019	449	449	15510	15510	149	149	0.93	0.93
3/4/24	16:34:28	R1	1.00	0.011	0.022	0.009	0.019	449	449	15482	15482	149	149	0.93	0.93
3/4/24	16:35:28	R1	1.00	0.011	0.022	0.009	0.019	448	448	15487	15487	149	149	0.93	0.93
3/4/24	16:36:28	R1	1.00	0.011	0.022	0.009	0.019	449	449	15401	15401	150	150	0.93	0.93
3/4/24	16:37:28	R1	1.00	0.011	0.022	0.009	0.019	447	447	15398	15398	150	150	0.93	0.93
3/4/24	16:38:31	R1	1.05	0.011	0.022	0.009	0.019	446	446	15310	15310	150	150	0.93	0.93
3/4/24	16:39:28	R1	0.95	0.030	0.030	0.009	0.019	446	446	15299	15299	150	150	0.93	0.93
3/4/24	16:40:28	R1	1.00	0.024	0.024	0.009	0.019	446	446	15281	15281	150	150	0.93	0.93
3/4/24	16:41:28	R1	1.00	0.030	0.030	0.009	0.019	445	445	15308	15308	150	150	0.93	0.93
3/4/24	16:42:28	R1	1.00	0.026	0.026	0.009	0.019	442	442	15305	15305	150	150	0.93	0.93
3/4/24	16:43:28	R1	1.00	0.031	0.031	0.020	0.020	441	441	15281	15281	150	150	0.93	0.93
3/4/24	16:44:28	R1	1.00	0.011	0.022	0.009	0.019	447	447	15260	15260	150	150	0.93	0.93
3/4/24	16:45:30	R1	1.03	0.011	0.022	0.009	0.019	448	448	15190	15190	150	150	0.93	0.93
3/4/24	16:46:28	R1	0.97	0.011	0.022	0.009	0.019	452	452	15190	15190	151	151	0.93	0.93
3/4/24	16:47:29	R1	1.02	0.027	0.027	0.022	0.022	450	450	15161	15161	150	150	0.93	0.93
3/4/24	16:48:30	R1	1.02	0.011	0.022	0.022	0.022	450	450	15110	15110	151	151	0.93	0.93
3/4/24	16:49:28	R1	0.97	0.011	0.022	0.009	0.019	451	451	15068	15068	151	151	0.93	0.93
3/4/24	16:50:33	R1	1.08	0.011	0.022	0.009	0.019	454	454	15061	15061	151	151	0.93	0.93
3/4/24	16:51:28	R1	0.92	0.011	0.022	0.009	0.019	453	453	15001	15001	151	151	0.93	0.93
3/4/24	16:52:28	R1	1.00	0.011	0.022	0.009	0.019	452	452	14970	14970	151	151	0.93	0.93
3/4/24	16:53:28	R1	1.00	0.011	0.022	0.009	0.019	455	455	14940	14940	151	151	0.93	0.93
3/4/24	16:54:28	R1	1.00	0.011	0.022	0.009	0.019	454	454	14907	14907	151	151	0.93	0.93
3/4/24	16:55:30	R1	1.03	0.011	0.022	0.009	0.019	454	454	14911	14911	150	150	0.93	0.93
3/4/24	16:56:28	R1	0.97	0.011	0.022	0.009	0.019	457	457	14900	14900	150	150	0.93	0.93
3/4/24	16:57:31	R1	1.05	0.011	0.022	0.009	0.019	457	457	14855	14855	150	150	0.93	0.93
3/4/24	16:58:31	R1	1.00	0.011	0.022	0.009	0.019	454	454	14755	14755	150	150	0.93	0.93
3/4/24	16:59:28	R1	0.95	0.011	0.022	0.019	0.019	452	452	14687	14687	150	150	0.93	0.93
3/4/24	17:00:28	R1	1.00	0.011	0.022	0.009	0.019	452	452	14571	14571	150	150	0.93	0.93
3/4/24	17:01:30	R1	1.03	0.011	0.022	0.009	0.019	455	455	14508	14508	150	150	0.93	0.93
3/4/24	17:02:28	R1	0.97	0.011	0.022	0.009	0.019	455	455	14400	14400	150	150	0.93	0.93
3/4/24	17:03:30	R1	1.03	0.011	0.022	0.022	0.022	455	455	14402	14402	150	150	0.93	0.93
3/4/24	17:04:28	R1	0.97	0.011	0.022	0.026	0.026	453	453	14429	14429	150	150	0.93	0.93
3/4/24	17:05:28	R1	1.00	0.011	0.022	0.024	0.024	453	453	14620	14620	150	150	0.93	0.93
3/4/24	17:06:28	R1	1.00	0.011	0.022	0.030	0.030	455	455	14680	14680	151	151	0.93	0.93
3/4/24	17:07:30	R1	1.03	0.011	0.022	0.028	0.028	457	457	14706	14706	151	151	0.93	0.93
3/4/24	17:08:30	R1	1.00	0.011	0.022	0.032	0.032	459	459	14744	14744	151	151	0.93	0.93
3/4/24	17:09:31	R1	1.02	0.011	0.022	0.035	0.035	456	456	14755	14755	151	151	0.93	0.93
3/4/24	17:10:28	R1	0.95	0.011	0.022	0.029	0.029	458	458	14763	14763	151	151	0.93	0.93
3/4/24	17:11:28	R1	1.00	0.011	0.022	0.009	0.019	457	457	14744	14744	151	151	0.93	0.93
3/4/24	17:12:28	R1	1.00	0.011	0.022	0.009	0.019	456	456	14683	14683	151	151	0.93	0.93
3/4/24	17:13:28	R1	1.00	0.011	0.022	0.035	0.035	457	457	14684	14684	151	151	0.93	0.93
3/4/24	17:14:28	R1	1.00	0.011	0.022	0.021	0.021	454	454	14618	14618	151	151	0.93	0.93
3/4/24	17:15:31	R1	1.05	0.011	0.022	0.036	0.036	457	457	14611	14611	151	151	0.93	0.93
3/4/24	17:16:28	R1	0.95	0.011	0.022	0.027	0.027	458	458	14616	14616	151	151	0.93	0.93
3/4/24	17:17:30	R2	1.03	0.011	0.022	0.019	0.019	457	457	14564	14564	151	151	0.93	0.93
3/4/24	17:18:28	R2	0.97	0.011	0.022	0.009	0.019	455	455	14515	14515	151	151	0.93	0.93
3/4/24	17:19:31	R2	1.05	0.011	0.022	0.032	0.032	458	458	14531	14531	150	150	0.93	0.93
3/4/24	17:20:28	R2	0.95	0.011	0.022	0.030	0.030	455	455	14546	14546	150	150	0.93	0.93
3/4/24	17:21:28	R2	1.00	0.011	0.022	0.038	0.038	453	453	14528	14528	150	150	0.93	0.93
3/4/24	17:22:30	R2	1.03	0.011	0.022	0.036	0.036	453	453	14506	14506	151	151	0.94	0.94
3/4/24	17:23:28	R2	0.97	0.011	0.022	0.037	0.037	451	451	14521	14521	151	151	0.93	0.93
3/4/24	17:24:28	R2	1.00	0.011	0.022	0.036	0.036	448	448	14559	14559	151	151	0.93	0.93
3/4/24	17:25:29	R2	1.02	0.011	0.022	0.031	0.031	450	450	14525	14525	151	151	0.93	0.93
3/4/24	17:26:29	R2	1.00	0.011	0.022	0.055	0.055	450	450	14532	14532	151	151	0.93	0.93
3/4/24	17:27:31	R2	1.03	0.011	0.022	0.045	0.045	450	450	14440	14440	151	151	0.93	0.93
3/4/24	17:28:30	R2	0.98	0.011	0.022	0.051	0.051	452	452	14376	14376	151	151	0.93	0.93
3/4/24	17:29:28	R2	0.97	0.011	0.022	0.054	0.054	453	453	14364	14364	151	151	0.93	0.93
3/4/24	17:30:28	R2	1.00	0.011	0.022	0.052	0.052	449	449	14273	14273	151	151	0.93	0.93
3/4/24	17:31:31	R2	1.05	0.011	0.022	0.060	0.060	449	449	14287	14287	151	151	0.93	0.93
3/4/24	17:32:28	R2	0.95	0.011	0.022	0.044	0.044	450	450	14299	14299	151	151	0.93	0.93
3/4/24	17:33:28	R2	1.00	0.011	0.022	0.050	0.050	447	447	14303	14303	151	151	0.93	0.93
3/4/24	17:34:30	R2	1.03	0.011	0.022	0.047	0.047	450	450	14286	14286	151	151	0.93	0.93
3/4/24	17:35:32	R2	1.03	0.011	0.022	0.031	0.031	447	447	14329	14329	150	150	0.93	0.93
3/4/24	17:36:28	R2	0.93	0.011	0.022	0.048	0.048	447	447	14318	14318	151	151	0.93	0.93
3/4/24	17:37:28	R2	1.00	0.011	0.022	0.044	0.044	446	446	14319	14319	151	151	0.93	0.93
3/4/24	17:38:30	R2	1.03	0.011	0.022	0.045	0.045	449	449	14331	14331	151	151	0.93	0.93
3/4/24	17:39:28	R2	0.97	0.011	0.022	0.059	0.059	450	450	14382	14382	151	151	0.93	0.93
3/4/24	17:40:28	R2	1.00	0.011	0.022	0.050	0.050	450	450	14417	14417	151	151	0.93	0.93
3/4/24	17:41:28	R2	1.00	0.011	0.022	0.038	0.038	450	450	14374	14374	151	151	0.93	0.93
3/4/24	17:42:28	R2	1.00	0.011	0.022	0.050	0.050	447	447	14379	14379	151	151	0.93	0.93
3/4/24	17:43:31	R2	1.05	0.011	0.022	0.050	0.050	447	447	14340	14340	151	151	0.93	0.93
3/4/24	17:44:28	R2	0.95	0.011	0.022	0.061	0.061	451	451	14306	14306	151	151	0.93	0.93
3/4/24	17:45:29	R2	1.02	0.011	0.022	0.058	0.058	450	450	14306	14306	152	152	0.93	0.93
3/4/24	17:46:28	R2	0.98	0.011	0.022	0.052	0.052	454	454	14328	14328	152	152	0.93	0.93
3/4/24	17:47:28	R2	1.00	0.023	0.023	0.060	0.060	454	454	14304	14304	152	152	0.93	0.93
3/4/24	17:48:28	R2	1.00	0.011	0.022	0.058	0.058	454	454	14327	14327	152	152	0.93	0.93
3/4/24	17:49:28	R2	1.00	0.011	0.022	0.055	0.055	455	455	14328	14328	152	152	0.93	0.93
3/4/24	17:50:28	R2	1.00	0.011	0.022	0.044	0.044	451	451	14391	14391	152	152	0.93	0.93
3/4/24	17:51:29	R2	1.02	0.011	0.022	0.046	0.046	454	454	14365	14365	153	153	0.93	0.93
3/4/24	17:52:31	R2	1.03	0.011	0.022	0.049	0.049	457	457	14400	14400	153	153	0.93	0.93
3/4/24	17:53:28	R2	0.95	0.011	0.022	0.049	0.049	459	459	14409	14409	153	153	0.93	0.93
3/4/24	17:54:28	R2	1.00	0.011	0.022	0.047	0.047	458	458	14417	14417	153	153	0.93	0.93
3/4/24	17:55:28	R2	1.00	0.011	0.022	0.065	0.065	464	464	14429	14429	153	153	0.93	0.93
3/4/24	17:56:28	R2	1.00	0.011	0.022	0.064	0.064	461	461	14429	14429	153	153	0.93	0.93
3/4/24	17:57:31	R2	1.05	0.011	0.022	0.054	0.054	463	463	14414	14414	153	153	0.93	0.93
3/4/24	17:58:28	R2	0.95	0.011	0.022	0.061	0.061	462	462	14784	14784	153	153	0.93	0.93
3/4/24	17:59:28	R2	1.00	0.011	0.022	0.058	0.058	461	461	14650	14650	152	152	0.93	0.93
3/4/24	18:00:28	R2	1.00	0.011	0.022	0.073	0.073	463	463	14522	14522	152	152	0.93	0.93
3/4/24	18:01:28	R2	1.00	0.011	0.022	0.057	0.057	460	460	14553	14553	152	152	0.93	0.93
3/4/24	18:02:28	R2	1.00	0.011	0.022	0.063	0.063	462	462	14790	14790	152	152	0.93	0.93

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PEN	Outlet	Scrubber												
Run Length			Minimum	BDL	BDL	BDL	BDL	441	441	14400	14400	149	149	0.93	0.93
60.0 (min)	Run 1	Conc. (ppmv)	Maximum	0.031	0.031	0.036	0.036	460	460	15843	15843	152	152	0.94	0.94
			(BDL = 1/2MDL) Average	0.013	0.013	0.014	0.014	453	453	15134	15134	150	150	0.93	0.93
			(BDL = MDL) Average	0.023	0.023	0.021	0.021	453	453	15134	15134	150	150	0.93	0.93
		(Volume)	MDL	0.022	0.022	0.019	0.019	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	446	446	14273	14273	150	150	0.93	0.93
60.0 (min)	Run 2	Conc. (ppmv)	Maximum	0.023	0.023	0.084	0.084	468	468	15001	15001	153	153	0.94	0.94
			(BDL = 1/2MDL) Average	0.011	0.011	0.053	0.053	456	456	14463	14463	152	152	0.93	0.93
			(BDL = MDL) Average	0.022	0.022	0.054	0.054	456	456	14463	14463	152	152	0.93	0.93
		(Volume)	MDL												
Run Length				BDL	BDL	0.056	0.056	452	452	13940	13940	152	152	0.93	0.93
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	BDL	BDL	0.097	0.097	482	482	15425	15425	153	153	0.93	0.93
			(BDL = 1/2MDL) Average	0.011	0.011	0.077	0.077	467	467	14695	14695	152	152	0.93	0.93
			(BDL = MDL) Average	0.022	0.022	0.077	0.077	467	467	14695	14695	152	152	0.93	0.93
		(Volume)	MDL	0.022	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	441	441	13940	13940	149	149	0.93	0.93
(min)	Test Results	Conc. (ppmv)	Maximum	0.031	0.031	0.097	0.097	482	482	15843	15843	153	153	0.94	0.94
			(BDL = 1/2MDL) Average	0.012	0.012	0.048	0.048	459	459	14764	14764	151	151	0.93	0.93
			(BDL = MDL) Average	0.022	0.022	0.050	0.050	459	459	14764	14764	151	151	0.93	0.93
		(Volume)	MDL	0.022	0.022	0.019	0.019	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/4/24	18:03:28	R2	1.00	0.011	0.022	0.059	0.059	462	462	15001	15001	152	152	0.93	0.93
	3/4/24	18:04:29	R2	1.02	0.011	0.022	0.064	0.064	467	467	14711	14711	152	152	0.93	0.93
	3/4/24	18:05:29	R2	1.00	0.011	0.022	0.066	0.066	468	468	14599	14599	152	152	0.93	0.93
	3/4/24	18:06:28	R2	0.98	0.011	0.022	0.074	0.074	465	465	14599	14599	152	152	0.93	0.93
	3/4/24	18:07:28	R2	1.00	0.011	0.022	0.067	0.067	467	467	14578	14578	152	152	0.93	0.93
	3/4/24	18:08:29	R2	1.02	0.011	0.022	0.071	0.071	465	465	14751	14751	152	152	0.93	0.93
	3/4/24	18:09:28	R2	0.98	0.011	0.022	0.072	0.072	468	468	14581	14581	152	152	0.93	0.93
	3/4/24	18:10:28	R2	1.00	0.011	0.022	0.066	0.066	462	462	14586	14586	152	152	0.93	0.93
	3/4/24	18:11:28	R2	1.00	0.011	0.022	0.068	0.068	462	462	14527	14527	152	152	0.93	0.93
	3/4/24	18:12:31	R2	1.05	0.011	0.022	0.069	0.069	468	468	14446	14446	152	152	0.93	0.93
	3/4/24	18:13:30	R2	0.98	0.011	0.022	0.068	0.068	465	465	14484	14484	152	152	0.93	0.93
	3/4/24	18:14:30	R2	1.00	0.011	0.022	0.084	0.084	458	458	14647	14647	152	152	0.93	0.93
	3/4/24	18:15:28	R2	0.97	0.011	0.022	0.079	0.079	461	461	14379	14379	152	152	0.93	0.93
	3/4/24	18:16:28	R2	1.00	0.011	0.022	0.076	0.076	459	459	14305	14305	152	152	0.93	0.93
	3/4/24	18:17:28	R3	1.00	0.011	0.022	0.071	0.071	462	462	14218	14218	152	152	0.93	0.93
	3/4/24	18:18:28	R3	1.00	0.011	0.022	0.078	0.078	459	459	14107	14107	152	152	0.93	0.93
	3/4/24	18:19:28	R3	1.00	0.011	0.022	0.080	0.080	464	464	14188	14188	152	152	0.93	0.93
	3/4/24	18:20:28	R3	1.00	0.011	0.022	0.084	0.084	461	461	14217	14217	152	152	0.93	0.93
	3/4/24	18:21:28	R3	1.00	0.011	0.022	0.074	0.074	460	460	14231	14231	152	152	0.93	0.93
	3/4/24	18:22:29	R3	1.02	0.011	0.022	0.078	0.078	470	470	13956	13956	152	152	0.93	0.93
	3/4/24	18:23:28	R3	0.98	0.011	0.022	0.078	0.078	460	460	14545	14545	152	152	0.93	0.93
	3/4/24	18:24:28	R3	1.00	0.011	0.022	0.079	0.079	466	466	14391	14391	152	152	0.93	0.93
	3/4/24	18:25:30	R3	1.03	0.011	0.022	0.077	0.077	455	455	15327	15327	152	152	0.93	0.93
	3/4/24	18:26:28	R3	0.97	0.011	0.022	0.084	0.084	454	454	15378	15378	152	152	0.93	0.93
	3/4/24	18:27:29	R3	1.02	0.011	0.022	0.078	0.078	455	455	15346	15346	152	152	0.93	0.93
	3/4/24	18:28:28	R3	0.98	0.011	0.022	0.090	0.090	455	455	15334	15334	152	152	0.93	0.93
	3/4/24	18:29:29	R3	1.02	0.011	0.022	0.079	0.079	457	457	15425	15425	152	152	0.93	0.93
	3/4/24	18:30:28	R3	0.98	0.011	0.022	0.080	0.080	456	456	15392	15392	152	152	0.93	0.93
	3/4/24	18:31:28	R3	1.00	0.011	0.022	0.073	0.073	456	456	15402	15402	152	152	0.93	0.93
	3/4/24	18:32:28	R3	1.00	0.011	0.022	0.069	0.069	456	456	15393	15393	152	152	0.93	0.93
	3/4/24	18:33:31	R3	1.05	0.011	0.022	0.090	0.090	456	456	15393	15393	152	152	0.93	0.93
	3/4/24	18:34:28	R3	0.95	0.011	0.022	0.078	0.078	459	459	15225	15225	152	152	0.93	0.93
	3/4/24	18:35:28	R3	1.00	0.011	0.022	0.082	0.082	459	459	14623	14623	152	152	0.93	0.93
	3/4/24	18:36:29	R3	1.02	0.011	0.022	0.083	0.083	455	455	14751	14751	152	152	0.93	0.93
	3/4/24	18:37:30	R3	1.02	0.011	0.022	0.086	0.086	454	454	14811	14811	152	152	0.93	0.93
	3/4/24	18:38:28	R3	0.97	0.011	0.022	0.075	0.075	452	452	14833	14833	152	152	0.93	0.93
	3/4/24	18:39:28	R3	1.00	0.011	0.022	0.072	0.072	455	455	14823	14823	152	152	0.93	0.93
	3/4/24	18:40:28	R3	1.00	0.011	0.022	0.083	0.083	454	454	14776	14776	152	152	0.93	0.93
	3/4/24	18:41:28	R3	1.00	0.011	0.022	0.062	0.062	454	454	14799	14799	152	152	0.93	0.93
	3/4/24	18:42:28	R3	1.00	0.011	0.022	0.075	0.075	453	453	14880	14880	152	152	0.93	0.93
	3/4/24	18:43:30	R3	1.03	0.011	0.022	0.056	0.056	454	454	14877	14877	152	152	0.93	0.93
	3/4/24	18:44:29	R3	0.98	0.011	0.022	0.070	0.070	459	459	14948	14948	152	152	0.93	0.93
	3/4/24	18:45:28	R3	0.98	0.011	0.022	0.075	0.075	459	459	14672	14672	152	152	0.93	0.93
	3/4/24	18:46:28	R3	1.00	0.011	0.022	0.075	0.075	463	463	14036	14036	152	152	0.93	0.93
	3/4/24	18:47:28	R3	1.00	0.011	0.022	0.067	0.067	463	463	14065	14065	152	152	0.93	0.93
	3/4/24	18:48:28	R3	1.00	0.011	0.022	0.060	0.060	471	471	14004	14004	152	152	0.93	0.93
	3/4/24	18:49:28	R3	1.00	0.011	0.022	0.074	0.074	469	469	13940	13940	152	152	0.93	0.93
	3/4/24	18:50:28	R3	1.00	0.011	0.022	0.075	0.075	469	469	14826	14826	152	152	0.93	0.93
	3/4/24	18:51:29	R3	1.02	0.011	0.022	0.079	0.079	470	470	14548	14548	152	152	0.93	0.93
	3/4/24	18:52:28	R3	0.98	0.011	0.022	0.076	0.076	473	473	14632	14632	152	152	0.93	0.93
	3/4/24	18:53:28	R3	1.00	0.011	0.022	0.092	0.092	475	475	14644	14644	153	153	0.93	0.93
	3/4/24	18:54:28	R3	1.00	0.011	0.022	0.084	0.084	477	477	14642	14642	153	153	0.93	0.93
	3/4/24	18:55:28	R3	1.00	0.011	0.022	0.079	0.079	479	479	14685	14685	153	153	0.93	0.93
	3/4/24	18:56:28	R3	1.00	0.011	0.022	0.081	0.081	479	479	14695	14695	153	153	0.93	0.93
	3/4/24	18:57:31	R3	1.05	0.011	0.022	0.085	0.085	480	480	14643	14643	153	153	0.93	0.93
	3/4/24	18:58:29	R3	0.97	0.011	0.022	0.079	0.079	478	478	14666	14666	153	153	0.93	0.93
	3/4/24	18:59:30	R3	1.02	0.011	0.022	0.085	0.085	479	479	14650	14650	153	153	0.93	0.93
	3/4/24	19:00:28	R3	0.97	0.011	0.022	0.074	0.074	478	478	14649	14649	153	153	0.93	0.93
	3/4/24	19:01:31	R3	1.05	0.011	0.022	0.075	0.075	481	481	14712	14712	153	153	0.93	0.93
	3/4/24	19:02:28	R3	0.95	0.011	0.022	0.062	0.062	482	482	14688	14688	153	153	0.93	0.93
	3/4/24	19:03:28	R3	1.00	0.011	0.022	0.068	0.068	481	481	14673	14673	153	153	0.93	0.93
	3/4/24	19:04:29	R3	1.02	0.011	0.022	0.073	0.073	480	480	14678	14678	153	153	0.93	0.93
	3/4/24	19:05:28	R3	0.98	0.011	0.022	0.070	0.070	478	478	14683	14683	152	152	0.93	0.93
	3/4/24	19:06:28	R3	1.00	0.011	0.022	0.074	0.074	477	477	14711	14711	152	152	0.93	0.93
	3/4/24	19:07:28	R3	1.00	0.011	0.022	0.073	0.073	480	480	14652	14652	152	152	0.93	0.93
	3/4/24	19:08:28	R3	1.00	0.011	0.022	0.075	0.075	482	482	14635	14635	152	152	0.93	0.93
	3/4/24	19:09:28	R3	1.00	0.011	0.022	0.072	0.072	481	481	14610	14610	152	152	0.93	0.93
	3/4/24	19:10:28	R3	1.00	0.011	0.022	0.066	0.066	480	480	14604	14604	152	152	0.93	0.93
	3/4/24	19:11:29	R3	1.02	0.011	0.022	0.078	0.078	480	480	14592	14592	152	152	0.93	0.93
	3/4/24	19:12:28	R3	0.98	0.011	0.022	0.083	0.083	479	479	14589	14589	152	152	0.93	0.93
	3/4/24	19:13:28	R3	1.00	0.011	0.022	0.088	0.088	472	472	14600	14600	152	152	0.93	0.93
	3/4/24	19:14:30	R3	1.03	0.011	0.022	0.082	0.082	467	467	14551	14551	152	152	0.93	0.93
	3/4/24	19:15:30	R3	1.00	0.011	0.022	0.083	0.083	468	468	14547	14547	152	152	0.93	0.93
	3/4/24	19:16:31	R3	1.02	0.011	0.022	0.097	0.097	465	465	14572	14572	152	152	0.93	0.93

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PES_001	Outlet	Scrubber												
60.9 (min)	Run 1	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	481	481	15041	15041	150	150	0.95	0.95
			Maximum	BDL	BDL	BDL	BDL	523	523	18985	18985	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	513	513	16549	16549	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	513	513	16549	16549	151	151	0.95	0.95
		(Volume)	MDL	0.022	0.022	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	507	507	15643	15643	151	151	0.95	0.95
59.9 (min)	Run 2	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	525	525	18516	18516	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	514	514	17434	17434	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	514	514	17434	17434	151	151	0.95	0.95
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	501	501	15992	15992	151	151	0.95	0.95
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	519	519	17201	17201	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	510	510	16462	16462	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	510	510	16462	16462	151	151	0.95	0.95
		(Volume)	MDL	0.022	0.022	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	481	481	15041	15041	150	150	0.95	0.95
(min)			Maximum	BDL	BDL	BDL	BDL	525	525	18985	18985	151	151	0.96	0.96
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	513	513	16815	16815	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	513	513	16815	16815	151	151	0.95	0.95
		(Volume)	MDL	0.022	0.022	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
3/2/24	10:15:46	R1	0.93	0.011	0.022	0.029	0.057	481	481	16363	16363	151	151	0.96	0.96
3/2/24	10:16:42	R1	0.93	0.011	0.022	0.029	0.057	522	522	16137	16137	151	151	0.96	0.96
3/2/24	10:17:45	R1	1.05	0.011	0.022	0.029	0.057	523	523	16049	16049	151	151	0.96	0.96
3/2/24	10:18:45	R1	1.00	0.011	0.022	0.029	0.057	519	519	15632	15632	151	151	0.96	0.96
3/2/24	10:19:48	R1	1.05	0.011	0.022	0.029	0.057	514	514	15041	15041	151	151	0.96	0.96
3/2/24	10:20:47	R1	0.98	0.011	0.022	0.029	0.057	519	519	15129	15129	151	151	0.96	0.96
3/2/24	10:21:50	R1	1.05	0.011	0.022	0.029	0.057	518	518	15532	15532	151	151	0.96	0.96
3/2/24	10:22:48	R1	0.97	0.011	0.022	0.029	0.057	516	516	15330	15330	151	151	0.96	0.96
3/2/24	10:23:49	R1	1.02	0.011	0.022	0.029	0.057	515	515	15236	15236	151	151	0.96	0.96
3/2/24	10:24:50	R1	1.02	0.011	0.022	0.029	0.057	513	513	15372	15372	151	151	0.96	0.96
3/2/24	10:25:51	R1	1.02	0.011	0.022	0.029	0.057	513	513	15554	15554	151	151	0.96	0.96
3/2/24	10:26:57	R1	1.10	0.011	0.022	0.029	0.057	511	511	15807	15807	151	151	0.96	0.96
3/2/24	10:27:53	R1	0.93	0.011	0.022	0.029	0.057	509	509	15810	15810	151	151	0.96	0.96
3/2/24	10:28:54	R1	1.02	0.011	0.022	0.029	0.057	512	512	15908	15908	151	151	0.96	0.96
3/2/24	10:29:55	R1	1.02	0.011	0.022	0.029	0.057	517	517	15838	15838	151	151	0.96	0.96
3/2/24	10:30:56	R1	1.02	0.011	0.022	0.029	0.057	515	515	15683	15683	151	151	0.96	0.96
3/2/24	10:31:58	R1	1.03	0.011	0.022	0.029	0.057	513	513	15632	15632	151	151	0.96	0.96
3/2/24	10:32:58	R1	1.00	0.011	0.022	0.029	0.057	514	514	15700	15700	151	151	0.96	0.96
3/2/24	10:33:59	R1	1.02	0.011	0.022	0.029	0.057	515	515	15756	15756	151	151	0.96	0.96
3/2/24	10:35:00	R1	1.02	0.011	0.022	0.029	0.057	516	516	15823	15823	151	151	0.96	0.96
3/2/24	10:36:03	R1	1.05	0.011	0.022	0.029	0.057	507	507	15806	15806	151	151	0.96	0.96
3/2/24	10:37:02	R1	0.98	0.011	0.022	0.029	0.057	511	511	15711	15711	151	151	0.96	0.96
3/2/24	10:38:03	R1	1.02	0.011	0.022	0.029	0.057	522	522	15779	15779	151	151	0.96	0.96
3/2/24	10:39:04	R1	1.02	0.011	0.022	0.029	0.057	511	511	15699	15699	151	151	0.96	0.96
3/2/24	10:40:05	R1	1.02	0.011	0.022	0.029	0.057	510	510	15680	15680	151	151	0.96	0.96
3/2/24	10:41:09	R1	1.07	0.011	0.022	0.029	0.057	509	509	15545	15545	151	151	0.96	0.96
3/2/24	10:42:07	R1	0.97	0.011	0.022	0.029	0.057	513	513	15561	15561	151	151	0.96	0.96
3/2/24	10:43:08	R1	1.02	0.011	0.022	0.029	0.057	513	513	15568	15568	151	151	0.96	0.96
3/2/24	10:44:09	R1	1.02	0.011	0.022	0.029	0.057	512	512	15586	15586	151	151	0.96	0.96
3/2/24	10:45:10	R1	1.02	0.011	0.022	0.029	0.057	511	511	15488	15488	151	151	0.96	0.96
3/2/24	10:46:11	R1	1.02	0.011	0.022	0.029	0.057	513	513	15527	15527	151	151	0.96	0.96
3/2/24	10:47:12	R1	1.02	0.011	0.022	0.029	0.057	512	512	15588	15588	151	151	0.96	0.96
3/2/24	10:48:13	R1	1.02	0.011	0.022	0.029	0.057	514	514	15627	15627	151	151	0.96	0.96
3/2/24	10:49:14	R1	1.02	0.011	0.022	0.029	0.057	511	511	15527	15527	151	151	0.96	0.96
3/2/24	10:50:18	R1	1.07	0.011	0.022	0.029	0.057	509	509	15655	15655	151	151	0.96	0.96
3/2/24	10:51:16	R1	0.97	0.011	0.022	0.029	0.057	514	514	15764	15764	151	151	0.96	0.96
3/2/24	10:52:17	R1	1.02	0.011	0.022	0.029	0.057	515	515	15715	15715	151	151	0.96	0.96
3/2/24	10:53:18	R1	1.02	0.011	0.022	0.029	0.057	510	510	15640	15640	151	151	0.96	0.96
3/2/24	10:54:19	R1	1.02	0.011	0.022	0.029	0.057	515	515	15835	15835	151	151	0.96	0.96
3/2/24	10:55:20	R1	1.02	0.011	0.022	0.029	0.057	515	515	15700	15700	151	151	0.96	0.96
3/2/24	10:56:21	R1	1.02	0.011	0.022	0.029	0.057	513	513	15661	15661	151	151	0.96	0.96
3/2/24	11:49:13	R1	1.02	0.011	0.022	0.029	0.057	517	517	18150	18150	150	150	0.95	0.95
3/2/24	11:50:20	R1	1.12	0.011	0.022	0.029	0.057	513	513	18185	18185	150	150	0.95	0.95
3/2/24	11:51:15	R1	0.92	0.011	0.022	0.029	0.057	515	515	18260	18260	150	150	0.95	0.95
3/2/24	11:52:16	R1	1.02	0.011	0.022	0.029	0.057	518	518	18310	18310	150	150	0.95	0.95
3/2/24	11:53:17	R1	1.02	0.011	0.022	0.029	0.057	516	516	18241	18241	150	150	0.95	0.95
3/2/24	11:54:18	R1	1.02	0.011	0.022	0.029	0.057	515	515	18375	18375	151	151	0.95	0.95
3/2/24	11:55:19	R1	1.02	0.011	0.022	0.029	0.057	515	515	18395	18395	151	151	0.95	0.95
3/2/24	11:56:20	R1	1.02	0.011	0.022	0.029	0.057	508	508	18343	18343	151	151	0.95	0.95
3/2/24	11:57:23	R1	1.05	0.011	0.022	0.029	0.057	508	508	18386	18386	151	151	0.95	0.95
3/2/24	11:58:22	R1	0.98	0.011	0.022	0.029	0.057	511	511	18985	18985	151	151	0.95	0.95
3/2/24	11:59:23	R1	1.02	0.011	0.022	0.029	0.057	517	517	18866	18866	151	151	0.95	0.95
3/2/24	12:00:24	R1	1.02	0.011	0.022	0.029	0.057	518	518	18684	18684	151	151	0.95	0.95
3/2/24	12:01:25	R1	1.02	0.011	0.022	0.029	0.057	521	521	18629	18629	151	151	0.95	0.95
3/2/24	12:02:26	R1	1.02	0.011	0.022	0.029	0.057	512	512	18554	18554	150	150	0.95	0.95
3/2/24	12:03:30	R1	1.07	0.011	0.022	0.029	0.057	514	514	18544	18544	150	150	0.95	0.95
3/2/24	12:04:28	R1	0.97	0.011	0.022	0.029	0.057	508	508	18469	18469	151	151	0.95	0.95
3/2/24	12:05:29	R1	1.02	0.011	0.022	0.029	0.057	512	512	18525	18525	151	151	0.95	0.95
3/2/24	12:06:31	R1	1.03	0.011	0.022	0.029	0.057	512	512	18543	18543	151	151	0.95	0.95
3/2/24	12:07:35	R1	1.07	0.011	0.022	0.029	0.057	513	513	18497	18497	151	151	0.95	0.95
3/2/24	12:08:32	R2	0.95	0.011	0.022	0.029	0.057	520	520	18445	18445	151	151	0.95	0.95
3/2/24	12:09:33	R2	1.02	0.011	0.022	0.029	0.057	518	518	18434	18434	151	151	0.95	0.95
3/2/24	12:10:34	R2	1.02	0.011	0.022	0.029	0.057	517	517	18516	18516	151	151	0.95	0.95
3/2/24	12:11:35	R2	1.02	0.011	0.022	0.029	0.057	516	516	18463	18463	151	151	0.95	0.95
3/2/24	12:12:38	R2	1.05	0.011	0.022	0.029	0.057	522	522	18448	18448	151	151	0.95	0.95
3/2/24	12:13:40	R2	1.03	0.011	0.022	0.029	0.057	516	516	18399	18399	151	151	0.95	0.95
3/2/24	12:14:39	R2	0.98	0.011	0.022	0.029	0.057	522	522	18368	18368	151	151	0.95	0.95
3/2/24	12:15:40	R2	1.02	0.011	0.022	0.029	0.057	516	516	18377	18377	151	151	0.95	0.95
3/2/24	12:16:40	R2	1.00	0.011	0.022	0.029	0.057	517	517	18403	18403	151	151	0.95	0.95
3/2/24	12:17:41	R2	1.02	0.011	0.022	0.029	0.057	515	515	18378	18378	151	151	0.95	0.95
3/2/24	12:18:42	R2	1.02	0.011	0.022	0.029	0.057	517	517	18398	18398	151	151	0.95	0.95
3/2/24	12:19:43	R2	1.02	0.011	0.022	0.029	0.057	517	517	18409	18409	151	151	0.95	0.95
3/2/24	12:20:44	R2	1.02	0.011	0.022	0.029	0.057	517	517	18338	18338	151	151	0.95	0.95
3/2/24	12:21:48	R2	1.07	0.011	0.022	0.029	0.057	512	512	18223	18223	151	151	0.95	0.95
3/2/24	12:22:46	R2	0.97	0.011	0.022	0.029	0.057	513	513	18090	18090	151	151	0.95	0.95
3/2/24	12:23:47	R2	1.02	0.011	0.022	0.029	0.057	511	511	18176	18176	151	151	0.95	0.95
3/2/24	12:24:48	R2	1.02	0.011	0.022	0.029	0.057	515	515	18378	18378	151	151	0.95	0.95
3/2/24	12:25:49	R2	1.02	0.011	0.022	0.029	0.057	515	515	18377	18377	151	151	0.95	0.95
3/2/24	12:26:50	R2	1.02	0.011	0.022	0.029	0.057	517	517	18341	18341	151	151	0.95	0.95
3/2/24	12:27:51	R2	1.02	0.011	0.022	0.029	0.057	519	519	18409	18409	151	151	0.95	0.95
3/2/24	12:28:52	R2	1.02	0.011	0.022	0.029	0.057	517	517	18390	18390	151	151	0.95	0.95
3/2/24	12:29:54	R2	1.03	0.011	0.022	0.029	0.057	513	513	18291	18291	151	151	0.95	0.95
3/2/24	12:30:57	R2	1.05	0.011	0.022	0.029	0.057	517	517	18289	18289	151	151	0.95	0.95
3/2/24	12:31:55	R2	0.97	0.011	0.022	0.029	0.057	510	510	18383	18383	151	151	0.95	0.95
3/2/24	12:32:56	R2	1.02	0.011	0.022	0.029	0.057	516	516	18415	18415	151	151	0.95	0.95
3/2/24	12:33:58	R2	1.03	0.011	0.022	0.029	0.057	514	514	18383	18383	151	151	0.95	0.95
3/2/24	12:34:58	R2	1.00	0.011	0.022	0.029	0.057	513	513	18299	18299	151	151	0.95	0.95
3/2/24	12:35:59	R2	1.02	0.011	0.022	0.029	0.057	509	509	18338	18338	151	151	0.95	0.95
3/2/24	12:37:00	R2	1.02	0.011	0.022	0.029	0.057	512	512	18372	18372	151	151	0.95	0.95
3/2/24	12:38:01	R2	1.02	0.011	0.022	0.029	0.057	518	518	18377	18377	151	151	0.95	0.95
3/2/24	12:39:02	R2	1.02	0.011	0.022	0.029	0.057	514	514	18384	18384	151	151	0.95	0.95
3/2/24	13:32:55	R2	1.02	0.011	0.022	0.029	0.057	525	525	17088	17088	151	151	0.95	0.95
3/2/24	13:33:56	R2	1.02	0.011	0.022	0.029	0.057	520	520	16909	16909	151	151	0.95	0.95
3/2/24	13:34:57	R2	1.02	0.011	0.022	0.029	0.057	520	520	16885	16885	151	151	0.95	0.95
3/2/24	13:36:00	R2	1.05	0.011	0.022	0.029	0.057	515	515	16954	16954	151	151	0.95	0.95
3/2/24	13:37:02	R2	1.03	0.011	0.022	0.029	0.057	514	514	16964	16964	151	151	0.95	0.95
3/2/24	13:38:02	R2	1.00	0.011	0.022	0.029	0.057	516	516	16953	16953	151	151	0.95	0.95
3/2/24	13:39:01	R2	0.98	0.011	0.022	0.029	0.057	515	515	17010	17010	151	151	0.95	0.95
3/2/24	13:40:03	R2	1.03	0.011	0.022	0.029	0.057	515	515	16993	16993	151	151	0.95	0.95
3/2/24	13:41:05	R2	1.03	0.011	0.022	0.029	0.057	513	513	16950	16950	151	151	0.95	0.95
3/2/24	13:42:04	R2	0.98	0.011	0.022	0.029	0.057	509	509	16979	16979	151	151	0.95	0.95
3/2/24	13:43:05	R2	1.02	0.011	0.022	0.029	0.057	514	514	16992	16992	151	151	0.95	0.95
3/2/24	13:44:06	R2	1.02	0.011	0.022	0.029	0.057	516	516	16966	16966	151	151	0.95	0.95
3/2/24	13:45:07	R2	1.02	0.011	0.022	0.029	0.057	507	507	16938	16938	151	151	0.95	0.95
3/2/24	13:46:14	R2	1.12	0.011	0.022	0.029	0.057	512	512	16625	16625	151	151	0.95	0.95

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PES_001	Outlet	Scrubber												
Run Length			Minimum	BDL	BDL	BDL	BDL	481	481	15041	15041	150	150	0.95	0.95
60.9 (min)	Run 1	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	523	523	18985	18985	151	151	0.96	0.96
			(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	513	513	16549	16549	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	513	513	16549	16549	151	151	0.95	0.95
		(Volume)	MDL	0.022	0.022	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	507	507	15643	15643	151	151	0.95	0.95
59.9 (min)	Run 2	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	525	525	18516	18516	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	514	514	17434	17434	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	514	514	17434	17434	151	151	0.95	0.95
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	501	501	15992	15992	151	151	0.95	0.95
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	519	519	17201	17201	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	510	510	16462	16462	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	510	510	16462	16462	151	151	0.95	0.95
		(Volume)	MDL	0.022	0.022	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	481	481	15041	15041	150	150	0.95	0.95
(min)			Maximum	BDL	BDL	BDL	BDL	525	525	18985	18985	151	151	0.96	0.96
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.011	0.011	0.029	0.029	513	513	16815	16815	151	151	0.95	0.95
			(BDL = MDL) Average	0.022	0.022	0.057	0.057	513	513	16815	16815	151	151	0.95	0.95
		(Volume)	MDL	0.022	0.022	0.057	0.057	NA	NA	NA	NA	NA	NA	NA	NA

					HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/2/24	13:47:09	R2	0.92	0.011	0.022	0.029	0.057	508	508	15767	15767	151	151	0.95	0.95
	3/2/24	13:48:10	R2	1.02	0.011	0.022	0.029	0.057	512	512	15697	15697	151	151	0.95	0.95
	3/2/24	13:49:11	R2	1.02	0.011	0.022	0.029	0.057	510	510	15643	15643	151	151	0.95	0.95
	3/2/24	13:50:12	R2	1.02	0.011	0.022	0.029	0.057	513	513	15759	15759	151	151	0.95	0.95
	3/2/24	13:51:15	R2	1.05	0.011	0.022	0.029	0.057	508	508	15761	15761	151	151	0.95	0.95
	3/2/24	13:52:14	R2	0.98	0.011	0.022	0.029	0.057	508	508	15808	15808	151	151	0.95	0.95
	3/2/24	13:53:16	R2	1.03	0.011	0.022	0.029	0.057	508	508	15797	15797	151	151	0.95	0.95
	3/2/24	13:54:16	R2	1.00	0.011	0.022	0.029	0.057	509	509	15920	15920	151	151	0.95	0.95
	3/2/24	13:55:17	R2	1.02	0.011	0.022	0.029	0.057	510	510	16013	16013	151	151	0.95	0.95
	3/2/24	13:56:18	R2	1.02	0.011	0.022	0.029	0.057	509	509	15933	15933	151	151	0.95	0.95
	3/2/24	13:57:22	R2	1.07	0.011	0.022	0.029	0.057	522	522	16113	16113	151	151	0.95	0.95
	3/2/24	13:58:20	R2	0.97	0.011	0.022	0.029	0.057	512	512	15939	15939	151	151	0.95	0.95
	3/2/24	13:59:21	R2	1.02	0.011	0.022	0.029	0.057	507	507	15927	15927	151	151	0.95	0.95
	3/2/24	14:00:23	R2	1.03	0.011	0.022	0.029	0.057	509	509	16045	16045	151	151	0.95	0.95
	3/2/24	14:01:23	R3	1.00	0.011	0.022	0.029	0.057	518	518	16110	16110	151	151	0.95	0.95
	3/2/24	14:02:26	R3	1.05	0.011	0.022	0.029	0.057	513	513	16012	16012	151	151	0.95	0.95
	3/2/24	14:03:25	R3	0.98	0.011	0.022	0.029	0.057	508	508	15992	15992	151	151	0.95	0.95
	3/2/24	14:04:29	R3	1.07	0.011	0.022	0.029	0.057	512	512	16070	16070	151	151	0.95	0.95
	3/2/24	14:05:28	R3	0.98	0.011	0.022	0.029	0.057	515	515	16126	16126	151	151	0.95	0.95
	3/2/24	14:06:30	R3	1.03	0.011	0.022	0.029	0.057	503	503	16103	16103	151	151	0.95	0.95
	3/2/24	14:07:29	R3	0.98	0.011	0.022	0.029	0.057	512	512	16243	16243	151	151	0.95	0.95
	3/2/24	14:08:30	R3	1.02	0.011	0.022	0.029	0.057	510	510	16226	16226	151	151	0.95	0.95
	3/2/24	14:09:31	R3	1.02	0.011	0.022	0.029	0.057	506	506	16083	16083	151	151	0.95	0.95
	3/2/24	14:10:32	R3	1.02	0.011	0.022	0.029	0.057	515	515	16166	16166	151	151	0.95	0.95
	3/2/24	14:11:33	R3	1.02	0.011	0.022	0.029	0.057	512	512	16250	16250	151	151	0.95	0.95
	3/2/24	14:12:34	R3	1.02	0.011	0.022	0.029	0.057	506	506	16187	16187	151	151	0.95	0.95
	3/2/24	14:13:35	R3	1.02	0.011	0.022	0.029	0.057	509	509	16133	16133	151	151	0.95	0.95
	3/2/24	14:14:36	R3	1.02	0.011	0.022	0.029	0.057	506	506	16178	16178	151	151	0.95	0.95
	3/2/24	14:15:37	R3	1.02	0.011	0.022	0.029	0.057	502	502	16136	16136	151	151	0.95	0.95
	3/2/24	14:16:38	R3	1.02	0.011	0.022	0.029	0.057	512	512	16272	16272	151	151	0.95	0.95
	3/2/24	14:17:39	R3	1.02	0.011	0.022	0.029	0.057	504	504	16251	16251	151	151	0.95	0.95
	3/2/24	14:18:40	R3	1.02	0.011	0.022	0.029	0.057	507	507	16222	16222	151	151	0.95	0.95
	3/2/24	14:19:42	R3	1.03	0.011	0.022	0.029	0.057	506	506	16235	16235	151	151	0.95	0.95
	3/2/24	14:20:42	R3	1.00	0.011	0.022	0.029	0.057	506	506	16186	16186	151	151	0.95	0.95
	3/2/24	14:21:46	R3	1.07	0.011	0.022	0.029	0.057	507	507	16370	16370	151	151	0.95	0.95
	3/2/24	14:22:44	R3	0.97	0.011	0.022	0.029	0.057	512	512	16349	16349	151	151	0.95	0.95
	3/2/24	14:23:45	R3	1.02	0.011	0.022	0.029	0.057	508	508	16289	16289	151	151	0.95	0.95
	3/2/24	14:24:46	R3	1.02	0.011	0.022	0.029	0.057	511	511	16306	16306	151	151	0.95	0.95
	3/2/24	14:25:49	R3	1.05	0.011	0.022	0.029	0.057	509	509	16304	16304	151	151	0.95	0.95
	3/2/24	14:26:49	R3	1.00	0.011	0.022	0.029	0.057	507	507	16379	16379	151	151	0.95	0.95
	3/2/24	14:27:51	R3	1.03	0.011	0.022	0.029	0.057	506	506	16250	16250	151	151	0.95	0.95
	3/2/24	14:28:53	R3	1.03	0.011	0.022	0.029	0.057	513	513	16256	16256	151	151	0.95	0.95
	3/2/24	14:29:54	R3	1.02	0.011	0.022	0.029	0.057	512	512	16298	16298	151	151	0.95	0.95
	3/2/24	14:30:52	R3	0.97	0.011	0.022	0.029	0.057	514	514	16209	16209	151	151	0.95	0.95
	3/2/24	14:31:56	R3	1.07	0.011	0.022	0.029	0.057	506	506	16187	16187	151	151	0.95	0.95
	3/2/24	14:32:56	R3	1.00	0.011	0.022	0.029	0.057	516	516	16287	16287	151	151	0.95	0.95
	3/2/24	14:33:55	R3	0.98	0.011	0.022	0.029	0.057	516	516	16277	16277	151	151	0.95	0.95
	3/2/24	14:34:59	R3	1.07	0.011	0.022	0.029	0.057	505	505	16215	16215	151	151	0.95	0.95
	3/2/24	14:35:58	R3	0.98	0.011	0.022	0.029	0.057	512	512	16323	16323	151	151	0.95	0.95
	3/2/24	14:36:59	R3	1.02	0.011	0.022	0.029	0.057	501	501	16283	16283	151	151	0.95	0.95
	3/2/24	14:37:59	R3	1.00	0.011	0.022	0.029	0.057	504	504	16335	16335	151	151	0.95	0.95
	3/2/24	14:39:00	R3	1.02	0.011	0.022	0.029	0.057	507	507	16269	16269	151	151	0.95	0.95
	3/2/24	14:40:01	R3	1.02	0.011	0.022	0.029	0.057	505	505	16248	16248	151	151	0.95	0.95
	3/2/24	14:41:02	R3	1.02	0.011	0.022	0.029	0.057	505	505	16275	16275	151	151	0.95	0.95
	3/2/24	14:42:03	R3	1.02	0.011	0.022	0.029	0.057	507	507	16281	16281	151	151	0.95	0.95
	3/2/24	14:43:07	R3	1.07	0.011	0.022	0.029	0.057	512	512	16516	16516	151	151	0.95	0.95
	3/2/24	14:44:05	R3	0.97	0.011	0.022	0.029	0.057	512	512	17021	17021	151	151	0.95	0.95
	3/2/24	14:45:07	R3	1.03	0.011	0.022	0.029	0.057	513	513	17022	17022	151	151	0.95	0.95
	3/2/24	14:46:07	R3	1.00	0.011	0.022	0.029	0.057	518	518	17067	17067	151	151	0.95	0.95
	3/2/24	14:47:08	R3	1.02	0.011	0.022	0.029	0.057	513	513	17080	17080	151	151	0.95	0.95
	3/2/24	14:48:09	R3	1.02	0.011	0.022	0.029	0.057	511	511	17035	17035	151	151	0.95	0.95
	3/2/24	14:49:12	R3	1.05	0.011	0.022	0.029	0.057	513	513	17057	17057	151	151	0.95	0.95
	3/2/24	14:50:14	R3	1.03	0.011	0.022	0.029	0.057	515	515	17155	17155	151	151	0.95	0.95
	3/2/24	14:51:12	R3	0.97	0.011	0.022	0.029	0.057	519	519	17201	17201	151	151	0.95	0.95
	3/2/24	14:52:14	R3	1.03	0.011	0.022	0.029	0.057	513	513	17144	17144	151	151	0.95	0.95
	3/2/24	14:53:16	R3	1.03	0.011	0.022	0.029	0.057	507	507	16950	16950	151	151	0.95	0.95
	3/2/24	14:54:18	R3	1.03	0.011	0.022	0.029	0.057	513	513	17018	17018	151	151	0.95	0.95
	3/2/24	14:55:16	R3	0.97	0.011	0.022	0.029	0.057	513	513	17012	17012	151	151	0.95	0.95
	3/2/24	14:56:17	R3	1.02	0.011	0.022	0.029	0.057	513	513	16992	16992	151	151	0.95	0.95
	3/2/24	14:57:18	R3	1.02	0.011	0.022	0.029	0.057	511	511	16982	16982	151	151	0.95	0.95
	3/2/24	14:58:19	R3	1.02	0.011	0.022	0.029	0.057	512	512	16954	16954	151	151	0.95	0.95
	3/2/24	14:59:20	R3	1.02	0.011	0.022	0.029	0.057	510	510	16894	16894	151	151	0.95	0.95
	3/2/24	15:00:22	R3	1.03	0.011	0.022	0.029	0.057	510	510	16995	16995	151	151	0.95	0.95

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PES_002 4-2	Outlet	Scrubber												
60.1 (min)			Minimum	BDL	BDL	BDL	BDL	570	570	18115	18115	151	151	0.94	0.94
	Run 1	Conc. (ppmv)	Maximum	BDL	BDL	BDL	BDL	604	604	19200	19200	151	151	0.94	0.94
			(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	591	591	18359	18359	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	591	591	18359	18359	151	151	0.94	0.94
		(Volume)	MDL	0.020	0.020	0.042	0.042	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	574	574	17604	17604	150	150	0.94	0.94
59.9 (min)			Maximum	BDL	BDL	BDL	BDL	612	612	18292	18292	151	151	0.94	0.94
	Run 2	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	595	595	18072	18072	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	595	595	18072	18072	151	151	0.94	0.94
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	574	574	17460	17460	151	151	0.94	0.94
60.0 (min)			Maximum	BDL	BDL	BDL	BDL	612	612	18196	18196	151	151	0.94	0.94
	Run 3	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	590	590	18074	18074	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	590	590	18074	18074	151	151	0.94	0.94
		(Volume)	MDL	0.020	0.020	0.042	0.042	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	570	570	17460	17460	150	150	0.94	0.94
(min)			Maximum	BDL	BDL	BDL	BDL	612	612	19200	19200	151	151	0.94	0.94
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	592	592	18168	18168	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	592	592	18168	18168	151	151	0.94	0.94
		(Volume)	MDL	0.020	0.020	0.042	0.042	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
3/1/24	18:37:36	R1	**1.00**	0.010	0.020	0.021	0.042	598	598	19200	19200	151	151	0.94	0.94
3/1/24	18:38:37	R1	1.02	0.010	0.020	0.021	0.042	598	598	19106	19106	151	151	0.94	0.94
3/1/24	18:39:36	R1	0.98	0.010	0.020	0.021	0.042	585	585	18997	18997	151	151	0.94	0.94
3/1/24	18:40:38	R1	1.03	0.010	0.020	0.021	0.042	593	593	19138	19138	151	151	0.94	0.94
3/1/24	18:41:36	R1	0.97	0.010	0.020	0.021	0.042	601	601	18997	18997	151	151	0.94	0.94
3/1/24	18:42:36	R1	1.00	0.010	0.020	0.021	0.042	600	600	18927	18927	151	151	0.94	0.94
3/1/24	18:43:39	R1	1.05	0.010	0.020	0.021	0.042	603	603	18863	18863	151	151	0.94	0.94
3/1/24	18:44:37	R1	0.97	0.010	0.020	0.021	0.042	595	595	18795	18795	151	151	0.94	0.94
3/1/24	18:45:36	R1	0.98	0.010	0.020	0.021	0.042	597	597	18735	18735	151	151	0.94	0.94
3/1/24	18:46:37	R1	1.02	0.010	0.020	0.021	0.042	596	596	18594	18594	151	151	0.94	0.94
3/1/24	18:47:38	R1	1.02	0.010	0.020	0.021	0.042	597	597	18482	18482	151	151	0.94	0.94
3/1/24	18:48:39	R1	1.02	0.010	0.020	0.021	0.042	596	596	18414	18414	151	151	0.94	0.94
3/1/24	18:49:39	R1	1.00	0.010	0.020	0.021	0.042	604	604	18506	18506	151	151	0.94	0.94
3/1/24	18:50:36	R1	0.95	0.010	0.020	0.021	0.042	594	594	18388	18388	151	151	0.94	0.94
3/1/24	18:51:36	R1	1.00	0.010	0.020	0.021	0.042	594	594	18298	18298	151	151	0.94	0.94
3/1/24	18:52:36	R1	1.00	0.010	0.020	0.021	0.042	587	587	18363	18363	151	151	0.94	0.94
3/1/24	18:53:36	R1	1.00	0.010	0.020	0.021	0.042	586	586	18360	18360	151	151	0.94	0.94
3/1/24	18:54:36	R1	1.00	0.010	0.020	0.021	0.042	590	590	18320	18320	151	151	0.94	0.94
3/1/24	18:55:36	R1	1.00	0.010	0.020	0.021	0.042	596	596	18227	18227	151	151	0.94	0.94
3/1/24	18:56:37	R1	1.02	0.010	0.020	0.021	0.042	593	593	18227	18227	151	151	0.94	0.94
3/1/24	18:57:36	R1	0.98	0.010	0.020	0.021	0.042	595	595	18177	18177	151	151	0.94	0.94
3/1/24	18:58:38	R1	1.03	0.010	0.020	0.021	0.042	589	589	18115	18115	151	151	0.94	0.94
3/1/24	18:59:36	R1	0.97	0.010	0.020	0.021	0.042	576	576	18193	18193	151	151	0.94	0.94
3/1/24	19:00:39	R1	1.05	0.010	0.020	0.021	0.042	572	572	18212	18212	151	151	0.94	0.94
3/1/24	19:01:36	R1	0.95	0.010	0.020	0.021	0.042	573	573	18318	18318	151	151	0.94	0.94
3/1/24	19:02:36	R1	1.00	0.010	0.020	0.021	0.042	575	575	18223	18223	151	151	0.94	0.94
3/1/24	19:03:38	R1	1.03	0.010	0.020	0.021	0.042	570	570	18192	18192	151	151	0.94	0.94
3/1/24	19:04:36	R1	0.97	0.010	0.020	0.021	0.042	571	571	18206	18206	151	151	0.94	0.94
3/1/24	19:05:42	R1	1.10	0.010	0.020	0.021	0.042	577	577	18211	18211	151	151	0.94	0.94
3/1/24	19:06:37	R1	0.92	0.010	0.020	0.021	0.042	583	583	18129	18129	151	151	0.94	0.94
3/1/24	19:07:37	R1	1.00	0.010	0.020	0.021	0.042	587	587	18206	18206	151	151	0.94	0.94
3/1/24	19:08:36	R1	0.98	0.010	0.020	0.021	0.042	582	582	18217	18217	151	151	0.94	0.94
3/1/24	19:09:36	R1	1.00	0.010	0.020	0.021	0.042	585	585	18234	18234	151	151	0.94	0.94
3/1/24	19:10:41	R1	1.08	0.010	0.020	0.021	0.042	584	584	18184	18184	151	151	0.94	0.94
3/1/24	19:11:36	R1	0.92	0.010	0.020	0.021	0.042	585	585	18233	18233	151	151	0.94	0.94
3/1/24	19:12:36	R1	1.00	0.010	0.020	0.021	0.042	592	592	18269	18269	151	151	0.94	0.94
3/1/24	19:13:36	R1	1.00	0.010	0.020	0.021	0.042	590	590	18189	18189	151	151	0.94	0.94
3/1/24	19:14:36	R1	1.00	0.010	0.020	0.021	0.042	597	597	18168	18168	151	151	0.94	0.94
3/1/24	19:15:36	R1	1.00	0.010	0.020	0.021	0.042	595	595	18272	18272	151	151	0.94	0.94
3/1/24	19:16:36	R1	1.00	0.010	0.020	0.021	0.042	593	593	18271	18271	151	151	0.94	0.94
3/1/24	19:17:36	R1	1.00	0.010	0.020	0.021	0.042	593	593	18178	18178	151	151	0.94	0.94
3/1/24	19:18:36	R1	1.00	0.010	0.020	0.021	0.042	592	592	18146	18146	151	151	0.94	0.94
3/1/24	19:19:39	R1	1.05	0.010	0.020	0.021	0.042	595	595	18282	18282	151	151	0.94	0.94
3/1/24	19:20:36	R1	0.95	0.010	0.020	0.021	0.042	599	599	18165	18165	151	151	0.94	0.94
3/1/24	19:21:36	R1	1.00	0.010	0.020	0.021	0.042	592	592	18163	18163	151	151	0.94	0.94
3/1/24	19:22:36	R1	1.00	0.010	0.020	0.021	0.042	589	589	18215	18215	151	151	0.94	0.94
3/1/24	19:23:36	R1	1.00	0.010	0.020	0.021	0.042	593	593	18263	18263	151	151	0.94	0.94
3/1/24	19:24:36	R1	1.00	0.010	0.020	0.021	0.042	594	594	18173	18173	151	151	0.94	0.94
3/1/24	19:25:36	R1	1.00	0.010	0.020	0.021	0.042	583	583	18149	18149	151	151	0.94	0.94
3/1/24	19:26:36	R1	1.00	0.010	0.020	0.021	0.042	590	590	18278	18278	151	151	0.94	0.94
3/1/24	19:27:36	R1	1.00	0.010	0.020	0.021	0.042	594	594	18278	18278	151	151	0.94	0.94
3/1/24	19:28:36	R1	1.00	0.010	0.020	0.021	0.042	598	598	18215	18215	151	151	0.94	0.94
3/1/24	19:29:36	R1	1.00	0.010	0.020	0.021	0.042	597	597	18223	18223	151	151	0.94	0.94
3/1/24	19:30:36	R1	1.00	0.010	0.020	0.021	0.042	602	602	18248	18248	151	151	0.94	0.94
3/1/24	19:31:36	R1	1.00	0.010	0.020	0.021	0.042	600	600	18205	18205	151	151	0.94	0.94
3/1/24	19:32:36	R1	1.00	0.010	0.020	0.021	0.042	589	589	18221	18221	151	151	0.94	0.94
3/1/24	19:33:36	R1	1.00	0.010	0.020	0.021	0.042	591	591	18196	18196	151	151	0.94	0.94
3/1/24	19:34:37	R1	1.02	0.010	0.020	0.021	0.042	591	591	18313	18313	151	151	0.94	0.94
3/1/24	19:35:39	R1	1.03	0.010	0.020	0.021	0.042	595	595	18242	18242	151	151	0.94	0.94
3/1/24	19:36:39	R1	1.00	0.010	0.020	0.021	0.042	592	592	18238	18238	151	151	0.94	0.94
3/1/24	19:37:37	R2	0.97	0.010	0.020	0.021	0.042	596	596	18218	18218	151	151	0.94	0.94
3/1/24	19:38:36	R2	0.98	0.010	0.020	0.021	0.042	605	605	18292	18292	151	151	0.94	0.94
3/1/24	19:39:36	R2	1.00	0.010	0.020	0.021	0.042	596	596	18218	18218	151	151	0.94	0.94
3/1/24	19:40:36	R2	1.00	0.010	0.020	0.021	0.042	593	593	18234	18234	151	151	0.94	0.94
3/1/24	19:41:36	R2	1.00	0.010	0.020	0.021	0.042	592	592	18281	18281	151	151	0.94	0.94
3/1/24	19:42:37	R2	1.02	0.010	0.020	0.021	0.042	591	591	18275	18275	151	151	0.94	0.94
3/1/24	19:43:37	R2	1.00	0.010	0.020	0.021	0.042	593	593	18176	18176	151	151	0.94	0.94
3/1/24	19:44:36	R2	0.98	0.010	0.020	0.021	0.042	593	593	18192	18192	151	151	0.94	0.94
3/1/24	19:45:40	R2	1.07	0.010	0.020	0.021	0.042	592	592	18271	18271	151	151	0.94	0.94
3/1/24	19:46:36	R2	0.93	0.010	0.020	0.021	0.042	583	583	18217	18217	151	151	0.94	0.94
3/1/24	19:47:39	R2	1.05	0.010	0.020	0.021	0.042	586	586	18141	18141	151	151	0.94	0.94
3/1/24	19:48:36	R2	0.95	0.010	0.020	0.021	0.042	579	579	18150	18150	151	151	0.94	0.94
3/1/24	19:49:36	R2	1.00	0.010	0.020	0.021	0.042	583	583	18276	18276	151	151	0.94	0.94
3/1/24	19:50:36	R2	1.00	0.010	0.020	0.021	0.042	586	586	18194	18194	151	151	0.94	0.94
3/1/24	19:51:39	R2	1.05	0.010	0.020	0.021	0.042	574	574	18174	18174	151	151	0.94	0.94
3/1/24	19:52:36	R2	0.95	0.010	0.020	0.021	0.042	581	581	18017	18017	150	150	0.94	0.94
3/1/24	19:53:36	R2	1.00	0.010	0.020	0.021	0.042	575	575	17604	17604	151	151	0.94	0.94
3/1/24	19:54:36	R2	1.00	0.010	0.020	0.021	0.042	578	578	17956	17956	151	151	0.94	0.94
3/1/24	19:55:37	R2	1.02	0.010	0.020	0.021	0.042	578	578	18081	18081	151	151	0.94	0.94
3/1/24	19:56:41	R2	1.07	0.010	0.020	0.021	0.042	586	586	18218	18218	151	151	0.94	0.94
3/1/24	19:57:39	R2	0.97	0.010	0.020	0.021	0.042	584	584	17704	17704	151	151	0.94	0.94
3/1/24	19:58:39	R2	1.00	0.010	0.020	0.021	0.042	583	583	18144	18144	151	151	0.94	0.94
3/1/24	19:59:36	R2	0.95	0.010	0.020	0.021	0.042	580	580	18148	18148	151	151	0.94	0.94
3/1/24	20:00:38	R2	1.03	0.010	0.020	0.021	0.042	580	580	18167	18167	151	151	0.94	0.94
3/1/24	20:01:36	R2	0.97	0.010	0.020	0.021	0.042	583	583	18172	18172	151	151	0.94	0.94
3/1/24	20:02:36	R2	1.00	0.010	0.020	0.021	0.042	580	580	18018	18018	151	151	0.94	0.94
3/1/24	20:03:39	R2	1.05	0.010	0.020	0.021	0.042	584	584	18063	18063	151	151	0.94	0.94
3/1/24	20:04:36	R2	0.95	0.010	0.020	0.021	0.042	588	588	18151	18151	151	151	0.94	0.94
3/1/24	20:05:38	R2	1.03	0.010	0.020	0.021	0.042	587	587	18094	18094	151	151	0.94	0.94
3/1/24	20:06:38	R2	1.00	0.010	0.020	0.021	0.042	588	588	18016	18016	151	151	0.94	0.94
3/1/24	20:07:36	R2	0.97	0.010	0.020	0.021	0.042	590	590	17939	17939	151	151	0.94	0.94
3/1/24	20:08:36	R2	1.00	0.010	0.020	0.021	0.042	587	587	18076	18076	151	151	0.94	0.94
3/1/24	20:09:36	R2	1.00	0.010	0.020	0.021	0.042	590	590	18070	18070	151	151	0.94	0.94
3/1/24	20:10:38	R2	1.03	0.010	0.020	0.021	0.042	593	593	18017	18017	151	151	0.94	0.94
3/1/24	20:11:36	R2	0.97	0.010	0.020	0.021	0.042	596	596	17849	17849	151	151	0.94	0.94
3/1/24	20:12:38	R2	1.03	0.010	0.020	0.021	0.042	598	598	18117	18117	151	151	0.94	0.94
3/1/24	20:13:36	R2	0.97	0.010	0.020	0.021	0.042	602	602	18079	18079	151	151	0.94	0.94
3/1/24	20:14:36	R2	1.00	0.010	0.020	0.021	0.042	604	604	17994	17994	151	151	0.94	0.94
3/1/24	20:15:38	R2	1.03	0.010	0.020	0.021	0.042	604	604	18014	18014	151	151	0.94	0.94
3/1/24	20:16:37	R2	0.98	0.010	0.020	0.021	0.042	599	599	18033	18033	151	151	0.94	0.94
3/1/24	20:17:36	R2	0.98	0.010	0.020	0.021	0.042	608	608	17979	17979	151	151	0.94	0.94
3/1/24	20:18:39	R2	1.05	0.010	0.020	0.021	0.042	602	602	17991	17991	151	151	0.94	0.94
3/1/24	20:19:36	R2	0.95	0.010	0.020	0.021	0.042	610	610	18037	18037	151	151	0.94	0.94
3/1/24	20:20:36	R2	1.00	0.010	0.020	0.021	0.042	608	608	18016	18016	151	151	0.94	0.94
3/1/24	20:21:36	R2	1.00	0.010	0.020	0.021	0.042	608	608	17989	17989	151	151	0.94	0.94

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PES_002 4-2	Outlet	Scrubber												
Run Length 60.1 (min)	Run 1	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	570	570	18115	18115	151	151	0.94	0.94
			Maximum	BDL	BDL	BDL	BDL	604	604	19200	19200	151	151	0.94	0.94
			(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	591	591	18359	18359	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	591	591	18359	18359	151	151	0.94	0.94
		(Volume)	MDL	0.020	0.020	0.042	0.042	NA	NA	NA	NA	NA	NA	NA	NA
Run Length 59.9 (min)	Run 2	Conc. (ppmv)	Minimum	BDL	BDL	BDL	BDL	574	574	17604	17604	150	150	0.94	0.94
			Maximum	BDL	BDL	BDL	BDL	612	612	18292	18292	151	151	0.94	0.94
			(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	595	595	18072	18072	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	595	595	18072	18072	151	151	0.94	0.94
		(Volume)	MDL												
Run Length 60.0 (min)	Run 3	Conc. (ppmv)		BDL	BDL	BDL	BDL	574	574	17460	17460	151	151	0.94	0.94
			Maximum	BDL	BDL	BDL	BDL	612	612	18196	18196	151	151	0.94	0.94
			(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	590	590	18074	18074	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	590	590	18074	18074	151	151	0.94	0.94
		(Volume)	MDL	0.020	0.020	0.042	0.042	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	570	570	17460	17460	150	150	0.94	0.94
(min)			Maximum	BDL	BDL	BDL	BDL	612	612	19200	19200	151	151	0.94	0.94
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.010	0.010	0.021	0.021	592	592	18168	18168	151	151	0.94	0.94
			(BDL = MDL) Average	0.020	0.020	0.042	0.042	592	592	18168	18168	151	151	0.94	0.94
		(Volume)	MDL	0.020	0.020	0.042	0.042	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/1/24	20:22:36	R2	1.00	0.010	0.020	0.021	0.042	611	611	18002	18002	151	151	0.94	0.94
	3/1/24	20:23:38	R2	1.03	0.010	0.020	0.021	0.042	608	608	17997	17997	151	151	0.94	0.94
	3/1/24	20:24:36	R2	0.97	0.010	0.020	0.021	0.042	608	608	18012	18012	151	151	0.94	0.94
	3/1/24	20:25:39	R2	1.05	0.010	0.020	0.021	0.042	601	601	17991	17991	151	151	0.94	0.94
	3/1/24	20:26:38	R2	0.98	0.010	0.020	0.021	0.042	608	608	18015	18015	151	151	0.94	0.94
	3/1/24	20:27:36	R2	0.97	0.010	0.020	0.021	0.042	608	608	18044	18044	151	151	0.94	0.94
	3/1/24	20:28:36	R2	1.00	0.010	0.020	0.021	0.042	612	612	17981	17981	151	151	0.94	0.94
	3/1/24	20:29:36	R2	1.00	0.010	0.020	0.021	0.042	607	607	18013	18013	151	151	0.94	0.94
	3/1/24	20:30:39	R2	1.05	0.010	0.020	0.021	0.042	611	611	18074	18074	151	151	0.94	0.94
	3/1/24	20:31:36	R2	0.95	0.010	0.020	0.021	0.042	604	604	18025	18025	151	151	0.94	0.94
	3/1/24	20:32:37	R2	1.02	0.010	0.020	0.021	0.042	609	609	17983	17983	151	151	0.94	0.94
	3/1/24	20:33:39	R2	1.03	0.010	0.020	0.021	0.042	605	605	18017	18017	151	151	0.94	0.94
	3/1/24	20:34:36	R2	0.95	0.010	0.020	0.021	0.042	610	610	18024	18024	151	151	0.94	0.94
	3/1/24	20:35:36	R2	1.00	0.010	0.020	0.021	0.042	608	608	18051	18051	151	151	0.94	0.94
	3/1/24	20:36:36	R2	1.00	0.010	0.020	0.021	0.042	605	605	18028	18028	151	151	0.94	0.94
	3/1/24	20:37:36	R3	1.00	0.010	0.020	0.021	0.042	597	597	18013	18013	151	151	0.94	0.94
	3/1/24	20:38:39	R3	1.05	0.010	0.020	0.021	0.042	609	609	18041	18041	151	151	0.94	0.94
	3/1/24	20:39:39	R3	1.00	0.010	0.020	0.021	0.042	612	612	18049	18049	151	151	0.94	0.94
	3/1/24	20:40:38	R3	0.98	0.010	0.020	0.021	0.042	608	608	18052	18052	151	151	0.94	0.94
	3/1/24	20:41:37	R3	0.98	0.010	0.020	0.021	0.042	601	601	18047	18047	151	151	0.94	0.94
	3/1/24	20:42:37	R3	1.00	0.010	0.020	0.021	0.042	603	603	18027	18027	151	151	0.94	0.94
	3/1/24	20:43:37	R3	1.00	0.010	0.020	0.021	0.042	601	601	18018	18018	151	151	0.94	0.94
	3/1/24	20:44:36	R3	0.98	0.010	0.020	0.021	0.042	591	591	17978	17978	151	151	0.94	0.94
	3/1/24	20:45:36	R3	1.00	0.010	0.020	0.021	0.042	595	595	18051	18051	151	151	0.94	0.94
	3/1/24	20:46:36	R3	1.00	0.010	0.020	0.021	0.042	585	585	18053	18053	151	151	0.94	0.94
	3/1/24	20:47:36	R3	1.00	0.010	0.020	0.021	0.042	577	577	17975	17975	151	151	0.94	0.94
	3/1/24	20:48:37	R3	1.02	0.010	0.020	0.021	0.042	582	582	17988	17988	151	151	0.94	0.94
	3/1/24	20:49:38	R3	1.02	0.010	0.020	0.021	0.042	583	583	18058	18058	151	151	0.94	0.94
	3/1/24	20:50:39	R3	1.02	0.010	0.020	0.021	0.042	579	579	18019	18019	151	151	0.94	0.94
	3/1/24	20:51:36	R3	0.95	0.010	0.020	0.021	0.042	577	577	18012	18012	151	151	0.94	0.94
	3/1/24	20:52:37	R3	1.02	0.010	0.020	0.021	0.042	574	574	17971	17971	151	151	0.94	0.94
	3/1/24	20:53:36	R3	0.98	0.010	0.020	0.021	0.042	581	581	18039	18039	151	151	0.94	0.94
	3/1/24	20:54:36	R3	1.00	0.010	0.020	0.021	0.042	583	583	18018	18018	151	151	0.94	0.94
	3/1/24	20:55:36	R3	1.00	0.010	0.020	0.021	0.042	587	587	18058	18058	151	151	0.94	0.94
	3/1/24	20:56:36	R3	1.00	0.010	0.020	0.021	0.042	585	585	18041	18041	151	151	0.94	0.94
	3/1/24	20:57:37	R3	1.02	0.010	0.020	0.021	0.042	582	582	18096	18096	151	151	0.94	0.94
	3/1/24	20:58:37	R3	1.00	0.010	0.020	0.021	0.042	579	579	18056	18056	151	151	0.94	0.94
	3/1/24	20:59:36	R3	0.98	0.010	0.020	0.021	0.042	587	587	18009	18009	151	151	0.94	0.94
	3/1/24	21:00:42	R3	1.10	0.010	0.020	0.021	0.042	593	593	18118	18118	151	151	0.94	0.94
	3/1/24	21:01:38	R3	0.93	0.010	0.020	0.021	0.042	591	591	18059	18059	151	151	0.94	0.94
	3/1/24	21:02:36	R3	0.97	0.010	0.020	0.021	0.042	592	592	18094	18094	151	151	0.94	0.94
	3/1/24	21:03:37	R3	1.02	0.010	0.020	0.021	0.042	591	591	18071	18071	151	151	0.94	0.94
	3/1/24	21:04:39	R3	1.03	0.010	0.020	0.021	0.042	584	584	18111	18111	151	151	0.94	0.94
	3/1/24	21:05:38	R3	0.98	0.010	0.020	0.021	0.042	592	592	18116	18116	151	151	0.94	0.94
	3/1/24	21:06:36	R3	0.97	0.010	0.020	0.021	0.042	588	588	18116	18116	151	151	0.94	0.94
	3/1/24	21:07:41	R3	1.08	0.010	0.020	0.021	0.042	585	585	18098	18098	151	151	0.94	0.94
	3/1/24	21:08:36	R3	0.92	0.010	0.020	0.021	0.042	588	588	18170	18170	151	151	0.94	0.94
	3/1/24	21:09:36	R3	1.00	0.010	0.020	0.021	0.042	585	585	18177	18177	151	151	0.94	0.94
	3/1/24	21:10:36	R3	1.00	0.010	0.020	0.021	0.042	585	585	18132	18132	151	151	0.94	0.94
	3/1/24	21:11:36	R3	1.00	0.010	0.020	0.021	0.042	588	588	18103	18103	151	151	0.94	0.94
	3/1/24	21:12:39	R3	1.05	0.010	0.020	0.021	0.042	591	591	18130	18130	151	151	0.94	0.94
	3/1/24	21:13:36	R3	0.95	0.010	0.020	0.021	0.042	594	594	18122	18122	151	151	0.94	0.94
	3/1/24	21:14:37	R3	1.02	0.010	0.020	0.021	0.042	592	592	18092	18092	151	151	0.94	0.94
	3/1/24	21:15:38	R3	1.02	0.010	0.020	0.021	0.042	593	593	18153	18153	151	151	0.94	0.94
	3/1/24	21:16:36	R3	0.97	0.010	0.020	0.021	0.042	590	590	18136	18136	151	151	0.94	0.94
	3/1/24	21:17:36	R3	1.00	0.010	0.020	0.021	0.042	586	586	18104	18104	151	151	0.94	0.94
	3/1/24	21:18:36	R3	1.00	0.010	0.020	0.021	0.042	584	584	18079	18079	151	151	0.94	0.94
	3/1/24	21:19:36	R3	1.00	0.010	0.020	0.021	0.042	586	586	18125	18125	151	151	0.94	0.94
	3/1/24	21:20:38	R3	1.03	0.010	0.020	0.021	0.042	584	584	18162	18162	151	151	0.94	0.94
	3/1/24	21:21:36	R3	0.97	0.010	0.020	0.021	0.042	576	576	18191	18191	151	151	0.94	0.94
	3/1/24	21:22:38	R3	1.03	0.010	0.020	0.021	0.042	581	581	18159	18159	151	151	0.94	0.94
	3/1/24	21:23:36	R3	0.97	0.010	0.020	0.021	0.042	583	583	18077	18077	151	151	0.94	0.94
	3/1/24	21:24:36	R3	1.00	0.010	0.020	0.021	0.042	589	589	18104	18104	151	151	0.94	0.94
	3/1/24	21:25:36	R3	1.00	0.010	0.020	0.021	0.042	586	586	18110	18110	151	151	0.94	0.94
	3/1/24	21:26:36	R3	1.00	0.010	0.020	0.021	0.042	587	587	18125	18125	151	151	0.94	0.94
	3/1/24	21:27:36	R3	1.00	0.010	0.020	0.021	0.042	605	605	18196	18196	151	151	0.94	0.94
	3/1/24	21:28:39	R3	1.05	0.010	0.020	0.021	0.042	609	609	18146	18146	151	151	0.94	0.94
	3/1/24	21:29:36	R3	0.95	0.010	0.020	0.021	0.042	605	605	18110	18110	151	151	0.94	0.94
	3/1/24	21:30:36	R3	1.00	0.010	0.020	0.021	0.042	596	596	18106	18106	151	151	0.94	0.94
	3/1/24	21:31:36	R3	1.00	0.010	0.020	0.021	0.042	595	595	18176	18176	151	151	0.94	0.94
	3/1/24	21:32:36	R3	1.00	0.010	0.020	0.021	0.042	595	595	18158	18158	151	151	0.94	0.94
	3/1/24	21:33:36	R3	1.00	0.010	0.020	0.021	0.042	603	603	18146	18146	151	151	0.94	0.94
	3/1/24	21:34:39	R3	1.05	0.010	0.020	0.021	0.042	596	596	18150	18150	151	151	0.94	0.94
	3/1/24	21:35:37	R3	0.97	0.010	0.020	0.021	0.042	595	595	17893	17893	151	151	0.94	0.94
	3/1/24	21:36:36	R3	0.98	0.010	0.020	0.021	0.042	588	588	17460	17460	151	151	0.94	0.94

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Temp(C) Summary	Press(atm) Summary
	PES_002	Outlet	Scrubber						
Run Length 59.9 (min)	Run 1	Conc. (ppmv)	Minimum	453	BDL	BDL	16096	148	0.96
			Maximum	468	BDL	BDL	16487	151	0.96
			(BDL = MDL) Average	461	0.022	0.032	16330	151	0.96
			MDL	NA	0.022	0.032	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	449	BDL	BDL	15832	150	0.96
			Maximum	471	BDL	BDL	16559	152	0.96
			(BDL = MDL) Average	464	0.022	0.032	16491	152	0.96
			MDL	NA	0.022	0.032	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	456	BDL	BDL	16418	151	0.96
			Maximum						
				461	0.022	0.032	16578	152	0.96
			MDL	NA	0.022	0.032	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	449	BDL	BDL	15832	148	0.96
			Maximum	473	BDL	BDL	16663	152	0.96
			(BDL = MDL) Average	462	0.022	0.032	16466	151	0.96
			MDL	NA	0.022	0.032	NA	NA	NA

	Date	Time	Run	Scan Length	CO2 1-min data Conc. (ppm) BDL=MDL	HCl 1-min data Conc. (ppm) BDL=MDL	HF 1-min data Conc. (ppm) BDL=MDL	H2O 1-min data Conc. (ppm) BDL=MDL	Temp(C) 1-min data Conc. (ppm) BDL=MDL	Press(atm) 1-min data Conc. (ppm) BDL=MDL
	3/6/24	18:22:34	R1	1.05	457	0.022	0.032	16404	151	0.96
	3/6/24	18:23:34	R1	1.00	455	0.022	0.032	16438	151	0.96
	3/6/24	18:24:37	R1	1.05	466	0.022	0.032	16431	151	0.96
	3/6/24	18:25:33	R1	0.93	456	0.022	0.032	16441	151	0.96
	3/6/24	18:26:31	R1	0.97	462	0.022	0.032	16487	151	0.96
	3/6/24	18:27:32	R1	1.02	459	0.022	0.032	16471	151	0.96
	3/6/24	18:28:31	R1	0.98	462	0.022	0.032	16439	151	0.96
	3/6/24	18:29:34	R1	1.05	463	0.022	0.032	16456	151	0.96
	3/6/24	18:30:33	R1	0.98	466	0.022	0.032	16458	151	0.96
	3/6/24	18:31:31	R1	0.97	456	0.022	0.032	16418	151	0.96
	3/6/24	18:32:31	R1	1.00	460	0.022	0.032	16393	151	0.96
	3/6/24	18:33:31	R1	1.00	461	0.022	0.032	16399	151	0.96
	3/6/24	18:34:31	R1	1.00	456	0.022	0.032	16424	151	0.96
	3/6/24	18:35:31	R1	1.00	460	0.022	0.032	16409	151	0.96
	3/6/24	18:36:31	R1	1.00	463	0.022	0.032	16216	151	0.96
	3/6/24	18:37:32	R1	1.02	461	0.022	0.032	16299	151	0.96
	3/6/24	18:38:31	R1	0.98	460	0.022	0.032	16332	151	0.96
	3/6/24	18:39:31	R1	1.00	467	0.022	0.032	16383	151	0.96
	3/6/24	18:40:32	R1	1.02	468	0.022	0.032	16387	151	0.96
	3/6/24	18:41:34	R1	1.03	461	0.022	0.032	16376	151	0.96
	3/6/24	18:42:31	R1	0.95	459	0.022	0.032	16374	151	0.96
	3/6/24	18:43:31	R1	1.00	466	0.022	0.032	16355	151	0.96
	3/6/24	18:44:34	R1	1.05	463	0.022	0.032	16364	151	0.96
	3/6/24	18:45:31	R1	0.95	463	0.022	0.032	16272	151	0.96
	3/6/24	18:46:33	R1	1.03	462	0.022	0.032	16206	151	0.96
	3/6/24	18:47:33	R1	1.00	466	0.022	0.032	16294	151	0.96
	3/6/24	18:48:32	R1	0.98	461	0.022	0.032	16346	151	0.96
	3/6/24	18:49:32	R1	1.00	467	0.022	0.032	16350	151	0.96
	3/6/24	18:50:31	R1	0.98	463	0.022	0.032	16382	151	0.96
	3/6/24	18:51:31	R1	1.00	459	0.022	0.032	16339	151	0.96
	3/6/24	18:52:32	R1	1.02	464	0.022	0.032	16363	151	0.96
	3/6/24	18:53:31	R1	0.98	466	0.022	0.032	16328	151	0.96
	3/6/24	18:54:33	R1	1.03	463	0.022	0.032	16177	151	0.96
	3/6/24	18:55:31	R1	0.97	460	0.022	0.032	16232	151	0.96
	3/6/24	18:56:34	R1	1.05	461	0.022	0.032	16305	151	0.96
	3/6/24	18:57:32	R1	0.97	464	0.022	0.032	16316	151	0.96
	3/6/24	18:58:32	R1	1.00	464	0.022	0.032	16333	151	0.96
	3/6/24	18:59:31	R1	0.98	460	0.022	0.032	16315	151	0.96
	3/6/24	19:00:34	R1	1.05	457	0.022	0.032	16351	151	0.96
	3/6/24	19:01:31	R1	0.95	458	0.022	0.032	16336	151	0.96
	3/6/24	19:02:35	R1	1.07	459	0.022	0.032	16310	151	0.96
	3/6/24	19:03:33	R1	0.97	457	0.022	0.032	16332	151	0.96
	3/6/24	19:04:33	R1	1.00	458	0.022	0.032	16096	151	0.96
	3/6/24	19:05:34	R1	1.02	454	0.022	0.032	16260	151	0.96
	3/6/24	19:06:34	R1	1.00	459	0.022	0.032	16277	151	0.96
	3/6/24	19:07:32	R1	0.97	461	0.022	0.032	16307	151	0.96
	3/6/24	19:08:31	R1	0.98	458	0.022	0.032	16326	151	0.96
	3/6/24	19:09:34	R1	1.05	457	0.022	0.032	16344	151	0.96
	3/6/24	19:10:34	R1	1.00	456	0.022	0.032	16375	151	0.96
	3/6/24	19:11:32	R1	0.97	456	0.022	0.032	16365	151	0.96
	3/6/24	19:12:32	R1	1.00	462	0.022	0.032	16107	151	0.96
	3/6/24	19:28:29	R1	0.92	459	0.022	0.032	16124	148	0.96
	3/6/24	19:29:29	R1	1.00	460	0.022	0.032	16166	149	0.96
	3/6/24	19:30:35	R1	1.10	464	0.022	0.032	16212	149	0.96
	3/6/24	19:31:29	R1	0.90	456	0.022	0.032	16216	149	0.96
	3/6/24	19:32:29	R1	1.00	463	0.022	0.032	16260	149	0.96
	3/6/24	19:33:29	R1	1.00	462	0.022	0.032	16267	150	0.96
	3/6/24	19:34:31	R1	1.03	456	0.022	0.032	16312	150	0.96
	3/6/24	19:35:29	R1	0.97	460	0.022	0.032	16358	150	0.96
	3/6/24	19:36:29	R1	1.00	453	0.022	0.032	16361	150	0.96
	3/6/24	19:37:30	R2	1.02	460	0.022	0.032	16390	150	0.96
	3/6/24	19:38:31	R2	1.02	460	0.022	0.032	16402	151	0.96
	3/6/24	19:39:31	R2	1.00	461	0.022	0.032	16444	151	0.96
	3/6/24	19:40:32	R2	1.02	458	0.022	0.032	16450	151	0.96
	3/6/24	19:41:29	R2	0.95	469	0.022	0.032	16503	151	0.96
	3/6/24	19:42:29	R2	1.00	463	0.022	0.032	16465	151	0.96
	3/6/24	19:43:29	R2	1.00	457	0.022	0.032	16472	151	0.96
	3/6/24	19:44:29	R2	1.00	468	0.022	0.032	16482	151	0.96
	3/6/24	19:45:29	R2	1.00	449	0.022	0.032	16490	151	0.96
	3/6/24	19:46:29	R2	1.00	452	0.022	0.032	16527	151	0.96
	3/6/24	19:47:29	R2	1.00	460	0.022	0.032	16517	151	0.96
	3/6/24	19:48:30	R2	1.02	455	0.022	0.032	16494	151	0.96
	3/6/24	19:49:31	R2	1.02	458	0.022	0.032	16534	151	0.96
	3/6/24	19:50:29	R2	0.97	461	0.022	0.032	16553	152	0.96
	3/6/24	19:51:29	R2	1.00	461	0.022	0.032	16538	152	0.96
	3/6/24	19:52:29	R2	1.00	463	0.022	0.032	16503	152	0.96
	3/6/24	19:53:30	R2	1.02	466	0.022	0.032	16559	152	0.96
	3/6/24	19:54:29	R2	0.98	465	0.022	0.032	16511	152	0.96
	3/6/24	19:55:29	R2	1.00	471	0.022	0.032	16503	152	0.96
	3/6/24	19:56:29	R2	1.00	467	0.022	0.032	16519	152	0.96
	3/6/24	19:57:29	R2	1.00	461	0.022	0.032	16474	152	0.96
	3/6/24	19:58:29	R2	1.00	465	0.022	0.032	16512	152	0.96
	3/6/24	19:59:29	R2	1.00	469	0.022	0.032	16544	152	0.96
	3/6/24	20:00:29	R2	1.00	469	0.022	0.032	16499	152	0.96
	3/6/24	20:01:31	R2	1.03	468	0.022	0.032	16514	152	0.96
	3/6/24	20:02:29	R2	0.97	465	0.022	0.032	16482	152	0.96
	3/6/24	20:03:31	R2	1.03	465	0.022	0.032	16515	152	0.96
	3/6/24	20:04:32	R2	1.02	470	0.022	0.032	16512	152	0.96
	3/6/24	20:05:29	R2	0.95	468	0.022	0.032	16535	152	0.96
	3/6/24	20:06:29	R2	1.00	466	0.022	0.032	16551	152	0.96
	3/6/24	20:07:31	R2	1.03	468	0.022	0.032	15832	152	0.96
	3/6/24	20:08:29	R2	0.97	467	0.022	0.032	16530	152	0.96
	3/6/24	20:09:29	R2	1.00	468	0.022	0.032	16514	152	0.96
	3/6/24	20:10:32	R2	1.05	468	0.022	0.032	16530	152	0.96
	3/6/24	20:11:29	R2	0.95	468	0.022	0.032	16481	152	0.96
	3/6/24	20:12:29	R2	1.00	471	0.022	0.032	16451	152	0.96
	3/6/24	20:13:29	R2	1.00	468	0.022	0.032	16522	152	0.96
	3/6/24	20:14:29	R2	1.00	469	0.022	0.032	16493	152	0.96
	3/6/24	20:15:29	R2	1.00	468	0.022	0.032	16505	152	0.96
	3/6/24	20:16:31	R2	1.03	465	0.022	0.032	16512	152	0.96
	3/6/24	20:17:32	R2	1.02	470	0.022	0.032	16534	152	0.96

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Temp(C) Summary	Press(atm) Summary
	PES_002	Outlet	Scrubber						
Run Length 59.9 (min)	Run 1	Conc. (ppmv)	Minimum	453	BDL	BDL	16096	148	0.96
			Maximum	468	BDL	BDL	16487	151	0.96
			(BDL = MDL) Average	461	0.022	0.032	16330	151	0.96
			MDL	NA	0.022	0.032	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	449	BDL	BDL	15832	150	0.96
			Maximum	471	BDL	BDL	16559	152	0.96
			(BDL = MDL) Average	464	0.022	0.032	16491	152	0.96
			MDL	NA	0.022	0.032	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	456	BDL	BDL	16418	151	0.96
			Maximum						
				461	0.022	0.032	16578	152	0.96
			MDL	NA	0.022	0.032	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	449	BDL	BDL	15832	148	0.96
			Maximum	473	BDL	BDL	16663	152	0.96
			(BDL = MDL) Average	462	0.022	0.032	16466	151	0.96
			MDL	NA	0.022	0.032	NA	NA	NA

	Date	Time	Run	Scan Length	CO2 1-min data Conc. (ppm) BDL=MDL	HCl 1-min data Conc. (ppm) BDL=MDL	HF 1-min data Conc. (ppm) BDL=MDL	H2O 1-min data Conc. (ppm) BDL=MDL	Temp(C) 1-min data Conc. (ppm) BDL=MDL	Press(atm) 1-min data Conc. (ppm) BDL=MDL
	3/6/24	20:18:29	R2	0.95	461	0.022	0.032	16491	152	0.96
	3/6/24	20:19:29	R2	1.00	460	0.022	0.032	16482	152	0.96
	3/6/24	20:20:32	R2	1.05	464	0.022	0.032	16467	152	0.96
	3/6/24	20:21:29	R2	0.95	466	0.022	0.032	16525	152	0.96
	3/6/24	20:22:30	R2	1.02	460	0.022	0.032	16497	152	0.96
	3/6/24	20:23:29	R2	0.98	462	0.022	0.032	16487	152	0.96
	3/6/24	20:24:29	R2	1.00	461	0.022	0.032	16488	152	0.96
	3/6/24	20:25:29	R2	1.00	454	0.022	0.032	16486	152	0.96
	3/6/24	20:26:31	R2	1.03	464	0.022	0.032	16531	152	0.96
	3/6/24	20:27:29	R2	0.97	457	0.022	0.032	16540	152	0.96
	3/6/24	20:28:29	R2	1.00	462	0.022	0.032	16463	152	0.96
	3/6/24	20:29:29	R2	1.00	464	0.022	0.032	16501	152	0.96
	3/6/24	20:30:29	R2	1.00	466	0.022	0.032	16530	152	0.96
	3/6/24	20:31:29	R2	1.00	462	0.022	0.032	16520	152	0.96
	3/6/24	20:32:29	R2	1.00	462	0.022	0.032	16496	152	0.96
	3/6/24	20:33:29	R2	1.00	462	0.022	0.032	16516	152	0.96
	3/6/24	20:34:29	R2	1.00	461	0.022	0.032	16495	152	0.96
	3/6/24	20:35:31	R2	1.03	457	0.022	0.032	16517	152	0.96
	3/6/24	20:36:30	R2	0.98	463	0.022	0.032	16538	152	0.96
	3/6/24	20:37:29	R3	0.98	465	0.022	0.032	16561	152	0.96
	3/6/24	20:38:29	R3	1.00	464	0.022	0.032	16576	152	0.96
	3/6/24	20:39:29	R3	1.00	466	0.022	0.032	16522	152	0.96
	3/6/24	20:40:29	R3	1.00	458	0.022	0.032	16598	152	0.96
	3/6/24	20:41:29	R3	1.00	465	0.022	0.032	16576	152	0.96
	3/6/24	20:42:32	R3	1.05	464	0.022	0.032	16562	152	0.96
	3/6/24	20:43:29	R3	0.95	463	0.022	0.032	16571	152	0.96
	3/6/24	20:44:29	R3	1.00	461	0.022	0.032	16609	152	0.96
	3/6/24	20:45:29	R3	1.00	462	0.022	0.032	16565	152	0.96
	3/6/24	20:46:29	R3	1.00	463	0.022	0.032	16613	152	0.96
	3/6/24	20:47:29	R3	1.00	461	0.022	0.032	16592	152	0.96
	3/6/24	20:48:30	R3	1.02	457	0.022	0.032	16610	152	0.96
	3/6/24	20:49:29	R3	0.98	460	0.022	0.032	16566	152	0.96
	3/6/24	20:50:29	R3	1.00	457	0.022	0.032	16571	151	0.96
	3/6/24	20:51:29	R3	1.00	458	0.022	0.032	16545	152	0.96
	3/6/24	20:52:29	R3	1.00	460	0.022	0.032	16566	152	0.96
	3/6/24	20:53:29	R3	1.00	467	0.022	0.032	16619	152	0.96
	3/6/24	20:54:29	R3	1.00	462	0.022	0.032	16615	152	0.96
	3/6/24	20:55:29	R3	1.00	462	0.022	0.032	16614	152	0.96
	3/6/24	20:56:29	R3	1.00	458	0.022	0.032	16645	152	0.96
	3/6/24	20:57:29	R3	1.00	460	0.022	0.032	16635	152	0.96
	3/6/24	20:58:29	R3	1.00	461	0.022	0.032	16663	152	0.96
	3/6/24	20:59:29	R3	1.00	462	0.022	0.032	16593	152	0.96
	3/6/24	21:00:29	R3	1.00	458	0.022	0.032	16625	152	0.96
	3/6/24	21:01:29	R3	1.00	461	0.022	0.032	16557	152	0.96
	3/6/24	21:02:29	R3	1.00	456	0.022	0.032	16611	152	0.96
	3/6/24	21:03:29	R3	1.00	459	0.022	0.032	16580	152	0.96
	3/6/24	21:04:29	R3	1.00	457	0.022	0.032	16611	152	0.96
	3/6/24	21:05:29	R3	1.00	461	0.022	0.032	16543	152	0.96
	3/6/24	21:06:32	R3	1.05	461	0.022	0.032	16500	152	0.96
	3/6/24	21:07:29	R3	0.95	461	0.022	0.032	16532	152	0.96
	3/6/24	21:08:30	R3	1.02	464	0.022	0.032	16577	152	0.96
	3/6/24	21:09:29	R3	0.98	457	0.022	0.032	16560	152	0.96
	3/6/24	21:10:30	R3	1.02	461	0.022	0.032	16576	152	0.96
	3/6/24	21:11:29	R3	0.98	460	0.022	0.032	16572	152	0.96
	3/6/24	21:12:29	R3	1.00	465	0.022	0.032	16617	152	0.96
	3/6/24	21:13:31	R3	1.03	462	0.022	0.032	16635	152	0.96
	3/6/24	21:14:29	R3	0.97	465	0.022	0.032	16613	152	0.96
	3/6/24	21:15:29	R3	1.00	473	0.022	0.032	16521	152	0.96
	3/6/24	21:16:29	R3	1.00	467	0.022	0.032	16509	152	0.96
	3/6/24	21:17:30	R3	1.02	464	0.022	0.032	16626	152	0.96
	3/6/24	21:18:32	R3	1.03	459	0.022	0.032	16628	152	0.96
	3/6/24	21:19:29	R3	0.95	463	0.022	0.032	16600	152	0.96
	3/6/24	21:20:31	R3	1.03	463	0.022	0.032	16587	152	0.96
	3/6/24	21:21:30	R3	0.98	464	0.022	0.032	16652	152	0.96
	3/6/24	21:22:30	R3	1.00	463	0.022	0.032	16636	152	0.96
	3/6/24	21:23:29	R3	0.98	458	0.022	0.032	16607	152	0.96
	3/6/24	21:24:29	R3	1.00	461	0.022	0.032	16588	152	0.96
	3/6/24	21:25:32	R3	1.05	463	0.022	0.032	16590	152	0.96
	3/6/24	21:26:29	R3	0.95	463	0.022	0.032	16487	152	0.96
	3/6/24	21:27:29	R3	1.00	462	0.022	0.032	16546	152	0.96
	3/6/24	21:28:30	R3	1.02	460	0.022	0.032	16524	152	0.96
	3/6/24	21:29:29	R3	0.98	459	0.022	0.032	16541	152	0.96
	3/6/24	21:30:29	R3	1.00	459	0.022	0.032	16579	152	0.96
	3/6/24	21:31:29	R3	1.00	459	0.022	0.032	16550	152	0.96
	3/6/24	21:32:31	R3	1.03	457	0.022	0.032	16572	152	0.96
	3/6/24	21:33:29	R3	0.97	466	0.022	0.032	16550	152	0.96
	3/6/24	21:34:29	R3	1.00	462	0.022	0.032	16553	152	0.96
	3/6/24	21:35:32	R3	1.05	458	0.022	0.032	16509	152	0.96
	3/6/24	21:36:29	R3	0.95	461	0.022	0.032	16418	152	0.96

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
Run Length	PES_003	Outlet	Scrubber												
60.0 (min)			Minimum	0.041	0.041	BDL	BDL	494	494	17769	17769	150	150	0.95	0.95
	Run 1	Conc. (ppmv)	Maximum	0.11	0.11	BDL	BDL	507	507	18048	18048	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.071	0.071	0.017	0.017	501	501	17910	17910	151	151	0.95	0.95
			(BDL = MDL) Average	0.071	0.071	0.033	0.033	501	501	17910	17910	151	151	0.95	0.95
		(Volume)	MDL	NA	NA	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
Run Length				BDL	BDL	BDL	BDL	498	498	17198	17198	151	151	0.95	0.95
60.0 (min)			Minimum												
	Run 2	Conc. (ppmv)	Maximum	0.054	0.054	BDL	BDL	518	518	18225	18225	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.036	0.036	0.017	0.017	505	505	17984	17984	151	151	0.95	0.95
			(BDL = MDL) Average	0.037	0.037	0.033	0.033	505	505	17984	17984	151	151	0.95	0.95
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	500	500	17660	17660	151	151	0.94	0.94
60.0 (min)			Minimum	0.084	0.084	BDL	BDL	518	518	18130	18130	151	151	0.95	0.95
	Run 3	Conc. (ppmv)	Maximum	0.060	0.060	0.017	0.017	509	509	18019	18019	151	151	0.94	0.94
			(BDL = 1/2MDL) Average	0.060	0.060	0.033	0.033	509	509	18019	18019	151	151	0.94	0.94
			(BDL = MDL) Average	0.025	0.025	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
		(Volume)	MDL	BDL	BDL	BDL	BDL	494	494	17198	17198	150	150	0.94	0.94
(min)			Minimum	0.11	0.11	BDL	BDL	518	518	18225	18225	151	151	0.95	0.95
	Test Results	Conc. (ppmv)	Maximum	0.055	0.055	0.017	0.017	505	505	17971	17971	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.056	0.056	0.033	0.033	505	505	17971	17971	151	151	0.95	0.95
		(Volume)	(BDL = MDL) Average	0.025	0.025	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
			MDL												

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
	Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
	3/1/24	15:30:19	R1	1.00	0.081	0.081	0.017	0.033	507	507	18008	18008	151	151	0.95	0.95
	3/1/24	15:31:19	R1	1.00	0.086	0.086	0.017	0.033	501	501	17961	17961	151	151	0.95	0.95
	3/1/24	15:32:19	R1	1.00	0.085	0.085	0.017	0.033	503	503	18048	18048	151	151	0.95	0.95
	3/1/24	15:33:19	R1	1.00	0.092	0.092	0.017	0.033	500	500	17954	17954	151	151	0.95	0.95
	3/1/24	15:34:19	R1	1.00	0.086	0.086	0.017	0.033	500	500	17887	17887	151	151	0.95	0.95
	3/1/24	15:35:19	R1	1.00	0.078	0.078	0.017	0.033	499	499	17906	17906	150	150	0.95	0.95
	3/1/24	15:36:19	R1	1.00	0.092	0.092	0.017	0.033	501	501	17960	17960	151	151	0.95	0.95
	3/1/24	15:37:19	R1	1.00	0.084	0.084	0.017	0.033	502	502	18003	18003	151	151	0.95	0.95
	3/1/24	15:38:20	R1	1.02	0.080	0.080	0.017	0.033	500	500	17917	17917	151	151	0.95	0.95
	3/1/24	15:39:20	R1	1.00	0.077	0.077	0.017	0.033	494	494	17909	17909	151	151	0.95	0.95
	3/1/24	15:40:19	R1	0.98	0.084	0.084	0.017	0.033	496	496	17954	17954	150	150	0.95	0.95
	3/1/24	15:41:19	R1	1.00	0.082	0.082	0.017	0.033	497	497	17929	17929	151	151	0.95	0.95
	3/1/24	15:42:20	R1	1.02	0.076	0.076	0.017	0.033	497	497	17864	17864	151	151	0.95	0.95
	3/1/24	15:43:19	R1	0.98	0.077	0.077	0.017	0.033	500	500	17917	17917	151	151	0.95	0.95
	3/1/24	15:44:19	R1	1.00	0.073	0.073	0.017	0.033	500	500	17927	17927	151	151	0.95	0.95
	3/1/24	15:45:21	R1	1.03	0.076	0.076	0.017	0.033	501	501	17930	17930	151	151	0.95	0.95
	3/1/24	15:46:19	R1	0.97	0.069	0.069	0.017	0.033	497	497	17835	17835	151	151	0.95	0.95
	3/1/24	15:47:19	R1	1.00	0.069	0.069	0.017	0.033	498	498	17852	17852	150	150	0.95	0.95
	3/1/24	15:48:19	R1	1.00	0.075	0.075	0.017	0.033	502	502	17964	17964	151	151	0.95	0.95
	3/1/24	15:49:20	R1	1.02	0.071	0.071	0.017	0.033	502	502	17963	17963	151	151	0.95	0.95
	3/1/24	15:50:20	R1	1.00	0.068	0.068	0.017	0.033	500	500	17885	17885	151	151	0.95	0.95
	3/1/24	15:51:19	R1	0.98	0.070	0.070	0.017	0.033	501	501	17894	17894	151	151	0.95	0.95
	3/1/24	15:52:19	R1	1.00	0.097	0.097	0.017	0.033	502	502	17953	17953	151	151	0.95	0.95
	3/1/24	15:53:21	R1	1.03	0.087	0.087	0.017	0.033	499	499	17850	17850	151	151	0.95	0.95
	3/1/24	15:54:19	R1	0.97	0.11	0.11	0.017	0.033	501	501	17870	17870	151	151	0.95	0.95
	3/1/24	15:55:19	R1	1.00	0.11	0.11	0.017	0.033	500	500	17864	17864	151	151	0.95	0.95
	3/1/24	15:56:20	R1	1.02	0.10	0.10	0.017	0.033	505	505	17933	17933	151	151	0.95	0.95
	3/1/24	15:57:19	R1	0.98	0.11	0.11	0.017	0.033	507	507	17861	17861	151	151	0.95	0.95
	3/1/24	15:58:19	R1	1.00	0.099	0.099	0.017	0.033	502	502	17893	17893	151	151	0.95	0.95
	3/1/24	15:59:19	R1	1.00	0.10	0.10	0.017	0.033	501	501	17869	17869	151	151	0.95	0.95
	3/1/24	16:00:19	R1	1.00	0.081	0.081	0.017	0.033	502	502	17947	17947	151	151	0.95	0.95
	3/1/24	16:01:19	R1	1.00	0.062	0.062	0.017	0.033	502	502	17823	17823	151	151	0.95	0.95
	3/1/24	16:02:22	R1	1.05	0.065	0.065	0.017	0.033	498	498	17769	17769	151	151	0.95	0.95
	3/1/24	16:03:19	R1	0.95	0.081	0.081	0.017	0.033	499	499	17847	17847	151	151	0.95	0.95
	3/1/24	16:04:19	R1	1.00	0.081	0.081	0.017	0.033	500	500	17875	17875	151	151	0.95	0.95
	3/1/24	16:05:20	R1	1.02	0.063	0.063	0.017	0.033	502	502	17853	17853	151	151	0.95	0.95
	3/1/24	16:06:19	R1	0.98	0.071	0.071	0.017	0.033	501	501	17889	17889	151	151	0.95	0.95
	3/1/24	16:07:19	R1	1.00	0.062	0.062	0.017	0.033	502	502	17921	17921	151	151	0.95	0.95
	3/1/24	16:08:21	R1	1.03	0.075	0.075	0.017	0.033	499	499	17935	17935	151	151	0.95	0.95
	3/1/24	16:09:19	R1	0.97	0.073	0.073	0.017	0.033	501	501	17900	17900	151	151	0.95	0.95
	3/1/24	16:10:19	R1	1.00	0.059	0.059	0.017	0.033	500	500	17888	17888	151	151	0.95	0.95
	3/1/24	16:11:19	R1	1.00	0.060	0.060	0.017	0.033	505	505	17845	17845	151	151	0.95	0.95
	3/1/24	16:12:21	R1	1.03	0.068	0.068	0.017	0.033	502	502	17900	17900	151	151	0.95	0.95
	3/1/24	16:13:19	R1	0.97	0.044	0.044	0.017	0.033	500	500	17895	17895	151	151	0.95	0.95
	3/1/24	16:14:19	R1	1.00	0.051	0.051	0.017	0.033	503	503	17801	17801	151	151	0.95	0.95
	3/1/24	16:15:19	R1	1.00	0.045	0.045	0.017	0.033	502	502	17938	17938	151	151	0.95	0.95
	3/1/24	16:16:19	R1	1.00	0.050	0.050	0.017	0.033	500	500	17861	17861	151	151	0.95	0.95
	3/1/24	16:17:19	R1	1.00	0.043	0.043	0.017	0.033	495	495	17935	17935	151	151	0.95	0.95
	3/1/24	16:18:21	R1	1.03	0.050	0.050	0.017	0.033	500	500	17906	17906	151	151	0.95	0.95
	3/1/24	16:19:19	R1	0.97	0.056	0.056	0.017	0.033	501	501	17943	17943	151	151	0.95	0.95
	3/1/24	16:20:19	R1	1.00	0.041	0.041	0.017	0.033	503	503	17950	17950	151	151	0.95	0.95
	3/1/24	16:21:20	R1	1.02	0.048	0.048	0.017	0.033	501	501	17917	17917	151	151	0.95	0.95
	3/1/24	16:22:19	R1	0.98	0.048	0.048	0.017	0.033	503	503	17887	17887	151	151	0.95	0.95
	3/1/24	16:23:20	R1	1.02	0.054	0.054	0.017	0.033	502	502	17935	17935	151	151	0.95	0.95
	3/1/24	16:24:19	R1	0.98	0.048	0.048	0.017	0.033	502	502	17933	17933	151	151	0.95	0.95
	3/1/24	16:25:19	R1	1.00	0.041	0.041	0.017	0.033	502	502	17991	17991	151	151	0.95	0.95
	3/1/24	16:26:19	R1	1.00	0.041	0.041	0.017	0.033	496	496	17930	17930	151	151	0.95	0.95
	3/1/24	16:27:19	R1	1.00	0.045	0.045	0.017	0.033	504	504	17948	17948	151	151	0.95	0.95
	3/1/24	16:28:19	R1	1.00	0.048	0.048	0.017	0.033	502	502	17964	17964	151	151	0.95	0.95
	3/1/24	16:29:19	R1	1.00	0.046	0.046	0.017	0.033	495	495	17916	17916	151	151	0.95	0.95
	3/1/24	16:30:19	R2	1.00	0.051	0.051	0.017	0.033	498	498	17876	17876	151	151	0.95	0.95
	3/1/24	16:31:21	R2	1.03	0.029	0.029	0.017	0.033	505	505	17970	17970	151	151	0.95	0.95
	3/1/24	16:32:22	R2	1.02	0.041	0.041	0.017	0.033	503	503	17864	17864	151	151	0.95	0.95
	3/1/24	16:33:21	R2	0.98	0.038	0.038	0.017	0.033	502	502	17827	17827	151	151	0.95	0.95
	3/1/24	16:34:22	R2	1.02	0.042	0.042	0.017	0.033	505	505	17923	17923	151	151	0.95	0.95
	3/1/24	16:35:21	R2	0.98	0.012	0.025	0.017	0.033	503	503	17890	17890	151	151	0.95	0.95
	3/1/24	16:36:19	R2	0.97	0.030	0.030	0.017	0.033	498	498	17928	17928	151	151	0.95	0.95
	3/1/24	16:37:19	R2	1.00	0.048	0.048	0.017	0.033	498	498	17944	17944	151	151	0.95	0.95
	3/1/24	16:38:19	R2	1.00	0.033	0.033	0.017	0.033	503	503	17959	17959	151	151	0.95	0.95
	3/1/24	16:39:19	R2	1.00	0.042	0.042	0.017	0.033	504	504	17950	17950	151	151	0.95	0.95
	3/1/24	16:40:19	R2	1.00	0.039	0.039	0.017	0.033	502	502	17927	17927	151	151	0.95	0.95
	3/1/24	16:41:22	R2	1.05	0.040	0.040	0.017	0.033	500	500	17971	17971	151	151	0.95	0.95
	3/1/24	16:42:19	R2	0.95	0.026	0.026	0.017	0.033	502	502	18047	18047	151	151	0.95	0.95
	3/1/24	16:43:19	R2	1.00	0.040	0.040	0.017	0.033	505	505	18009	18009	151	151	0.95	0.95
	3/1/24	16:44:19	R2	1.00	0.039	0.039	0.017	0.033	504	504	17973	17973	151	151	0.95	0.95
	3/1/24	16:45:21	R2	1.03	0.038	0.038	0.017	0.033	507	507	18019	18019	151	151	0.95	0.95
	3/1/24	16:46:19	R2	0.97	0.038	0.038	0.017	0.033	504	504	18117	18117	151	151	0.95	0.95
	3/1/24	16:47:22	R2	1.05	0.031	0.031	0.017	0.033	503	503	18012	18012	151	151	0.95	0.95
	3/1/24	16:48:19	R2	0.95	0.038	0.038	0.017	0.033	502	502	17965	17965	151	151	0.95	0.95
	3/1/24	16:49:19	R2	1.00	0.038	0.038	0.017	0.033	501	501	18029	18029	151	151	0.95	0.95
	3/1/24	16:50:20	R2	1.02	0.049	0.049	0.017	0.033	503	503	17943	17943	151	151	0.95	0.95
	3/1/24	16:51:19	R2	0.98	0.036	0.036	0.017	0.033	506	506	17962	17962	151	151	0.95	0.95
	3/1/24	16:52:21	R2	1.03	0.034	0.034	0.017	0.033	505	505	18073	18073	151	151	0.95	0.95
	3/1/24	16:53:20	R2	0.98	0.034	0.034	0.017	0.033	508	508	18083	18083	151	151	0.95	0.95
	3/1/24	16:54:19	R2	0.98	0.033	0.033	0.017	0.033	504	504	18058	18058	151	151	0.95	0.95
	3/1/24	16:55:19	R2	1.00	0.034	0.034	0.017	0.033	500	500	18039	18039	151	151	0.95	0.95
	3/1/24	16:56:19	R2	1.00	0.036	0.036	0.017	0.033	506	506	18044	18044	151	151	0.95	0.95
	3/1/24	16:57:22	R2	1.05	0.025	0.025	0.017	0.033	502	502	18061	18061	151	151	0.95	0.95
	3/1/24	16:58:19	R2	0.95	0.037	0.037	0.017	0.033	506	506	18020	18020	151	151	0.95	0.95
	3/1/24	16:59:22	R2	1.05	0.033	0.033	0.017	0.033	505	505	18117	18117	151	151	0.95	0.95
	3/1/24	17:00:19	R2	0.95	0.029	0.029	0.017	0.033	507	507	18083	18083	151	151	0.95	0.95
	3/1/24	17:01:19	R2	1.00	0.034	0.034	0.017	0.033	509	509	18050	18050	151	151	0.95	0.95
	3/1/24	17:02:19	R2	1.00	0.039	0.039	0.017	0.033	507	507	18050	18050	151	151	0.95	0.95
	3/1/24	17:03:19	R2	1.00	0.045	0.045	0.017	0.033	507	507	18152	18152	151	151	0.95	0.95
	3/1/24	17:04:19	R2	1.00	0.030	0.030	0.017	0.033	507	507	18115	18115	151	151	0.95	0.95
	3/1/24	17:05:19	R2	1.00	0.012	0.025	0.017	0.033	506	506	18073	18073	151	151	0.95	0.95
	3/1/24	17:06:19	R2	1.00	0.032	0.032	0.017	0.033	511	511	17899	17899	151	151	0.95	0.95
	3/1/24	17:07:19	R2	1.00	0.030	0.030	0.017	0.033	518	518	17198	17198	151	151	0.95	0.95
	3/1/24	17:08:19	R2	1.00	0.029	0.029	0.017	0.033	516	516	17220	17220	151	151	0.95	0.95
	3/1/24	17:09:21	R2	1.03	0.032	0.032	0.017	0.033	509	509	17245	17245	151	151	0.95	0.95
	3/1/24	17:10:19	R2	0.97	0.037	0.037	0.017	0.033	509	509	17379	17379	151	151	0.95	0.95
	3/1/24	17:11:21	R2	1.03	0.051	0.051	0.017	0.033	513	513	17982	17982	151	151	0.95	0.95
	3/1/24	17:12:19	R2	0.97	0.046	0.046	0.017	0.033	507	507	18126	18126	151	151	0.95	0.95
	3/1/24	17:13:19	R2	1.00	0.043	0.043	0.017	0.033	507	507	17806	17806	151	151	0.95	0.95
	3/1/24	17:14:21	R2	1.03	0.046	0.046	0.017	0.033	503	503	17841	17841	151	151	0.95	0.95
	3/1/24	17:15:19	R2	0.97	0.045	0.045	0.017	0.033	503	503	18225	18225	151	151	0.95	0.95

	Unitname	Location	Condition	HCl Summary	HCl Summary	HF Summary	HF Summary	CO2 Summary	CO2 Summary	H2O Summary	H2O Summary	Temp(C) Summary	Temp(C) Summary	Press(atm) Summary	Press(atm) Summary
	PES_003	Outlet	Scrubber												
Run Length			Minimum	0.041	0.041	BDL	BDL	494	494	17769	17769	150	150	0.95	0.95
60.0 (min)	Run 1	Conc. (ppmv)	Maximum	0.11	0.11	BDL	BDL	507	507	18048	18048	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.071	0.071	0.017	0.017	501	501	17910	17910	151	151	0.95	0.95
			(BDL = MDL) Average	0.071	0.071	0.033	0.033	501	501	17910	17910	151	151	0.95	0.95
		(Volume)	MDL	NA	NA	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
Run Length			Minimum	BDL	BDL	BDL	BDL	498	498	17198	17198	151	151	0.95	0.95
60.0 (min)	Run 2	Conc. (ppmv)	Maximum	0.054	0.054	BDL	BDL	518	518	18225	18225	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.036	0.036	0.017	0.017	505	505	17984	17984	151	151	0.95	0.95
			(BDL = MDL) Average	0.037	0.037	0.033	0.033	505	505	17984	17984	151	151	0.95	0.95
		(Volume)	MDL												
Run Length				BDL	BDL	BDL	BDL	500	500	17660	17660	151	151	0.94	0.94
60.0 (min)	Run 3	Conc. (ppmv)	Maximum	0.084	0.084	BDL	BDL	518	518	18130	18130	151	151	0.95	0.95
			(BDL = 1/2MDL) Average	0.060	0.060	0.017	0.017	509	509	18019	18019	151	151	0.94	0.94
			(BDL = MDL) Average	0.060	0.060	0.033	0.033	509	509	18019	18019	151	151	0.94	0.94
		(Volume)	MDL	0.025	0.025	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA
			Minimum	BDL	BDL	BDL	BDL	494	494	17198	17198	150	150	0.94	0.94
(min)			Maximum	0.11	0.11	BDL	BDL	518	518	18225	18225	151	151	0.95	0.95
	Test Results	Conc. (ppmv)	(BDL = 1/2MDL) Average	0.055	0.055	0.017	0.017	505	505	17971	17971	151	151	0.95	0.95
			(BDL = MDL) Average	0.056	0.056	0.033	0.033	505	505	17971	17971	151	151	0.95	0.95
		(Volume)	MDL	0.025	0.025	0.033	0.033	NA	NA	NA	NA	NA	NA	NA	NA

				HCl 1-min data		HF 1-min data		CO2 1-min data		H2O 1-min data		Temp(C) 1-min data		Press(atm) 1-min data	
Date	Time	Run	Scan Length	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=1/2MDL	Conc. (ppm) BDL=MDL
3/1/24	17:16:19	R2	1.00	0.037	0.037	0.017	0.033	503	503	18193	18193	151	151	0.95	0.95
3/1/24	17:17:19	R2	1.00	0.046	0.046	0.017	0.033	501	501	18128	18128	151	151	0.95	0.95
3/1/24	17:18:21	R2	1.03	0.049	0.049	0.017	0.033	508	508	18203	18203	151	151	0.95	0.95
3/1/24	17:19:19	R2	0.97	0.054	0.054	0.017	0.033	509	509	18138	18138	151	151	0.95	0.95
3/1/24	17:20:19	R2	1.00	0.037	0.037	0.017	0.033	507	507	18112	18112	151	151	0.95	0.95
3/1/24	17:21:19	R2	1.00	0.030	0.030	0.017	0.033	509	509	18209	18209	151	151	0.95	0.95
3/1/24	17:22:19	R2	1.00	0.032	0.032	0.017	0.033	508	508	18175	18175	151	151	0.95	0.95
3/1/24	17:23:19	R2	1.00	0.029	0.029	0.017	0.033	511	511	18111	18111	151	151	0.95	0.95
3/1/24	17:24:19	R2	1.00	0.035	0.035	0.017	0.033	501	501	18087	18087	151	151	0.95	0.95
3/1/24	17:25:19	R2	1.00	0.042	0.042	0.017	0.033	507	507	18144	18144	151	151	0.95	0.95
3/1/24	17:26:19	R2	1.00	0.039	0.039	0.017	0.033	505	505	18142	18142	151	151	0.95	0.95
3/1/24	17:27:20	R2	1.02	0.027	0.027	0.017	0.033	507	507	18109	18109	151	151	0.95	0.95
3/1/24	17:28:19	R2	0.98	0.012	0.025	0.017	0.033	512	512	18109	18109	151	151	0.95	0.95
3/1/24	17:29:19	R2	1.00	0.012	0.025	0.017	0.033	507	507	18132	18132	151	151	0.95	0.95
3/1/24	17:30:19	R3	1.00	0.012	0.025	0.017	0.033	505	505	18062	18062	151	151	0.95	0.95
3/1/24	17:31:22	R3	1.05	0.032	0.032	0.017	0.033	507	507	18087	18087	151	151	0.94	0.94
3/1/24	17:32:19	R3	0.95	0.041	0.041	0.017	0.033	509	509	18063	18063	151	151	0.94	0.94
3/1/24	17:33:19	R3	1.00	0.026	0.026	0.017	0.033	507	507	18129	18129	151	151	0.95	0.95
3/1/24	17:34:19	R3	1.00	0.025	0.025	0.017	0.033	505	505	18072	18072	151	151	0.95	0.95
3/1/24	17:35:19	R3	1.00	0.046	0.046	0.017	0.033	507	507	18052	18052	151	151	0.95	0.95
3/1/24	17:36:19	R3	1.00	0.061	0.061	0.017	0.033	506	506	18100	18100	151	151	0.95	0.95
3/1/24	17:37:20	R3	1.02	0.061	0.061	0.017	0.033	509	509	18084	18084	151	151	0.95	0.95
3/1/24	17:38:19	R3	0.98	0.084	0.084	0.017	0.033	508	508	18068	18068	151	151	0.95	0.95
3/1/24	17:39:19	R3	1.00	0.077	0.077	0.017	0.033	506	506	18015	18015	151	151	0.94	0.94
3/1/24	17:40:19	R3	1.00	0.057	0.057	0.017	0.033	506	506	18035	18035	151	151	0.94	0.94
3/1/24	17:41:19	R3	1.00	0.072	0.072	0.017	0.033	505	505	18021	18021	151	151	0.95	0.95
3/1/24	17:42:19	R3	1.00	0.065	0.065	0.017	0.033	507	507	18029	18029	151	151	0.94	0.94
3/1/24	17:43:19	R3	1.00	0.074	0.074	0.017	0.033	506	506	18063	18063	151	151	0.94	0.94
3/1/24	17:44:20	R3	1.02	0.070	0.070	0.017	0.033	504	504	18028	18028	151	151	0.95	0.95
3/1/24	17:45:19	R3	0.98	0.060	0.060	0.017	0.033	503	503	18029	18029	151	151	0.95	0.95
3/1/24	17:46:24	R3	1.08	0.073	0.073	0.017	0.033	505	505	18066	18066	151	151	0.94	0.94
3/1/24	17:47:19	R3	0.92	0.060	0.060	0.017	0.033	500	500	17941	17941	151	151	0.95	0.95
3/1/24	17:48:19	R3	1.00	0.052	0.052	0.017	0.033	502	502	18016	18016	151	151	0.95	0.95
3/1/24	17:49:19	R3	1.00	0.054	0.054	0.017	0.033	506	506	17973	17973	151	151	0.95	0.95
3/1/24	17:50:19	R3	1.00	0.052	0.052	0.017	0.033	506	506	18059	18059	151	151	0.94	0.94
3/1/24	17:51:20	R3	1.02	0.062	0.062	0.017	0.033	506	506	17981	17981	151	151	0.95	0.95
3/1/24	17:52:21	R3	1.02	0.065	0.065	0.017	0.033	502	502	17924	17924	151	151	0.94	0.94
3/1/24	17:53:19	R3	0.97	0.063	0.063	0.017	0.033	505	505	18025	18025	151	151	0.94	0.94
3/1/24	17:54:20	R3	1.02	0.067	0.067	0.017	0.033	506	506	18016	18016	151	151	0.95	0.95
3/1/24	17:55:19	R3	0.98	0.070	0.070	0.017	0.033	503	503	17961	17961	151	151	0.95	0.95
3/1/24	17:56:19	R3	1.00	0.084	0.084	0.017	0.033	509	509	17744	17744	151	151	0.94	0.94
3/1/24	17:57:19	R3	1.00	0.069	0.069	0.017	0.033	506	506	17677	17677	151	151	0.95	0.95
3/1/24	17:58:19	R3	1.00	0.043	0.043	0.017	0.033	509	509	17660	17660	151	151	0.95	0.95
3/1/24	17:59:19	R3	1.00	0.070	0.070	0.017	0.033	509	509	17664	17664	151	151	0.95	0.95
3/1/24	18:00:19	R3	1.00	0.065	0.065	0.017	0.033	511	511	17749	17749	151	151	0.94	0.94
3/1/24	18:01:22	R3	1.05	0.063	0.063	0.017	0.033	511	511	17960	17960	151	151	0.94	0.94
3/1/24	18:02:19	R3	0.95	0.052	0.052	0.017	0.033	508	508	17998	17998	151	151	0.94	0.94
3/1/24	18:03:19	R3	1.00	0.059	0.059	0.017	0.033	508	508	18013	18013	151	151	0.94	0.94
3/1/24	18:04:19	R3	1.00	0.075	0.075	0.017	0.033	518	518	18119	18119	151	151	0.94	0.94
3/1/24	18:05:20	R3	1.02	0.069	0.069	0.017	0.033	514	514	18054	18054	151	151	0.95	0.95
3/1/24	18:06:19	R3	0.98	0.069	0.069	0.017	0.033	509	509	18021	18021	151	151	0.95	0.95
3/1/24	18:07:19	R3	1.00	0.065	0.065	0.017	0.033	513	513	18073	18073	151	151	0.94	0.94
3/1/24	18:08:19	R3	1.00	0.054	0.054	0.017	0.033	511	511	18123	18123	151	151	0.94	0.94
3/1/24	18:09:19	R3	1.00	0.062	0.062	0.017	0.033	510	510	18026	18026	151	151	0.94	0.94
3/1/24	18:10:19	R3	1.00	0.052	0.052	0.017	0.033	516	516	18023	18023	151	151	0.94	0.94
3/1/24	18:11:19	R3	1.00	0.058	0.058	0.017	0.033	516	516	18087	18087	151	151	0.94	0.94
3/1/24	18:12:19	R3	1.00	0.061	0.061	0.017	0.033	514	514	18036	18036	151	151	0.94	0.94
3/1/24	18:13:19	R3	1.00	0.063	0.063	0.017	0.033	512	512	18043	18043	151	151	0.94	0.94
3/1/24	18:14:22	R3	1.05	0.061	0.061	0.017	0.033	507	507	18122	18122	151	151	0.94	0.94
3/1/24	18:15:19	R3	0.95	0.069	0.069	0.017	0.033	512	512	18112	18112	151	151	0.94	0.94
3/1/24	18:16:19	R3	1.00	0.059	0.059	0.017	0.033	513	513	18117	18117	151	151	0.94	0.94
3/1/24	18:17:21	R3	1.03	0.066	0.066	0.017	0.033	508	508	18087	18087	151	151	0.95	0.95
3/1/24	18:18:19	R3	0.97	0.057	0.057	0.017	0.033	510	510	18080	18080	151	151	0.94	0.94
3/1/24	18:19:19	R3	1.00	0.067	0.067	0.017	0.033	509	509	18083	18083	151	151	0.94	0.94
3/1/24	18:20:19	R3	1.00	0.068	0.068	0.017	0.033	511	511	18036	18036	151	151	0.94	0.94
3/1/24	18:21:19	R3	1.00	0.063	0.063	0.017	0.033	518	518	18054	18054	151	151	0.94	0.94
3/1/24	18:22:19	R3	1.00	0.060	0.060	0.017	0.033	512	512	18112	18112	151	151	0.94	0.94
3/1/24	18:23:19	R3	1.00	0.070	0.070	0.017	0.033	514	514	18101	18101	151	151	0.95	0.95
3/1/24	18:24:22	R3	1.05	0.059	0.059	0.017	0.033	517	517	18039	18039	151	151	0.95	0.95
3/1/24	18:25:19	R3	0.95	0.049	0.049	0.017	0.033	515	515	18086	18086	151	151	0.94	0.94
3/1/24	18:26:19	R3	1.00	0.050	0.050	0.017	0.033	516	516	18130	18130	151	151	0.94	0.94
3/1/24	18:27:21	R3	1.03	0.045	0.045	0.017	0.033	514	514	18082	18082	151	151	0.94	0.94
3/1/24	18:28:20	R3	0.98	0.057	0.057	0.017	0.033	514	514	17855	17855	151	151	0.94	0.94
3/1/24	18:29:19	R3	0.98	0.063	0.063	0.017	0.033	511	511	18057	18057	151	151	0.94	0.94

	Unitname	Location	Condition	Carbon Summary	Hydrochloric Summary	Hydrofluoric Summary	H2O Summary	Temp(C) Summary	Press(atm) Summary
	PES_005	Outlet	Scrubber						
Run Length 61.0 (min)	Run 1	Conc. (ppmv)	Minimum	784	BDL	BDL	15678	151	0.97
			Maximum	853	0.060	0.22	16251	152	0.97
			(BDL = MDL) Average	826	0.037	0.10	16049	152	0.97
			MDL	NA	0.015	0.090	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	843	0.033	BDL	16189	152	0.97
			Maximum	907	0.075	0.35	16457	152	0.97
			(BDL = MDL) Average	864	0.057	0.22	16373	152	0.97
			MDL	NA	NA	0.090	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	857	0.027	0.13	16364	152	0.97
			Maximum						
				875	0.052	0.24	16434	152	0.97
			MDL	NA	NA	NA	NA	NA	NA
Test Length 181 (min)	Test Results	Conc. (ppmv)	Minimum	784	BDL	BDL	15678	151	0.97
			Maximum	907	0.082	0.36	16490	152	0.97
			(BDL = MDL) Average	855	0.049	0.19	16285	152	0.97
			MDL	NA	0.015	0.090	NA	NA	NA

Meas. Flow Rate (lpm) 0

Date	Time	Run	0 Scan Length	Carbon 1-min data Conc. (ppm) BDL=MDL	Hydrochloric 1-min data Conc. (ppm) BDL=MDL	Hydrofluoric 1-min data Conc. (ppm) BDL=MDL	H2O 1-min data Conc. (ppm) BDL=MDL	Temp(C) 1-min data Conc. (ppm) BDL=MDL	Press(atm) 1-min data Conc. (ppm) BDL=MDL
3/5/24	18:51:11	R1	1.00	784	0.019	0.090	16095	151	0.97
3/5/24	18:52:08	R1	0.95	806	0.020	0.090	16120	151	0.97
3/5/24	18:53:08	R1	1.00	808	0.030	0.090	16116	151	0.97
3/5/24	18:54:08	R1	1.00	796	0.022	0.090	16125	151	0.97
3/5/24	18:55:11	R1	1.05	807	0.020	0.090	16083	151	0.97
3/5/24	18:56:08	R1	0.95	816	0.025	0.090	16122	151	0.97
3/5/24	18:57:08	R1	1.00	814	0.023	0.090	16117	151	0.97
3/5/24	18:58:08	R1	1.00	822	0.015	0.090	16111	151	0.97
3/5/24	18:59:08	R1	1.00	803	0.037	0.090	16143	152	0.97
3/5/24	19:00:09	R1	1.02	814	0.027	0.090	16096	152	0.97
3/5/24	19:01:08	R1	0.98	818	0.027	0.090	16092	152	0.97
3/5/24	19:02:08	R1	1.00	815	0.037	0.090	16105	152	0.97
3/5/24	19:03:08	R1	1.00	810	0.042	0.090	16128	152	0.97
3/5/24	19:04:08	R1	1.00	820	0.031	0.090	16113	152	0.97
3/5/24	19:05:08	R1	1.00	825	0.038	0.090	16106	152	0.97
3/5/24	19:06:08	R1	1.00	838	0.041	0.090	16124	152	0.97
3/5/24	19:07:08	R1	1.00	815	0.015	0.090	16112	152	0.97
3/5/24	19:08:08	R1	1.00	820	0.032	0.090	16140	152	0.97
3/5/24	19:09:08	R1	1.00	822	0.040	0.090	16128	152	0.97
3/5/24	19:10:08	R1	1.00	837	0.025	0.090	16131	152	0.97
3/5/24	19:11:08	R1	1.00	813	0.032	0.090	16179	152	0.97
3/5/24	19:12:08	R1	1.00	809	0.035	0.090	16151	152	0.97
3/5/24	19:13:08	R1	1.00	830	0.030	0.090	16161	152	0.97
3/5/24	19:14:08	R1	1.00	834	0.033	0.090	16166	152	0.97
3/5/24	19:15:08	R1	1.00	833	0.035	0.090	16090	152	0.97
3/5/24	19:16:09	R1	1.02	828	0.031	0.090	16083	152	0.97
3/5/24	19:17:08	R1	0.98	840	0.034	0.090	16228	152	0.97
3/5/24	19:18:08	R1	1.00	830	0.045	0.090	16079	152	0.97
3/5/24	19:19:08	R1	1.00	822	0.039	0.090	16102	152	0.97
3/5/24	19:20:08	R1	1.00	818	0.040	0.12	16094	152	0.97
3/5/24	19:21:08	R1	1.00	830	0.049	0.090	16069	152	0.97
3/5/24	19:22:10	R1	1.03	833	0.034	0.090	16103	152	0.97
3/5/24	19:23:08	R1	0.97	826	0.040	0.090	16069	152	0.97
3/5/24	19:24:08	R1	1.00	810	0.022	0.090	16091	152	0.97
3/5/24	19:25:08	R1	1.00	820	0.038	0.090	16105	152	0.97
3/5/24	19:26:11	R1	1.05	830	0.039	0.090	16112	152	0.97
3/5/24	19:27:10	R1	0.98	834	0.034	0.090	16146	152	0.97
3/5/24	19:28:08	R1	0.97	823	0.042	0.090	16113	152	0.97
3/5/24	19:29:11	R1	1.05	833	0.029	0.11	16078	152	0.97
3/5/24	19:30:14	R1	1.05	829	0.044	0.13	16090	152	0.97
3/5/24	19:31:13	R1	0.98	823	0.040	0.22	15951	152	0.97
3/5/24	19:32:08	R1	0.92	811	0.047	0.18	15859	152	0.97
3/5/24	19:33:08	R1	1.00	827	0.034	0.19	15771	152	0.97
3/5/24	19:34:11	R1	1.05	834	0.043	0.19	15748	152	0.97
3/5/24	19:35:08	R1	0.95	818	0.029	0.15	15678	152	0.97
3/5/24	19:36:08	R1	1.00	821	0.057	0.13	15703	152	0.97
3/5/24	19:37:08	R1	1.00	826	0.044	0.14	15735	152	0.97
3/5/24	19:38:09	R1	1.02	823	0.031	0.12	15728	152	0.97
3/5/24	19:39:11	R1	1.03	843	0.047	0.12	15743	152	0.97
3/5/24	19:40:08	R1	0.95	832	0.048	0.12	15767	152	0.97
3/5/24	19:41:08	R1	1.00	844	0.052	0.094	15821	152	0.97
3/5/24	19:42:08	R1	1.00	851	0.045	0.11	15833	152	0.97
3/5/24	19:43:09	R1	1.02	847	0.048	0.12	16015	152	0.97
3/5/24	19:44:08	R1	0.98	845	0.054	0.096	16251	152	0.97
3/5/24	19:45:10	R1	1.03	838	0.049	0.090	16222	152	0.97
3/5/24	19:46:08	R1	0.97	845	0.050	0.10	16143	152	0.97
3/5/24	19:47:10	R1	1.03	844	0.052	0.12	16083	152	0.97
3/5/24	19:48:10	R1	1.00	842	0.059	0.11	16009	152	0.97
3/5/24	19:49:08	R1	0.97	833	0.047	0.11	16018	152	0.97
3/5/24	19:50:08	R1	1.00	843	0.054	0.10	16176	152	0.97
3/5/24	19:51:09	R1	1.02	853	0.060	0.096	16138	152	0.97
3/5/24	19:52:08	R2	0.98	851	0.057	0.090	16189	152	0.97
3/5/24	19:53:10	R2	1.03	851	0.060	0.11	16223	152	0.97
3/5/24	19:54:08	R2	0.97	843	0.040	0.11	16201	152	0.97
3/5/24	19:55:08	R2	1.00	895	0.056	0.17	16246	152	0.97
3/5/24	19:56:10	R2	1.03	893	0.060	0.17	16247	152	0.97
3/5/24	19:57:08	R2	0.97	851	0.045	0.18	16277	152	0.97
3/5/24	19:58:08	R2	1.00	862	0.060	0.17	16231	152	0.97
3/5/24	19:59:08	R2	1.00	873	0.042	0.14	16268	152	0.97
3/5/24	20:00:08	R2	1.00	850	0.044	0.12	16285	152	0.97
3/5/24	20:01:08	R2	1.00	862	0.057	0.15	16322	152	0.97
3/5/24	20:02:12	R2	1.07	863	0.053	0.13	16339	152	0.97
3/5/24	20:03:09	R2	0.95	863	0.056	0.15	16370	152	0.97
3/5/24	20:04:08	R2	0.98	868	0.063	0.16	16353	152	0.97
3/5/24	20:05:08	R2	1.00	843	0.060	0.14	16308	152	0.97
3/5/24	20:06:14	R2	1.10	847	0.071	0.15	16396	152	0.97
3/5/24	20:07:08	R2	0.90	862	0.059	0.15	16345	152	0.97
3/5/24	20:08:10	R2	1.03	851	0.052	0.14	16368	152	0.97
3/5/24	20:09:09	R2	0.98	859	0.063	0.19	16394	152	0.97
3/5/24	20:10:11	R2	1.03	849	0.048	0.23	16335	152	0.97
3/5/24	20:11:11	R2	1.00	872	0.062	0.28	16310	152	0.97
3/5/24	20:12:14	R2	1.05	871	0.058	0.35	16356	152	0.97
3/5/24	20:13:11	R2	0.95	875	0.058	0.32	16360	152	0.97
3/5/24	20:14:08	R2	0.95	885	0.033	0.27	16372	152	0.97
3/5/24	20:15:08	R2	1.00	885	0.052	0.28	16398	152	0.97
3/5/24	20:16:08	R2	1.00	862	0.053	0.25	16369	152	0.97
3/5/24	20:17:11	R2	1.05	861	0.058	0.23	16376	152	0.97
3/5/24	20:18:09	R2	0.97	846	0.063	0.24	16398	152	0.97
3/5/24	20:19:08	R2	0.98	860	0.051	0.23	16390	152	0.97
3/5/24	20:20:08	R2	1.00	863	0.066	0.24	16403	152	0.97
3/5/24	20:21:08	R2	1.00	857	0.058	0.23	16362	152	0.97
3/5/24	20:22:08	R2	1.00	855	0.057	0.20	16412	152	0.97
3/5/24	20:23:12	R2	1.07	852	0.057	0.24	16411	152	0.97
3/5/24	20:24:08	R2	0.93	861	0.058	0.24	16430	152	0.97
3/5/24	20:25:10	R2	1.03	861	0.060	0.21	16403	152	0.97
3/5/24	20:26:08	R2	0.97	851	0.047	0.24	16427	152	0.97
3/5/24	20:27:08	R2	1.00	851	0.060	0.23	16404	152	0.97
3/5/24	20:28:08	R2	1.00	862	0.061	0.22	16425	152	0.97
3/5/24	20:29:10	R2	1.03	861	0.051	0.26	16445	152	0.97
3/5/24	20:30:08	R2	0.97	855	0.051	0.22	16412	152	0.97
3/5/24	20:31:08	R2	1.00	864	0.066	0.26	16416	152	0.97

	Unitname	Location	Condition	Carbon Summary	Hydrochloric Summary	Hydrofluoric Summary	H2O Summary	Temp(C) Summary	Press(atm) Summary
	PES_005	Outlet	Scrubber						
Run Length 61.0 (min)	Run 1	Conc. (ppmv)	Minimum	784	BDL	BDL	15678	151	0.97
			Maximum	853	0.060	0.22	16251	152	0.97
			(BDL = MDL) Average	826	0.037	0.10	16049	152	0.97
			MDL	NA	0.015	0.090	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	843	0.033	BDL	16189	152	0.97
			Maximum	907	0.075	0.35	16457	152	0.97
			(BDL = MDL) Average	864	0.057	0.22	16373	152	0.97
			MDL	NA	NA	0.090	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	857	0.027	0.13	16364	152	0.97
			Maximum						
				875	0.052	0.24	16434	152	0.97
			MDL	NA	NA	NA	NA	NA	NA
Test Length 181 (min)	Test Results	Conc. (ppmv)	Minimum	784	BDL	BDL	15678	151	0.97
			Maximum	907	0.082	0.36	16490	152	0.97
			(BDL = MDL) Average	855	0.049	0.19	16285	152	0.97
			MDL	NA	0.015	0.090	NA	NA	NA

Meas. Flow Rate (lpm)	0			Carbon 1-min data	Hydrochloric 1-min data	Hydrofluoric 1-min data	H2O 1-min data	Temp(C) 1-min data	Press(atm) 1-min data
			0	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=MDL	Conc. (ppm) BDL=MDL
Date	Time	Run	Scan Length						
3/5/24	20:32:13	R2	1.08	860	0.059	0.24	16395	152	0.97
3/5/24	20:33:11	R2	0.97	870	0.075	0.27	16386	152	0.97
3/5/24	20:34:08	R2	0.95	885	0.071	0.35	16417	152	0.97
3/5/24	20:35:10	R2	1.03	880	0.057	0.32	16449	152	0.97
3/5/24	20:36:11	R2	1.02	875	0.057	0.29	16446	152	0.97
3/5/24	20:37:08	R2	0.95	851	0.073	0.32	16435	152	0.97
3/5/24	20:38:08	R2	1.00	844	0.060	0.31	16415	152	0.97
3/5/24	20:39:11	R2	1.05	872	0.053	0.28	16413	152	0.97
3/5/24	20:40:08	R2	0.95	872	0.047	0.25	16457	152	0.97
3/5/24	20:41:08	R2	1.00	907	0.066	0.29	16411	152	0.97
3/5/24	20:42:08	R2	1.00	895	0.055	0.23	16411	152	0.97
3/5/24	20:43:08	R2	1.00	861	0.058	0.28	16382	152	0.97
3/5/24	20:44:08	R2	1.00	861	0.053	0.26	16418	152	0.97
3/5/24	20:45:08	R2	1.00	864	0.055	0.26	16429	152	0.97
3/5/24	20:46:08	R2	1.00	871	0.062	0.30	16444	152	0.97
3/5/24	20:47:08	R2	1.00	857	0.053	0.23	16425	152	0.97
3/5/24	20:48:08	R2	1.00	858	0.049	0.22	16413	152	0.97
3/5/24	20:49:11	R2	1.05	868	0.070	0.23	16398	152	0.97
3/5/24	20:50:08	R2	0.95	867	0.053	0.19	16418	152	0.97
3/5/24	20:51:08	R2	1.00	859	0.065	0.20	16425	152	0.97
3/5/24	20:52:08	R3	1.00	866	0.074	0.25	16425	152	0.97
3/5/24	20:53:08	R3	1.00	884	0.063	0.25	16428	152	0.97
3/5/24	20:54:08	R3	1.00	883	0.082	0.32	16416	152	0.97
3/5/24	20:55:08	R3	1.00	876	0.070	0.36	16419	152	0.97
3/5/24	20:56:10	R3	1.03	861	0.074	0.31	16432	152	0.97
3/5/24	20:57:08	R3	0.97	874	0.076	0.34	16437	152	0.97
3/5/24	20:58:08	R3	1.00	868	0.068	0.30	16418	152	0.97
3/5/24	20:59:08	R3	1.00	862	0.066	0.24	16444	152	0.97
3/5/24	21:00:08	R3	1.00	863	0.082	0.25	16417	152	0.97
3/5/24	21:01:08	R3	1.00	873	0.057	0.22	16422	152	0.97
3/5/24	21:02:08	R3	1.00	878	0.073	0.21	16430	152	0.97
3/5/24	21:03:08	R3	1.00	866	0.078	0.23	16406	152	0.97
3/5/24	21:04:08	R3	1.00	860	0.069	0.26	16439	152	0.97
3/5/24	21:05:08	R3	1.00	864	0.054	0.27	16431	152	0.97
3/5/24	21:06:09	R3	1.02	871	0.065	0.29	16420	152	0.97
3/5/24	21:07:10	R3	1.02	872	0.049	0.26	16405	152	0.97
3/5/24	21:08:08	R3	0.97	870	0.054	0.24	16416	152	0.97
3/5/24	21:09:08	R3	1.00	859	0.051	0.28	16427	152	0.97
3/5/24	21:10:08	R3	1.00	870	0.057	0.24	16435	152	0.97
3/5/24	21:11:08	R3	1.00	874	0.047	0.24	16443	152	0.97
3/5/24	21:12:08	R3	1.00	869	0.056	0.27	16412	152	0.97
3/5/24	21:13:12	R3	1.07	868	0.049	0.22	16379	152	0.97
3/5/24	21:14:08	R3	0.93	881	0.030	0.21	16410	152	0.97
3/5/24	21:15:08	R3	1.00	877	0.057	0.26	16421	152	0.97
3/5/24	21:16:08	R3	1.00	885	0.047	0.26	16435	152	0.97
3/5/24	21:17:08	R3	1.00	882	0.043	0.26	16364	152	0.97
3/5/24	21:18:09	R3	1.02	882	0.055	0.23	16441	152	0.97
3/5/24	21:19:08	R3	0.98	876	0.051	0.24	16437	152	0.97
3/5/24	21:20:08	R3	1.00	876	0.060	0.22	16427	152	0.97
3/5/24	21:21:08	R3	1.00	879	0.042	0.19	16420	152	0.97
3/5/24	21:22:08	R3	1.00	883	0.036	0.17	16459	152	0.97
3/5/24	21:23:08	R3	1.00	879	0.042	0.17	16446	152	0.97
3/5/24	21:24:10	R3	1.03	877	0.041	0.15	16413	152	0.97
3/5/24	21:25:14	R3	1.07	870	0.048	0.16	16415	152	0.97
3/5/24	21:26:08	R3	0.90	881	0.049	0.15	16426	152	0.97
3/5/24	21:27:08	R3	1.00	883	0.042	0.16	16408	152	0.97
3/5/24	21:28:08	R3	1.00	857	0.048	0.13	16394	152	0.97
3/5/24	21:29:08	R3	1.00	879	0.027	0.20	16430	152	0.97
3/5/24	21:30:08	R3	1.00	872	0.047	0.25	16422	152	0.97
3/5/24	21:31:11	R3	1.05	875	0.049	0.30	16436	152	0.97
3/5/24	21:32:08	R3	0.95	876	0.046	0.33	16456	152	0.97
3/5/24	21:33:08	R3	1.00	890	0.046	0.29	16430	152	0.97
3/5/24	21:34:08	R3	1.00	880	0.035	0.26	16422	152	0.97
3/5/24	21:35:11	R3	1.05	875	0.028	0.24	16460	152	0.97
3/5/24	21:36:11	R3	1.00	871	0.043	0.21	16490	152	0.97
3/5/24	21:37:08	R3	0.95	879	0.040	0.21	16454	152	0.97
3/5/24	21:38:08	R3	1.00	882	0.038	0.19	16430	152	0.97
3/5/24	21:39:10	R3	1.03	884	0.043	0.23	16463	152	0.97
3/5/24	21:40:08	R3	0.97	867	0.047	0.23	16435	152	0.97
3/5/24	21:41:14	R3	1.10	872	0.054	0.26	16448	152	0.97
3/5/24	21:42:08	R3	0.90	872	0.059	0.29	16485	152	0.97
3/5/24	21:43:08	R3	1.00	890	0.046	0.25	16484	152	0.97
3/5/24	21:44:08	R3	1.00	890	0.047	0.26	16471	152	0.97
3/5/24	21:45:10	R3	1.03	882	0.056	0.28	16468	152	0.97
3/5/24	21:46:08	R3	0.97	869	0.050	0.25	16469	152	0.97
3/5/24	21:47:08	R3	1.00	870	0.049	0.25	16476	152	0.97
3/5/24	21:48:08	R3	1.00	869	0.051	0.26	16455	152	0.97
3/5/24	21:49:08	R3	1.00	873	0.039	0.24	16436	152	0.97
3/5/24	21:50:11	R3	1.05	884	0.044	0.28	16449	152	0.97
3/5/24	21:51:08	R3	0.95	883	0.040	0.29	16433	152	0.97

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Press(atm) Summary
	PES_006	Outlet	Scrubber					
Run Length 60.0 (min)	Run 1	Conc. (ppmv)	Minimum	865	0.026	0.026	15462	0.98
			Maximum	904	0.057	0.097	15735	0.98
			(BDL = MDL) Average	881	0.043	0.067	15620	0.98
			MDL	NA	NA	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	867	0.039	0.026	15590	0.98
			Maximum	902	0.067	0.084	15848	0.98
			(BDL = MDL) Average	886	0.054	0.055	15676	0.98
			MDL	NA	NA	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	868	0.040	0.051	15407	0.98
			Maximum					
				883	0.055	0.088	15573	0.98
			MDL	NA	NA	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	865	0.026	0.026	15407	0.98
			Maximum	904	0.089	0.12	15848	0.98
			(BDL = MDL) Average	883	0.051	0.070	15623	0.98
			MDL	NA	NA	NA	NA	NA

	Date	Time	Run	Scan Length	CO2 1-min data Conc. (ppm) BDL=MDL	HCl 1-min data Conc. (ppm) BDL=MDL	HF 1-min data Conc. (ppm) BDL=MDL	H2O 1-min data Conc. (ppm) BDL=MDL	Press(atm) 1-min data Conc. (ppm) BDL=MDL
	3/6/24	10:23:51	R1	1.00	894	0.044	0.030	15616	0.98
	3/6/24	10:24:53	R1	1.03	896	0.045	0.026	15646	0.98
	3/6/24	10:25:54	R1	1.02	896	0.029	0.026	15664	0.98
	3/6/24	10:26:51	R1	0.95	904	0.037	0.065	15677	0.98
	3/6/24	10:27:51	R1	1.00	894	0.039	0.044	15590	0.98
	3/6/24	10:28:51	R1	1.00	884	0.053	0.054	15615	0.98
	3/6/24	10:29:51	R1	1.00	889	0.037	0.058	15629	0.98
	3/6/24	10:30:51	R1	1.00	891	0.044	0.055	15624	0.98
	3/6/24	10:31:52	R1	1.02	891	0.037	0.028	15677	0.98
	3/6/24	10:32:51	R1	0.98	886	0.045	0.095	15607	0.98
	3/6/24	10:33:51	R1	1.00	883	0.041	0.071	15606	0.98
	3/6/24	10:34:52	R1	1.02	896	0.037	0.092	15664	0.98
	3/6/24	10:35:51	R1	0.98	883	0.034	0.075	15655	0.98
	3/6/24	10:36:51	R1	1.00	884	0.038	0.058	15627	0.98
	3/6/24	10:37:52	R1	1.02	881	0.041	0.083	15610	0.98
	3/6/24	10:38:53	R1	1.02	886	0.046	0.051	15650	0.98
	3/6/24	10:39:51	R1	0.97	885	0.043	0.080	15673	0.98
	3/6/24	10:40:54	R1	1.05	879	0.037	0.052	15634	0.98
	3/6/24	10:41:53	R1	0.98	869	0.033	0.060	15592	0.98
	3/6/24	10:42:51	R1	0.97	876	0.057	0.083	15629	0.98
	3/6/24	10:43:51	R1	1.00	884	0.043	0.085	15659	0.98
	3/6/24	10:44:53	R1	1.03	880	0.040	0.062	15608	0.98
	3/6/24	10:45:51	R1	0.97	875	0.038	0.079	15577	0.98
	3/6/24	10:46:51	R1	1.00	878	0.047	0.080	15586	0.98
	3/6/24	10:47:51	R1	1.00	872	0.036	0.097	15599	0.98
	3/6/24	10:48:51	R1	1.00	866	0.054	0.094	15462	0.98
	3/6/24	10:49:51	R1	1.00	876	0.053	0.096	15622	0.98
	3/6/24	10:50:52	R1	1.02	876	0.056	0.076	15616	0.98
	3/6/24	10:51:51	R1	0.98	880	0.039	0.075	15650	0.98
	3/6/24	10:52:51	R1	1.00	882	0.040	0.081	15556	0.98
	3/6/24	10:53:51	R1	1.00	880	0.054	0.081	15592	0.98
	3/6/24	10:54:51	R1	1.00	883	0.051	0.073	15569	0.98
	3/6/24	10:55:51	R1	1.00	885	0.026	0.093	15564	0.98
	3/6/24	10:56:51	R1	1.00	883	0.052	0.078	15539	0.98
	3/6/24	10:57:51	R1	1.00	886	0.041	0.060	15506	0.98
	3/6/24	10:58:53	R1	1.03	890	0.051	0.084	15539	0.98
	3/6/24	10:59:51	R1	0.97	886	0.049	0.073	15564	0.98
	3/6/24	11:00:51	R1	1.00	877	0.043	0.080	15582	0.98
	3/6/24	11:01:51	R1	1.00	867	0.037	0.059	15549	0.98
	3/6/24	11:02:53	R1	1.03	870	0.037	0.051	15537	0.98
	3/6/24	11:03:51	R1	0.97	870	0.032	0.032	15518	0.98
	3/6/24	11:04:51	R1	1.00	870	0.039	0.047	15639	0.98
	3/6/24	11:05:54	R1	1.05	879	0.036	0.067	15604	0.98
	3/6/24	11:06:51	R1	0.95	865	0.054	0.061	15573	0.98
	3/6/24	11:07:53	R1	1.03	871	0.049	0.061	15624	0.98
	3/6/24	11:08:52	R1	0.98	874	0.055	0.056	15604	0.98
	3/6/24	11:09:51	R1	0.98	872	0.044	0.069	15651	0.98
	3/6/24	11:10:51	R1	1.00	874	0.041	0.075	15675	0.98
	3/6/24	11:11:53	R1	1.03	872	0.053	0.069	15693	0.98
	3/6/24	11:12:53	R1	1.00	868	0.042	0.069	15658	0.98
	3/6/24	11:13:54	R1	1.02	874	0.048	0.079	15683	0.98
	3/6/24	11:14:51	R1	0.95	875	0.050	0.093	15680	0.98
	3/6/24	11:15:51	R1	1.00	887	0.044	0.064	15730	0.98
	3/6/24	11:16:51	R1	1.00	876	0.041	0.057	15649	0.98
	3/6/24	11:17:53	R1	1.03	881	0.035	0.057	15669	0.98
	3/6/24	11:18:51	R1	0.97	885	0.032	0.093	15652	0.98
	3/6/24	11:19:51	R1	1.00	897	0.039	0.091	15672	0.98
	3/6/24	11:20:54	R1	1.05	883	0.047	0.065	15662	0.98
	3/6/24	11:21:54	R1	1.00	880	0.038	0.057	15688	0.98
	3/6/24	11:22:54	R1	1.00	875	0.041	0.046	15735	0.98
	3/6/24	11:23:53	R2	0.98	876	0.044	0.042	15814	0.98
	3/6/24	11:24:52	R2	0.98	874	0.057	0.068	15698	0.98
	3/6/24	11:25:51	R2	0.98	884	0.045	0.045	15688	0.98
	3/6/24	11:26:54	R2	1.05	875	0.044	0.043	15671	0.98
	3/6/24	11:27:51	R2	0.95	876	0.061	0.031	15719	0.98
	3/6/24	11:28:54	R2	1.05	875	0.039	0.059	15666	0.98
	3/6/24	11:29:57	R2	1.05	877	0.055	0.055	15681	0.98
	3/6/24	11:30:51	R2	0.90	876	0.051	0.057	15657	0.98
	3/6/24	11:31:54	R2	1.05	884	0.045	0.069	15695	0.98
	3/6/24	11:32:51	R2	0.95	890	0.058	0.071	15848	0.98
	3/6/24	11:33:51	R2	1.00	879	0.048	0.062	15694	0.98
	3/6/24	11:34:51	R2	1.00	875	0.046	0.050	15665	0.98
	3/6/24	11:35:51	R2	1.00	876	0.048	0.068	15673	0.98
	3/6/24	11:36:51	R2	1.00	874	0.065	0.056	15674	0.98
	3/6/24	11:37:52	R2	1.02	875	0.064	0.046	15701	0.98
	3/6/24	11:38:52	R2	1.00	880	0.062	0.073	15729	0.98
	3/6/24	11:39:52	R2	1.00	881	0.049	0.050	15710	0.98
	3/6/24	11:40:51	R2	0.98	884	0.045	0.051	15698	0.98
	3/6/24	11:41:51	R2	1.00	878	0.059	0.044	15690	0.98

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Press(atm) Summary
	PES_006	Outlet	Scrubber					
Run Length 60.0 (min)	Run 1	Conc. (ppmv)	Minimum	865	0.026	0.026	15462	0.98
			Maximum	904	0.057	0.097	15735	0.98
			(BDL = MDL) Average	881	0.043	0.067	15620	0.98
			MDL	NA	NA	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	867	0.039	0.026	15590	0.98
			Maximum	902	0.067	0.084	15848	0.98
			(BDL = MDL) Average	886	0.054	0.055	15676	0.98
			MDL	NA	NA	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	868	0.040	0.051	15407	0.98
			Maximum					
				883	0.055	0.088	15573	0.98
			MDL	NA	NA	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	865	0.026	0.026	15407	0.98
			Maximum	904	0.089	0.12	15848	0.98
			(BDL = MDL) Average	883	0.051	0.070	15623	0.98
			MDL	NA	NA	NA	NA	NA

	Date	Time	Run	Scan Length	CO2 1-min data Conc. (ppm) BDL=MDL	HCl 1-min data Conc. (ppm) BDL=MDL	HF 1-min data Conc. (ppm) BDL=MDL	H2O 1-min data Conc. (ppm) BDL=MDL	Press(atm) 1-min data Conc. (ppm) BDL=MDL
	3/6/24	11:42:51	R2	1.00	876	0.061	0.044	15663	0.98
	3/6/24	11:43:51	R2	1.00	874	0.043	0.055	15685	0.98
	3/6/24	11:44:51	R2	1.00	882	0.052	0.054	15691	0.98
	3/6/24	11:45:52	R2	1.02	876	0.056	0.029	15699	0.98
	3/6/24	11:46:54	R2	1.03	884	0.056	0.059	15697	0.98
	3/6/24	11:47:51	R2	0.95	881	0.059	0.049	15654	0.98
	3/6/24	11:48:52	R2	1.02	879	0.050	0.063	15684	0.98
	3/6/24	11:49:51	R2	0.98	881	0.055	0.054	15810	0.98
	3/6/24	11:50:51	R2	1.00	879	0.061	0.066	15694	0.98
	3/6/24	11:51:51	R2	1.00	867	0.060	0.037	15665	0.98
	3/6/24	11:52:51	R2	1.00	882	0.050	0.042	15704	0.98
	3/6/24	11:53:51	R2	1.00	880	0.047	0.046	15706	0.98
	3/6/24	11:54:51	R2	1.00	888	0.067	0.026	15652	0.98
	3/6/24	11:55:51	R2	1.00	881	0.048	0.059	15681	0.98
	3/6/24	11:56:52	R2	1.02	887	0.060	0.063	15670	0.98
	3/6/24	11:57:53	R2	1.02	888	0.059	0.077	15684	0.98
	3/6/24	11:58:51	R2	0.97	897	0.057	0.060	15718	0.98
	3/6/24	11:59:51	R2	1.00	895	0.056	0.058	15732	0.98
	3/6/24	12:00:51	R2	1.00	897	0.051	0.059	15690	0.98
	3/6/24	12:01:51	R2	1.00	896	0.048	0.043	15654	0.98
	3/6/24	12:02:51	R2	1.00	895	0.052	0.044	15653	0.98
	3/6/24	12:03:51	R2	1.00	895	0.060	0.041	15666	0.98
	3/6/24	12:04:51	R2	1.00	897	0.054	0.053	15682	0.98
	3/6/24	12:05:51	R2	1.00	890	0.051	0.053	15660	0.98
	3/6/24	12:06:51	R2	1.00	901	0.050	0.061	15638	0.98
	3/6/24	12:07:51	R2	1.00	900	0.059	0.046	15619	0.98
	3/6/24	12:08:51	R2	1.00	894	0.051	0.058	15637	0.98
	3/6/24	12:09:51	R2	1.00	889	0.049	0.053	15653	0.98
	3/6/24	12:10:51	R2	1.00	901	0.062	0.056	15696	0.98
	3/6/24	12:11:53	R2	1.03	892	0.058	0.052	15658	0.98
	3/6/24	12:12:51	R2	0.97	892	0.046	0.047	15645	0.98
	3/6/24	12:13:51	R2	1.00	902	0.051	0.060	15592	0.98
	3/6/24	12:14:51	R2	1.00	895	0.058	0.053	15611	0.98
	3/6/24	12:15:51	R2	1.00	892	0.053	0.080	15590	0.98
	3/6/24	12:16:51	R2	1.00	895	0.065	0.084	15639	0.98
	3/6/24	12:17:51	R2	1.00	893	0.066	0.069	15624	0.98
	3/6/24	12:18:51	R2	1.00	890	0.055	0.075	15652	0.98
	3/6/24	12:19:51	R2	1.00	891	0.058	0.071	15600	0.98
	3/6/24	12:20:51	R2	1.00	894	0.057	0.074	15630	0.98
	3/6/24	12:21:54	R2	1.05	891	0.049	0.062	15631	0.98
	3/6/24	12:22:54	R2	1.00	890	0.057	0.049	15595	0.98
	3/6/24	12:23:53	R3	0.98	886	0.046	0.051	15588	0.98
	3/6/24	12:24:51	R3	0.97	881	0.046	0.061	15615	0.98
	3/6/24	12:25:51	R3	1.00	875	0.049	0.079	15591	0.98
	3/6/24	12:26:53	R3	1.03	883	0.058	0.075	15561	0.98
	3/6/24	12:27:54	R3	1.02	881	0.048	0.059	15579	0.98
	3/6/24	12:28:51	R3	0.95	887	0.053	0.054	15582	0.98
	3/6/24	12:29:51	R3	1.00	886	0.053	0.067	15580	0.98
	3/6/24	12:30:51	R3	1.00	882	0.055	0.058	15604	0.98
	3/6/24	12:31:54	R3	1.05	879	0.044	0.058	15630	0.98
	3/6/24	12:32:51	R3	0.95	881	0.058	0.053	15625	0.98
	3/6/24	12:33:51	R3	1.00	887	0.045	0.071	15562	0.98
	3/6/24	12:34:51	R3	1.00	882	0.045	0.078	15582	0.98
	3/6/24	12:35:52	R3	1.02	886	0.062	0.086	15674	0.98
	3/6/24	12:36:51	R3	0.98	878	0.059	0.090	15561	0.98
	3/6/24	12:37:51	R3	1.00	880	0.040	0.10	15602	0.98
	3/6/24	12:38:51	R3	1.00	881	0.050	0.087	15618	0.98
	3/6/24	12:39:53	R3	1.03	881	0.065	0.076	15631	0.98
	3/6/24	12:40:52	R3	0.98	885	0.055	0.10	15575	0.98
	3/6/24	12:41:54	R3	1.03	881	0.050	0.092	15632	0.98
	3/6/24	12:42:51	R3	0.95	884	0.044	0.094	15651	0.98
	3/6/24	12:43:51	R3	1.00	885	0.043	0.094	15655	0.98
	3/6/24	12:44:51	R3	1.00	889	0.071	0.10	15590	0.98
	3/6/24	12:45:51	R3	1.00	880	0.049	0.097	15619	0.98
	3/6/24	12:46:51	R3	1.00	885	0.045	0.086	15566	0.98
	3/6/24	12:47:53	R3	1.03	880	0.043	0.060	15564	0.98
	3/6/24	12:48:51	R3	0.97	886	0.063	0.091	15579	0.98
	3/6/24	12:49:51	R3	1.00	886	0.051	0.076	15736	0.98
	3/6/24	12:50:51	R3	1.00	884	0.050	0.085	15617	0.98
	3/6/24	12:51:51	R3	1.00	883	0.051	0.068	15517	0.98
	3/6/24	12:52:53	R3	1.03	883	0.054	0.067	15652	0.98
	3/6/24	12:53:51	R3	0.97	883	0.052	0.086	15628	0.98
	3/6/24	12:54:52	R3	1.02	895	0.049	0.11	15776	0.98
	3/6/24	12:55:51	R3	0.98	893	0.052	0.084	15626	0.98
	3/6/24	12:56:51	R3	1.00	887	0.056	0.084	15646	0.98
	3/6/24	12:57:51	R3	1.00	879	0.055	0.10	15482	0.98
	3/6/24	12:58:51	R3	1.00	888	0.049	0.095	15513	0.98
	3/6/24	12:59:51	R3	1.00	892	0.054	0.10	15476	0.98
	3/6/24	13:00:51	R3	1.00	886	0.062	0.098	15490	0.98

	Unitname	Location	Condition	CO2 Summary	HCl Summary	HF Summary	H2O Summary	Press(atm) Summary
	PES_006	Outlet	Scrubber					
Run Length 60.0 (min)	Run 1	Conc. (ppmv)	Minimum	865	0.026	0.026	15462	0.98
			Maximum	904	0.057	0.097	15735	0.98
			(BDL = MDL) Average	881	0.043	0.067	15620	0.98
			MDL	NA	NA	NA	NA	NA
Run Length 60.0 (min)	Run 2	Conc. (ppmv)	Minimum	867	0.039	0.026	15590	0.98
			Maximum	902	0.067	0.084	15848	0.98
			(BDL = MDL) Average	886	0.054	0.055	15676	0.98
			MDL	NA	NA	NA	NA	NA
Run Length 60.0 (min)	Run 3	Conc. (ppmv)	Minimum	868	0.040	0.051	15407	0.98
			Maximum					
				883	0.055	0.088	15573	0.98
			MDL	NA	NA	NA	NA	NA
Test Length 180 (min)	Test Results	Conc. (ppmv)	Minimum	865	0.026	0.026	15407	0.98
			Maximum	904	0.089	0.12	15848	0.98
			(BDL = MDL) Average	883	0.051	0.070	15623	0.98
			MDL	NA	NA	NA	NA	NA

	Date	Time	Run	Scan Length	CO2 1-min data Conc. (ppm) BDL=MDL	HCl 1-min data Conc. (ppm) BDL=MDL	HF 1-min data Conc. (ppm) BDL=MDL	H2O 1-min data Conc. (ppm) BDL=MDL	Press(atm) 1-min data Conc. (ppm) BDL=MDL
	3/6/24	13:01:54	R3	1.05	889	0.054	0.12	15539	0.98
	3/6/24	13:02:51	R3	0.95	886	0.056	0.12	15593	0.98
	3/6/24	13:03:51	R3	1.00	883	0.058	0.093	15533	0.98
	3/6/24	13:04:54	R3	1.05	892	0.074	0.097	15593	0.98
	3/6/24	13:05:51	R3	0.95	883	0.057	0.11	15536	0.98
	3/6/24	13:06:51	R3	1.00	880	0.064	0.099	15420	0.98
	3/6/24	13:07:51	R3	1.00	893	0.051	0.10	15583	0.98
	3/6/24	13:08:54	R3	1.05	880	0.066	0.10	15413	0.98
	3/6/24	13:09:51	R3	0.95	874	0.059	0.082	15407	0.98
	3/6/24	13:10:51	R3	1.00	880	0.052	0.10	15506	0.98
	3/6/24	13:11:51	R3	1.00	886	0.049	0.12	15690	0.98
	3/6/24	13:12:51	R3	1.00	883	0.071	0.096	15479	0.98
	3/6/24	13:13:51	R3	1.00	880	0.059	0.082	15530	0.98
	3/6/24	13:14:54	R3	1.05	873	0.061	0.11	15412	0.98
	3/6/24	13:15:51	R3	0.95	883	0.089	0.083	15809	0.98
	3/6/24	13:16:51	R3	1.00	876	0.071	0.12	15626	0.98
	3/6/24	13:17:51	R3	1.00	878	0.053	0.095	15532	0.98
	3/6/24	13:18:54	R3	1.05	868	0.062	0.095	15495	0.98
	3/6/24	13:19:53	R3	0.98	871	0.055	0.086	15489	0.98
	3/6/24	13:20:51	R3	0.97	880	0.067	0.097	15447	0.98
	3/6/24	13:21:51	R3	1.00	869	0.064	0.11	15470	0.98
	3/6/24	13:22:52	R3	1.02	879	0.058	0.11	15497	0.98

Appendix D

Permit to Operate

State of Oregon
Department of
Environmental
Quality

STANDARD
AIR CONTAMINANT DISCHARGE PERMIT

Department of Environmental Quality
Northwest Region
700 NE Multnomah St., Suite 600
Portland, OR 97232

This permit is being issued in accordance with the provisions of ORS 468A.040 and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Microchip Technology Incorporated
Gresham Fab 4
21015 SE Stark Street
Gresham, OR 97030

PLANT SITE LOCATION:

21015 SE Stark Street
Gresham, OR 97030

INFORMATION RELIED UPON:

Application No.: 029474
Date Received: 12/22/2017

LAND USE COMPATIBILITY FINDING:

Approving Authority: City of Gresham
Approval Date: 06/29/1995

ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY

Matt Hoffman, Northwest Region Air Quality Manager

6/21/2019
Dated

Sources Permitted to Discharge Air Contaminants (OAR 340-216-8010):

Table 1 Code	Source Description	SIC (NAICS)
Part B, 85	Sources which would have actual emissions, if they source were to operate uncontrolled, of 10 or more tons of any single criteria pollutant. Semiconductor manufacturing.	3674 (334413)
Part B, 13	Boilers over 10 mmBtu/hr heat input with oil back-up, or NG fired over 30 mmBtu/hr heat input with or without oil back-up (for database tracking purposes only, not a separate emission unit)	4961 (221330)

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1.0 GENERAL EMISSION STANDARDS AND LIMITS

1.1. Visible Emissions

The permittee must comply with the following visible emission limits from air contaminant sources other than fugitive emission sources, as applicable.

a. Emissions from any air contaminant source must not equal or exceed 20% opacity.

b. Opacity must be measured as a six-minute block average using EPA Method 9, a continuous opacity monitoring system (COMS) installed and operated in accordance with the DEQ Continuous Monitoring Manual or 40 CFR part 60, or an alternative monitoring method approved by DEQ that is equivalent to EPA Method 9.

1.2. Particulate Matter Emissions

The permittee must comply with the following particulate matter emission limits, as applicable:

a. Particulate matter emissions from any fuel burning equipment installed on or after April 16, 2015 must not exceed 0.10 grains per dry standard cubic foot, corrected to 12% CO_2 or 50% excess air.

b. Particulate matter emissions from any fuel burning equipment installed, constructed, or modified before April 16, 2015 must not exceed 0.14 grains per dry standard cubic foot, corrected to 12% CO_2 or 50% excess air.

c. Particulate matter emissions from any air contaminant source installed, constructed, or modified before April 16, 2015 other than fuel burning equipment and fugitive emission sources must not exceed 0.14 grains per dry standard cubic foot.

d. Particulate matter emissions from any air contaminant source installed, constructed, or modified on or after April 16, 2015 other than fuel burning equipment and fugitive emission sources must not exceed 0.10 grains per dry standard cubic foot.

1.3. Fugitive Emissions

The permittee must take reasonable precautions to prevent fugitive dust emissions, as measured by EPA method 22, by:

a. Using, where possible, water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;

b. Applying water or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts;

c. Enclosing (full or partial) materials stockpiles in cases where application of water or other suitable chemicals are not sufficient to prevent particulate matter from becoming airborne;

d. Installing and using hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
e. Installing adequate containment during sandblasting or other similar operations;
f. Covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne;
g. Promptly removing earth or other material that does or may become airborne from paved streets; and
h. Developing a DEQ approved fugitive emission control plan upon request by DEQ if the above precautions are not adequate and implementing the plan whenever fugitive emissions leave the property for more than 18 seconds in a six-minute period.

1.4. Particulate Matter Fallout

The permittee must not cause or permit the deposition of any particulate matter larger than 250 microns in size at sufficient duration or quantity, as to create an observable deposition upon the real property of another person.

1.5. Nuisance and Odors

The permittee must not cause or allow air contaminants from any source to cause a nuisance. Nuisance conditions will be verified by DEQ personnel.

1.6. Fuels and Fuel Sulfur Content

The permittee must not use any fuel other than natural gas, propane, butane, ASTM grade 1 or 2 fuel oils, or a DEQ approved equivalent (e.g. biodiesel). Fuel oils must not contain more than:

a. 0.3% sulfur by weight for ASTM Grade 1 distillate oil; or
b. 0.5% sulfur by weight for ASTM Grade 2 distillate oil.

1.7. Emergency Stationary RICE

The permittee must comply with the following requirements for emergency stationary reciprocating internal combustion engines (RICE): [40 CFR 63.6640(f)]

For each emergency stationary RICE, the permittee must:

a. Change oil and filter every 500 hours of operation or annually, whichever comes first; [40 CFR 63. 6603(a), table 2d(4)(a)]
b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; [40 CFR 63. 6603(a), table 2d(4)(b)]
c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary; [40 CFR 63. 6603(a), table 2d(4)(c)]
d. During periods of startup, minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply; and [40 CFR 63. 6603(a), table 2d]
e. The permittee must install a non-resettable hour meter on each emergency stationary RICE, if one is not already installed. [40 CFR 63.6625(f)]

1.8. Operating Conditions for Emergency Stationary RICE

The permittee must operate any emergency stationary RICE in compliance with the following conditions: [40 CFR 63.6640(f)]

a. There is no time limit on the use of emergency stationary RICE in emergency situations.

b. Emergency stationary RICE may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by the manufacturer, the vendor, or the insurance company associated with the engine. Required maintenance and testing of such units is limited to 50 hours per year.

c. The permittee is prohibited from using its emergency stationary RICE for any non-emergency use including but not limited to peak shaving, demand response operation, and/or generation of income from the sale of power. To perform such activity the permittee must first obtain a modified permit in accordance with Condition 13.2 or a separate permit for power generation that appropriately addresses and allows this activity.

1.9. Operating Conditions for Emergency Stationary RICE

The permittee must keep records of the hours of operation of each emergency stationary RICE that is recorded through the non-resettable hour meter. The permittee must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation used for maintenance checks and readiness testing. [40 CFR 63.6655(f)]

2.0 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

2.1. Boilers

The permittee must comply with 40 CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, 10 – 100 million Btu per hour heat input, including:

a. Notifications - Date of construction, anticipated startup, and actual startup of each new boiler, subsequent to the effective date of this permit.

b. Recordkeeping - Monthly natural gas combusted per boiler, unless an alternative boiler monitoring schedule is approved by the EPA Administrator.

3.0 TYPICALLY ACHIEVABLE CONTROL TECHNOLOGY (TACT)

3.1. VOC Emissions

The permittee must control Volatile Organic Compound (VOC) emissions from Building 1 and Building 2 manufacturing operations with a concentrator thermal oxidizer that must achieve a minimum 90% destruction removal efficiency (DRE) of VOCs entering the concentrator thermal oxidizer (CTO).

3.2. Acid Gas Emissions

The permittee must control acid gases from Building 1 and Building 2 manufacturing operations with wet scrubber systems that achieves a minimum 90% DRE. As an alternative, the permittee may meet a facility-wide volumetric flow-weighted average emission concentration of 1 part per million by volume (ppmv) of HF and 1 ppmv of HCl, using results of a performance source test.

4.0 OPERATION AND MAINTENANCE REQUIREMENTS

4.1. O&M plan

The permittee must establish and maintain an O & M plan that addresses both short and long-term activities to ensure that all air pollution control devices are operating as efficient as possible at all times.

5.0 PLANT SITE EMISSION LIMITS

5.1. Plant Site Emission Limits (PSEL)

The permittee must not cause or allow plant site emissions to exceed the following:

Pollutant	Limit	Units
PM	24	tons per year
PM_{10}	14	tons per year
$PM_{2.5}$	9	tons per year
SO_2	39	tons per year
NO_X	39	tons per year
CO	99	tons per year
VOC	39	tons per year
GHGs (CO2e)	181,000	tons per year
Single HAP	9	tons per year
Combined HAPs	24	tons per year
Fluorides	2.9	tons per year

All PM is assumed to be PM10 and all PM10 is assumed to be PM2.5. Fluorides are calculated using the site specific fluorides emission factor based on 2015 emission testing results (see review report). HAP PSELs are included because uncontrolled PTE is greater than the major source threshold.

5.2. Annual Period

The annual plant site emissions limits apply to any 12-consecutive calendar month period.

6.0 COMPLIANCE DEMONSTRATION AND SOURCE TESTING

6.1. Testing Requirements

The permittee must conduct a source test of the control devices as specified below:

a. Once during this permit cycle the permittee must perform a performance test of each wet scrubber system to determine the HF and HCl destruction removal efficiency (DRE).

b. Once during this permit cycle the permittee must perform a performance test of the CTO to determine the VOC DRE.

c. Stack exhaust gas during each source test must be sampled while the facility is operating within 90% its normal operating capacity at the time of the test.

d. Exhaust gas concentrations must be sampled before and after each wet scrubber system and the CTO to demonstrate the system's DRE. The source test report must include the DRE demonstrated during each test run as well as the average DRE for the three test runs.

e. During each source test the following parameters must be monitored and recorded:

   i. Combustion temperature of the CTO; and

   ii. Recirculation flow rate and pH of the wet scrubbers.

   iii. Other facility/process operating parameters identified prior to the test.

f. Only regular operating staff may adjust the combustion system or production processes and emission control parameters during the source test and within two hours prior to the tests. Any operating adjustments made during the source test, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source test invalid.

g. A pretest plan for each source test required above must be submitted for approval to DEQ's Source Test Coordinator at the ODEQ Northwest Regional Office, at least 15 days prior to testing.

h. The reference test methods identified in the table below must be utilized in the source tests identified above. A test method modification/variance or substitution of an alternative test method must be pre-approved by the DEQ's Source Test Coordinator.

i. All tests must be conducted in accordance with the DEQ's Source Sampling Manual and with the pretest plan. All test data and results must be submitted to the Source Test Coordinator for review within 45 days after completion of the testing cycle unless an alternate submission date or extension is approved by DEQ.

Reference Test Method	Tested pollutant/parameter	
EPA 1&2	Flow Rate	
EPA 3	Dry Molecular Weight	
EPA 4 or ODEQ Method	Moisture	
EPA 25A	Total VOC	
EPA 26, 26A or 320	Acid Gases	

7.0 PSEL COMPLIANCE DEMONSTRATION

7.1. Boiler Emissions

On a monthly basis, the permittee must calculate $PM_{2.5}$, SO_2, CO, NO_x, and VOC using the formula below:

$$\mathbf{E = EF_{NG\text{-}1} \times NG\text{-}1 + EF_{OIL\text{-}1} \times OIL\text{-}1 + EF_{NG\text{-}2} \times NG\text{-}2 + EF_{OIL\text{-}2} \times OIL\text{-}2}$$

Where:

E = Emissions, pounds per month

$EF_{NG\text{-}1}$ and $EF_{OIL\text{-}1}$ and $EF_{NG\text{-}2}$ and $EF_{OIL\text{-}2}$ = see Condition 0

NG-1 and NG-2 = Amount of natural gas combusted in Bldg 1 and Bldg 2

OIL-1 and OIL-2 = Amount of fuel oil combusted in Bldg 1 and Bldg 2

7.2. Generator Emissions

On a monthly basis, the permittee must calculate $PM_{2.5}$, SO_2, CO, NOx, and VOC using the formula below:

$$\mathbf{E = EF_G \times G}$$

Where:

E = Emissions, pounds per month

EF_G = see Condition 0

G = Number of hours of operation per month

7.3. CTO Emissions

On a monthly basis, the permittee must calculate $PM_{2.5}$, SO_2, CO, NO_x and VOC resulting from natural gas combustion in the CTO using the formula below:

$$\mathbf{E = EF_{NG} \times NG}$$

Where:

E = Emissions, pounds per month

EF_{NG} = see Condition 0

NG = Amount of natural gas combusted in the CTO

7.4. VOC Fab Emissions

On a monthly basis, the permittee must calculate VOC emissions from the Building 1 and Building 2 manufacturing processes as described below.

a. VOC emissions are determined as follows:

$$\mathbf{E = \sum [Q \times EF \times (1\text{-}DRE)]}$$

Where:

E = Emissions, pounds per month

$\sum$ = Summation of VOC contributions (pounds of emissions) of each VOC-containing material

Q = Amount of VOC-containing material used, pounds per month

Material used = Amount of material issued minus the amount transferred off-site or disposed of as waste

EF = Emission factor for VOCs, pounds VOC emitted per pound of material used

DRE = (see 7.7.b.)

b. VOC emissions will be calculated by assuming that the CTO DRE is 90%, unless demonstrated otherwise through DEQ-approved stack testing results.

c. Fugitive emissions that do not pass through the CTO have a DRE equal to zero.

d. The representative VOC content of waste must be measured by EPA Method 8015M GC/FID or other method approved by DEQ.

7.5. VOC Emission Factors

The permittee must use the VOC EFs in the permit application for calculating emissions. If the permittee uses a different VOC-containing material, which current equipment is capable of accommodating, the emission factor must be adjusted in direct proportion to the ratio of VOC content. Any changes in emissions factors must follow Condition 8.3.

7.6. Acid Gas Fab Emissions

On a monthly basis, the permittee must calculate HCl and HF emissions from the Building 1 and Building 2 manufacturing processes as described below.

a. HCl emissions are determined as follows:

$$\mathbf{E_{HCl} = \sum [Q_{HCl} \times EF_{HCl}]}$$

Where:

E_{HCl} = Emissions, pounds per month

$\sum$ = Summation of HCl contributions (pounds of emissions) of each HCl-containing material and each HCl-precursor material

Q_{HCl} = Amount of HCl-containing and HCl-precursor material used, pound per month

Material used = Amount of material issued minus the amount transferred off-site or disposed of as waste

EF_{HCl} = Emission factor, pounds HCl emitted per pound of HCl-containing and HCl-precursor material used per month

b. HF emissions are determined as follows:

$$E_{HF} = \sum [Q_{HF} \times EF_{HF}]$$

Where:

E_{HF} = Emissions, pounds per month

$\sum$ = Summation of HF contributions (pounds of emissions) of each HF-containing material and each HF-precursor material

Q_{HF} = Amount of HF-containing and HF-precursor material used, pounds per month

Material used = Amount of material issued minus the amount transferred off-site or disposed of as waste

EF_{HF} = Emission factor, pounds HF emitted per pound of HF-containing and HF-precursor material used per month

7.7. Acid Gas Emission Factors The permittee must use the HCl and HF EFs in the permit application for calculating emissions. If the permittee uses a different HCL or HF- containing material, which current equipment is capable of accommodating, the emission factor must be adjusted in direct proportion to the ratio of HCl or HF content. Any changes in emission factors must follow Condition 8.3.

7.8. Alternate Methods Alternate methods may be used for emissions calculations if demonstrated by the permittee to be equivalent to or more accurate than the above methods. An alternate method must be reviewed and approved by DEQ prior to use.

7.9. GHG emissions On a monthly basis the permittee must determine compliance with the GHG PSEL in accordance with OAR 340 division 215 and the calculation protocols in 40 CFR Part 98 Subparts A, C and I. Point of use (POU) abatement devices are used primarily for safety and facilities protection purposes; a portion of the facility's POU abatement devices may be used for GHG abatement provided they meet the conditions below. POU abatement device GHG destruction or removal efficiency (DRE) may be used to calculate actual greenhouse gas emissions once a site maintenance plan is submitted to Oregon DEQ. Installation, maintenance and operation of POU abatement devices claiming a GHG DRE must follow a site maintenance plan that meets the requirements of 40 CFR Part 98 Subpart I made effective January 1, 2014. If the site maintenance plan is modified, the permittee must submit a copy to Oregon DEQ. (Note: the GHG PSEL is in tons/year and not metric-tons/year). GHGs are defined in OAR 340-200-0020 for PSEL compliance, and in OAR 340-215-0020 for GHG reporting purposes.

7.10. Fluorides emissions

On a monthly basis the permittee must determine compliance with the fluorides PSEL by calculating fluorides emissions using fluorides specific emission factors from source testing conducted in June 2015 as detailed in the review report of this permit renewal. Condition 0 includes a ratio to HF emissions that may be used for this calculation.

8.0 SPECIAL CONDITIONS

8.1. Installation of Additional Control Devices

The permittee must notify DEQ in writing of the date any additional VOC or acid gas control device begins treating process exhaust, within seven (7) days.

8.2. Emission factor adjustments

In the event the permittee exchanges the use of a material for a similar material, which the existing equipment is capable of accommodating and which has higher or lower emission potential (VOC, HCl, HF, GHG), the permittee must adjust the associated emission factor using the ratio of the content of the new material to the content of the material used to establish the original emission factor. The permittee must include a summary of these changes in the annual report.

8.3. Change of Emission Factors

Except as allowed in Condition 8.2, the permittee must notify DEQ in writing of a change in the recipe of chemicals that changes the emission factors. This notification must include an analysis of how the changes in the emission factors affect plant site emissions relative to the PSEL.

9.0 MONITORING CONDITIONS

9.1. Continuous Monitoring

The permittee must monitor and maintain the following records related to the operation of control devices continuously during all hours of operation:

a. CTO combustion chamber temperature; and

b. Wet scrubber recirculation flow rate and pH.

c. The permittee is presumed to be in compliance with the 20% visible emissions standard and the 0.10 gr/dscf particulate emissions standard as long as the boilers burn natural gas.

9.2. Fuel Monitoring

The permittee must record and maintain records of the amounts of each fuel combusted monthly for each boiler that is an affected facility under 40 CFR 60 Subpart Dc, unless an alternate monitoring schedule is approved by the EPA Administrator.

9.3. Monthly Monitoring

The permittee must monitor and maintain the following records related to the operation and maintenance of the facility and associated air contaminant control devices monthly:

a. The amount and type of fuel combusted in the Building 1 boilers (combined) and the Building 2 boilers (individual, unless combining is approved by EPA).

b. The hours of non-emergency generator operation (combined).

c. The amount of natural gas combusted in the CTO.

d. The quantity of VOC, HCl- and HF-containing, and HCl- or HF-precursor, fluoride-containing, GHG-containing, or GHG-precursor material issued.

e. The quantity of VOC, HCl- and HF-containing, and HCl- or HF-precursor, fluoride-containing, GHG-containing, or GHG-precursor raw material shipped off-site or disposed of as waste.

f. Any change in emission factors of VOC, HCl, HF, fluorides, or GHG.

10.0 RECORDKEEPING REQUIREMENTS

10.1. Excess Emissions

The permittee must maintain records of excess emissions as defined in OAR 340-214-0300 through 340-214-0340 (recorded on occurrence). Typically, excess emissions are caused by process upsets, startups, shutdowns, or scheduled maintenance. In many cases, excess emissions are evident when visible emissions are greater than 20% opacity as a six-minute block average. If there is an ongoing excess emission caused by an upset or breakdown, the permittee must cease operation of the equipment or facility no later than 48 hours after the beginning of the excess emissions, unless continued operation is approved by DEQ in accordance with OAR 340-214-0330(4).

10.2. Complaint Log

The permittee must maintain a log of all written complaints and complaints received via telephone that specifically refer to air pollution concerns associated to the permitted facility. The log must include a record of the permittee's actions to investigate the validity of each complaint and a record of actions taken for complaint resolution.

10.3. Maintenance Log

The permittee must maintain records of major maintenance performed on air pollution control equipment as described in Section 4. See also O & M Plan on file for logs of routine maintenance.

10.4. Retention of Records Unless otherwise specified, the permittee must retain all records for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application and make them available to DEQ upon request. The permittee must maintain the two (2) most recent years of records onsite.

11.0 REPORTING REQUIREMENTS

11.1. Excess Emissions The permittee must notify DEQ of excess emissions events if the excess emission is of a nature that could endanger public health.

a. Such notice must be provided as soon as possible, but never more than one hour after becoming aware of the problem. Notice must be made to the regional office identified in Condition 15.0 by email, telephone, facsimile, or in person.

b. If the excess emissions occur during non-business hours, the permittee must notify DEQ by calling the Oregon Emergency Response System (OERS). The current number is 1-800-452-0311.

c. The permittee must also submit follow-up reports when required by DEQ.

11.2. Semi-annual The permittee must submit a report to the Administrator, United States Environmental Protection Agency, Region X a report of the fuel sulfur content of fuel oil received at the facility during the previous six months for use in any NSPS-affected boiler. The report must be submitted no later than the 30th day after the end of the reporting period. The reporting period begins on January 1 and July 1 of each year.

11.3. Annual Report For each year this permit is in effect, the permittee must submit to DEQ by **March 15** two (2) copies of the following information for the previous calendar year:

a. A letter stating the facility's compliance status with permit conditions for the calendar year. Any violations or exceedances must be explained in detail including corrective actions taken.

b. Operating parameters:

i. A summary of the monthly amount (therms, gallons, or cubic feet) of fuel (natural gas, propane, oil, or other) combusted in the boilers.

ii. A summary of the rolling 12-month amount (therms, gallons or cubic feet) of fuel (natural gas, propane, oil, or other) combusted in the boilers.

iii. A summary of the monthly hours of non-emergency generator operation.

iv. A summary of the rolling 12-month hours of non-emergency generator operation.

v. A summary of the monthly amount (pounds) of VOC, HCl- and HF-containing, and HCl- and HF-precursor, fluorides-containing, GHG-containing, or GHG precursor materials received on site for use in the fab.

vi. A summary of the monthly amount (pounds) of VOC, HCl- and HF-containing, and HCl- and HF-precursor, fluorides-containing, GHG-containing, or GHG precursor materials shipped off-site or disposed of as waste.

vii. A summary of any changes in material content that affect emission factor values.

viii. A summary of the rolling 12-month amount (pounds) of VOC, HCl- and HF-containing, and HCl- and HF-precursor fluorides-containing, GHG-containing, or GHG precursor materials used.

Material used = Amount of material issued minus the amount transferred off-site or disposed of as waste

ix. Revisions of the DRE of the CTO used for compliance emission calculations in Condition 7.4.b.

x. A summary of the rolling 12-month emissions of $PM_{2.5}$, SO_2, CO, NO_x, VOC, HCl, HF and PSEL fluorides.

c. Greenhouse gas emissions in accordance with OAR 340 division 215

d. A summary of all planned and unplanned excess emissions events as recorded in the Excess Emissions Log.

e. A summary of any emission factors which were changed.

f. A summary of complaints relating to air quality received by the permittee during the previous calendar year, as recorded in the Complaint Log.

12.0 NOTIFICATIONS

12.1. Notice of Change of Ownership or Company Name

The permittee must notify DEQ in writing using a DEQ "Permit Application Form" within 60 days after the following:

a. Legal change of the name of the company as registered with the Corporations Division of the State of Oregon; or

b. Sale or exchange of the activity or facility.

12.2. Construction or Modification Notices

The permittee must notify DEQ in writing using a DEQ "Notice of Construction Form," or "Permit Application Form," and obtain approval in accordance with OAR 340-210-0205 through 340-210-0250 before:

a. Constructing, installing, or establishing a new stationary source that will cause an increase in any regulated pollutant emissions;

b. Making any physical change or change in operation of an existing stationary source that will cause an increase, on an hourly basis at full production, in any regulated pollutant emissions; or

c. Constructing or modifying any air pollution control equipment.

12.3. Where to Send Reports and Notices The reports, with the permit number prominently displayed, must be sent to the Permit Coordinator for the region where the source is located as identified in Condition 15.3

13.0 ADMINISTRATIVE REQUIREMENTS

13.1. Permit Renewal Application The permittee must submit the completed application package for renewal of this permit **180 days prior to the expiration date**. Two (2) copies of the application must be submitted to the DEQ Permit Coordinator listed in Condition 15.0.

13.2. Permit Modifications Application for a modification of this permit must be submitted within **60 days** prior to the source modification. When preparing an application, the applicant should also consider submitting the application 180 days prior to allow DEQ adequate time to process the application and issue a permit before it is needed. A special activity fee must be submitted with an application for the permit modification. The fees and two (2) copies of the application must be submitted to the DEQ Business Office.

14.0 FEES

14.1. Annual Compliance Fee The permittee must pay the annual fee specified in OAR 340-216-8020, Table 2, Part 2 for a Standard ACDP on **December 1** of each year this permit is in effect. An invoice indicating the amount, as determined by DEQ regulations will be mailed prior to the above date. **Late fees in accordance with Part 4 of the table will be assessed as appropriate.**

14.2. Change of Ownership or Company Name Fee The permittee must pay the non-technical permit modification fee specified in OAR 340-216-8020, Table 2, Part 3(a) with an application for changing the ownership or the name of the company.

14.3. Special Activity Fees The permittee must pay the special activity fees specified in OAR 340-216-8020, Table 2, Part 3 (b through k) with an application to modify the permit.

15.0 DEQ CONTACTS / ADDRESSES

15.1. Business Office

The permittee must submit payments for invoices, applications to modify the permit, and any other payments to DEQ's Business Office:

Department of Environmental Quality
Accounting / Revenue
700 NE Multnomah St., Suite 600
Portland, Oregon 97232

15.2. Permit Coordinator

The permittee must submit all notices and applications that do not include payment to the Northwest Region Air Quality Permit Coordinator:

Department of Environmental Quality
Northwest Region Air Quality PC
700 NE Multnomah St., Suite 600
Portland OR 97232

15.3. Report Submittals

Unless otherwise notified, the permittee must submit all reports (annual reports, source test plans and reports, etc.) to DEQ's Region. If you know the name of the Air Quality staff member responsible for your permit, please include it.

15.4. Web Site

Information about air quality permits and DEQ's regulations may be obtained from the DEQ web page at www.oregon.gov/deq

16.0 GENERAL CONDITIONS AND DISCLAIMERS

16.1. Permitted Activities

This permit allows the permittee to discharge air contaminants from processes and activities related to the air contaminant source(s) listed on the first page of this permit until this permit expires, is modified, or is revoked.

16.2. Other Regulations

In addition to the specific requirements listed in this permit, the permittee must comply with all other legal requirements enforceable by DEQ.

16.3. Conflicting Conditions

In any instance in which there is an apparent conflict relative to conditions in this permit, the most stringent conditions apply.

16.4. Masking of Emissions

The permittee must not cause or permit the installation of any device or use any means designed to mask the emissions of an air contaminant that causes or is likely to cause detriment to health, safety, or welfare of any person or otherwise violate any other regulation or requirement.

16.5. DEQ Access

The permittee must allow DEQ's representatives access to the plant site and pertinent records at all reasonable times for the purposes of performing inspections, surveys, collecting samples, obtaining data, reviewing and copying air contaminant emissions discharge records and conducting all necessary functions related to this permit in accordance with ORS 468-095.

16.6. Permit Availability

The permittee must have a copy of the permit available at the facility at all times.

16.7. Open Burning

The permittee may not conduct any open burning except as allowed by OAR 340, division 264.

16.8. Asbestos

The permittee must comply with the asbestos abatement requirements in OAR 340, division 248 for all activities involving asbestos-containing materials, including, but not limited to, demolition, renovation, repair, construction, and maintenance.

16.9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

16.10. Permit Expiration

a. A source may not be operated after the expiration date of the permit, unless any of the following occur prior to the expiration date of the permit:

   i. A timely and complete application for renewal or for an Oregon Title V Operating Permit has been submitted, or

   ii. Another type of permit (ACDP or Oregon Title V Operating Permit) has been issued authorizing operation of the source.

b. For a source operating under an ACDP or Oregon Title V Operating Permit, a requirement established in an earlier ACDP remains in effect notwithstanding expiration of the ACDP, unless the provision expires by its terms or unless the provision is modified or terminated according to the procedures used to establish the requirement initially.

16.11. Permit Termination, Revocation, or Modification

DEQ may modify or revoke this permit pursuant to OAR 340-216-0082 and 340-216-0084.

17.0 EMISSION FACTORS

Combustion emission factor table

Emissions device or activity	Pollutant	Emission Factor (EF)	EF units	EF Reference
Boilers B1, B2, B3 Natural gas (Building 1)	$PM/PM_{10}/PM_{2.5}$	0.0075	Lbs/mmBtu	AP-42 Tbl 1.4-2
	CO	0.040	Lbs/mmBtu	Manufacturer
	NO_x	0.04	Lbs/mmBtu	Manufacturer
	SO_2	0.0017	Lbs/mmBtu	ODEQ AQ-EF05
	VOC	0.016	Lbs/mmBtu	Manufacturer
Boilers B4, B5, B6 Natural gas (Building 2)	$PM/PM_{10}/PM_{2.5}$	0.0075	Lbs/mmBtu	AP-42 Tbl 1.4-2
	CO	0.037	Lbs/mmBtu	Manufacturer
	NO_x	0.035	Lbs/mmBtu	Manufacturer
	SO_2	0.0017	Lbs/mmBtu	ODEQ AQ-EF05
	VOC	0.016	Lbs/mmBtu	Manufacturer
Boilers B1, B2, B3 Fuel oil (Building 1)	$PM/PM_{10}/PM_{2.5}$	4.2	Lbs/mgal	Manufacturer
	CO	9.8	Lbs/mgal	Manufacturer
	NO_x	16.8	Lbs/mgal	Manufacturer
	SO_2	50.26	Lbs/mgal	Manufacturer
	VOC	4.06	Lbs/mgal	Manufacturer
Boilers B4, B5, B6 Fuel oil (Building 2)	$PM/PM_{10}/PM_{2.5}$	3.36	Lbs/mgal	Manufacturer
	CO	9.8	Lbs/mgal	Manufacturer
	NO_x	26.6	Lbs/mgal	Manufacturer
	SO_2	57.68	Lbs/mgal	Manufacturer
	VOC	4.2	Lbs/mgal	Manufacturer
Fire pump	$PM/PM_{10}/PM_{2.5}$	0.0022	Lbs/hp-hr	AP-42 Table 3.3-1
	CO	0.00668	Lbs/hp-hr	AP-42 Table 3.3-1
	NO_x	0.031	Lbs/hp-hr	AP-42 Table 3.3-1
	SO_2	0.00205	Lbs/hp-hr	AP-42 Table 3.3-1
	VOC	0.00247	Lbs/hp-hr	AP-42 Table 3.3-1
Building 1 diesel generators (2 each) [Full load/weekly testing]	$PM/PM_{10}/PM_{2.5}$	0.8/0.1	Lbs/hr	Manufacturer
	CO	3.5/0.4	Lbs/hr	Manufacturer
	NO_x	26.5/3.2	Lbs/hr	Manufacturer
	SO_2	1.7/0.2	Lbs/hr	Manufacturer
	VOC	0.6/0.1	Lbs/hr	Manufacturer

Emissions device or activity	**Pollutant**	**Emission Factor (EF)**	**EF units**	**EF Reference**
Building 2 diesel generators (3 each) [Full load/weekly testing]	$PM/PM_{10}/PM_{2.5}$	0.6/0.1	Lbs/hr	Manufacturer
	CO	5.2/0.6	Lbs/hr	Manufacturer
	NO_x	32.0/3.8	Lbs/hr	Manufacturer
	SO_2	1.9/0.2	Lbs/hr	Manufacturer
	VOC	0.8/0.1	Lbs/hr	Manufacturer
CTO on NG	$PM/PM_{10}/PM_{2.5}$	0.0073	Lbs/mmBtu	Manufacturer
	CO	0.0808	Lbs/mmBtu	Manufacturer
	NO_x	0.06	Lbs/mmBtu	Manufacturer
	SO_2	0.00058	Lbs/mmBtu	Manufacturer
	VOC	0.0053	Lbs/mmBtu	Manufacturer
Facility wide	Fluorides	0.583	Lbs F/lbs HF	Source test and empirical calcs.

Gas and Liquid Precursors – Emission factor Table

Chemical/Precursor	Pollutant	Emissions factor	Units
01000-060643, 01000-003985	NOx	0.270	Lb/lb
01000-065355	CO	1	Lb/lb
01000-060020	CO	0.269	Lb/lb
01000-060005	CO	0.203	Lb/lb
01000-060644 Process 1	CO NO_x	0.008 0.648	Lb/lb
01000-060644 Process 2	CO NO_x	0.00239 0.011	Lb/lb
01000-064403	NO_x	0.209	Lb/lb
01000-060014	CO	0.280	Lb/lb
01000-062718	CO	0.330	Lb/lb
01000-062689	CO	0.223	Lb/lb
01000-060018 Process 1	SO_2	0.439	Lb/lb
01000-060045	CO	0.269	Lb/lb
01000-064404	CO	0.159	Lb/lb
01000-064404, 01000-060007	CO	0.159	Lb/lb
01000-060006	CO	0.200	Lb/lb

Emission factors are based on an evaluation of the site specific emissions from the various chemicals and precursor

18.0 ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

ACDP	Air Contaminant Discharge Permit
ASTM	American Society for Testing and Materials
AQMA	Air Quality Maintenance Area
calendar year	The 12-month period beginning January 1st and ending December 31st
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
DEQ	Oregon Department of Environmental Quality
dscf	dry standard cubic foot
EPA	US Environmental Protection Agency
FCAA	Federal Clean Air Act
Gal	gallon(s)
GHG	greenhouse gas
gr/dscf	grains per dry standard cubic foot
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040
I&M	inspection and maintenance
lb	pound(s)
MMBtu	million British thermal units
NA	not applicable
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO_X	nitrogen oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	oxygen
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
O&M	operation and maintenance
Pb	lead
PCD	pollution control device
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in size
$PM_{2.5}$	particulate matter less than 2.5 microns in size
ppm	part per million
PSD	Prevention of Significant Deterioration
PSEL	Plant Site Emission Limit
PTE	Potential to Emit
RACT	Reasonably Available Control Technology
scf	standard cubic foot
SER	Significant Emission Rate
SIC	Standard Industrial Code
SIP	State Implementation Plan
SO_2	sulfur dioxide
Special Control Area	as defined in OAR 340-204-0070
VE	visible emissions
VOC	volatile organic compound
year	A period consisting of any 12-consecutive calendar months

State of Oregon
Department of
Environmental
Quality

Department of Environmental Quality
Northwest Region
Air Quality Program

Standard AIR CONTAMINANT DISCHARGE PERMIT REVIEW REPORT

Source Information:

SIC	3674, 4961
NAICS	221330, 334413

Source Categories (Table 1 Part, code)	B13, B85
Public Notice Category	III

Compliance and Emissions Monitoring Requirements:

FCE	
Compliance schedule	
Unassigned emissions	
Emission credits	
Special Conditions	

Source test	once
COMS	
CEMS	
PEMS	
Ambient monitoring	

Reporting Requirements

Annual report	March 15
Quarterly report	

Monthly report	
Excess emissions report	
Other (Semi-annual)	July 30

Air Programs

Synthetic Minor (SM)	
SM -80	
NSPS (list subparts)	Dc
NESHAP (list subparts)	ZZZZ
Part 68 Risk Management	
CFC	

NSR	
PSD	
RACT	
TACT	
Other (specify)	

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PERMITTING

GENERAL BACKGROUND INFORMATION

1. Microchip Technology Incorporated ("Microchip") owns and operates an existing semiconductor manufacturing facility located at 21015 SE Stark Street, Gresham, Oregon, referred to as the Microchip Gresham Fab 4. There are two main buildings at the facility, Building 1 and Building 2, within which semiconductor manufacturing occurs. The manufacturing-related emissions from both buildings are controlled by numerous wet scrubber systems and a concentrator thermal oxidizer (CTO). The wet scrubber systems and the CTO remove approximately 90% of the potential emissions. There are several support buildings (e.g., water and wastewater treatment, emergency generators, boilers) also located at the facility.

   Microchip Gresham Fab 4 ("facility") was previously owned and operated by Fujitsu Microelectronics, Incorporated ("Fujitsu"), and the existing permit for the facility was transferred to Microchip upon closing of the sale to Microchip (approximately August 23, 2002). Prior to the sale to Microchip, Fujitsu discontinued semiconductor manufacturing and removed many of the individual process tools that are used in the semiconductor manufacturing process. However, Fujitsu did not remove the various control devices. Microchip subsequently brought the manufacturing process back on-line by installing the process tools necessary to produce Microchip's products.

PERMIT HISTORY

2. DEQ issued Air Contaminant Discharge Permit Number 26-3240 ("permit") to Fujitsu on June 11, 1997 and was originally scheduled to expire on September 1, 2000. Fujitsu made timely application for permit renewal on June 2, 2000; however, Fujitsu subsequently discontinued semiconductor manufacturing operations and DEQ halted its review of the renewal application prior to issuing a renewal permit.

3. Microchip purchased the Fujitsu facility on August 23, 2002, and, at Microchip's request, DEQ transferred Fujitsu's permit to Microchip. DEQ also authorized Microchip to replace Fujitsu's permit renewal application with one more closely reflecting Microchip's semiconductor manufacturing process emissions. Microchip submitted a modified permit application on November 26, 2002.

4. The old ACDP was converted to a Standard ACDP in accordance with the rules adopted in May 2001.

5. This permit renewal updates the existing permit to include current applicable conditions, increases the GHG PSEL that was previously set to keep the facility out of Title V permitting and modifies emission factors to be based on chemical usage instead of production parameters. A moderate technical modification is included in this permit renewal, under the same application number, to increase the GHG PSEL.

OTHER PERMITS AND REGISTRATION

6. Other permits issued or required by DEQ for this source include a No Exposure Certification for Stormwater. Microchip is also registered as a Large Quantity Generator (LQG) of hazardous waste with DEQ.

ATTAINMENT STATUS

7. The source is located in maintenance areas for carbon monoxide (CO) and ozone (O_3). The permittee is a small source of volatile organic compounds (VOCs) and nitrogen oxides (NOx), both ozone precursors, and of CO. The area is in attainment for all other pollutants.

COMPLIANCE

8. The facility was inspected on March 17, 2016, and found to be in compliance with permit conditions. No enforcement actions have been taken during this last permit cycle.

9. During the prior permit period there were no complaints recorded for this facility.

SOURCE DESCRIPTION

10. The general layout of the air contaminant sources at the facility consist of the following:

Amount	Equipment/Process	Capacity	Control Equipment	Installed
Building 1				
1	Semiconductor Fab	N/A	Wet scrubber systems	1988
3	Boilers 1, 2, 3	12.565 mmBtu/hr each	low-NOx burners	1988
2	Emergency Generators	1,456 hp each	N/A	1988
Building 2				
1	Semiconductor Fab	N/A	Wet scrubber systems	1996
1	Semiconductor Fab	N/A	CTO*	1996
3	Boilers 4, 5, 6	29.291 mmBtu/hr each	Low-NOx burners	1996
3	Emergency Generators	1,582 hp each	N/A	1996

* The CTO is physically located at Building 2, but serves both Building 1 and Building 2.

11. The facility emissions are controlled by several wet scrubber systems (for ammonia and acid gas emission control) and a CTO for VOC emission control. A single CTO treats VOC emissions from both Building 1 and Building 2.

The wet scrubber systems are variously manifolded into common exhaust manifolds and individual as well as combined emission stacks. A given combination of wet scrubbers, their associated exhaust fans, and stacks results in a "discharge point" or "wet scrubber system." A wet scrubber system can have several or single "stacks" and several or single wet scrubbers/manifolded exhaust fans serving it. The following table shows that there are six wet scrubber discharge points (1-3 through 2-3) and one CTO discharge point (2-4). Therefore, for purposes of the ACDP, there are six "wet scrubber systems."

Air Emission Discharge Points

Common Name	Microchip ID	DEQ ID	Exhaust Discharge Point ID	# of Fans*	Design Flow Rate (cfm)
Ammonia Scrubber	S-4	DEQ-4	1-3	2	13,500
Acid Scrubber	S-2	DEQ-2	1-4	2	28,000
Acid Scrubber	S-5	DEQ-5	1-4	2	36,000
Acid Scrubber	S-6	DEQ-6	1-5	2	16,000
Ion Implant Scrubber	S-9	DEQ-16	2-1	7	14,500
CVD Scrubber	S-11	DEQ-16	2-1	7	30,000
Acid Scrubber	S-13	DEQ-16	2-1	7	42,300
CVD Scrubber	S-14	DEQ-16	2-1	7	30,000
Acid Scrubber	S-15	DEQ-16	2-1	7	42,300
Acid Scrubber	S-16	DEQ-16	2-1	7	42,300
Nitric Scrubber	S-10	NA	2-2	2	7,400
Ammonia Scrubber	S-12	NA	2-3	2	26,900
CTO	C-1	NA	2-4	2	29,000

* Note: Number of exhaust fans pulling air through discharge point.

CONTINUOUS MONITORING DEVICES

12. The facility has the following continuous monitoring devices:
    a. The CTO is continuously monitored for the temperature in its combustion chamber.
    b. The wet scrubber systems are continuously monitored for the flow rate of recirculation water and pH.

SPECIAL CONDITIONS

13. The permittee must notify DEQ in writing of the date any additional VOC or acid gas control device begins treating process exhaust, within seven (7) days.

14. Except for change of materials that existing equipment is capable accommodating, the permittee must notify DEQ in writing of a change in the recipe of chemicals that changes the emission factors and the revised emission factors used in the Fab processes. This notification must include an analysis of how the changes in the emission factors affect plant site emissions relative to the PSEL.

EMISSIONS

15. The Baseline Emission Rate for the facility is zero since it was constructed after 1978.

16. The Microchip permit renewal application projects maximum potential emissions at full operation of the facility using Microchip's proprietary processes.

17. The following table shows the current (2013) PSEL and the proposed (2019) PSEL:

Pollutant	Current (2013) PSEL (tpy)	Proposed (2019) PSEL (tpy)
PM	24	24
PM_{10}	14	14
$PM_{2.5}$	9	9
SO_2	39	39
NOx	39	39
CO	99	99
VOC	39	39
Single HAP	9	9
Combined HAPs	24	24
Fluorides	2.9	2.9
GHG	74,000	181,000

SIGNIFICANT EMISSION RATE ANALYSIS

18. For each pollutant, the proposed Plant Site Emission Limit is less than the Netting Basis plus the significant emission rate, thus no further air quality analysis is required.

CALCULATION METHODOLOGY

19. The PSELs for the Microchip permit were calculated by using a set of emission factors (EFs) provided by manufacturers and the permittee and using the following methodology:

a. Boilers Combustion Emissions –Boilers 1 through 3 serve Building 1 and Boilers 4 through 6 serve Building 2. All of the boilers are capable of combusting both natural gas and #2 oil. The boilers are considered "gas-fired boilers" that burn gaseous fuels not combined with any solid fuels and burn liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance or operator training on liquid fuel. Periodic testing, maintenance, or operator training on liquid fuel does not exceed a combined total of 48 hours per boiler during any calendar year.

In addition, although there are six boilers on site, typically at least one of the boilers in each building is in hot standby and is not used. Therefore, in order to calculate potential emissions from the boilers, assumptions regarding annual load factor and the amount of oil versus natural gas burned were made.

The maximum annual emissions from boiler natural gas combustion is calculated based on a load factor of 35% across all boilers operating simultaneously. (This is roughly equivalent to one of three boilers serving each building at full load and the other two boilers serving each building in standby).

The EFs were provided by the manufacturers of the boilers and are contained in the permit and the application.

b. Generator Combustion Emissions – All of the generators combust ultra low sulfur distillate oil. These units are used for emergency power only when electricity is curtailed from the manufacturing facility.

c. CTO Combustion Emissions - Criteria pollutant emissions from natural gas combustion in the CTO are calculated in the same manner as the boilers. The emission factors were provided by the manufacturer and are shown in the permit and the application.

d. Building 1 and Building 2 Fab Emissions – Emissions from semiconductor manufacturing processes are calculated based on the use of materials containing air pollutants or precursors for air pollutants. The quantities of materials are determined by reviewing Microchip's parts inventory, locating the materials of interest by part number, and computing the quantity of air pollutant or precursor used based on the material's composition determined by analytical testing, vendor statement, SDS, or other appropriate method.

Emission factors (EF) for the Fab processes are in units of lb / lb chemical or precursor. The factors are calculated based on the following information: Amount of chemical consumed in the process tool and any built-in point-of-use abatement (POU); Percent weight of each chemical and/or precursor in the material; Chemistry of conversion of the chemical into air pollutants. Emissions are determined by multiplying the total pounds of chemical or precursor used by the associated EF. Control efficiencies for the centralized scrubber system or RCTO are applied if the pollutant is removed in either system.

The emission factors used for calculating Fab emissions are provided in detail in the air contaminant discharge permit renewal application. These emissions may include pollutant classes such as: hazardous air pollutants (HAPs), particulate matter (PM) emissions from non-combustion sources, volatile organic compounds (VOCs), carbon dioxide (CO2), greenhouse gases and other miscellaneous criterial pollutants. The emission factors are derived from a number of sources including: Microchip's knowledge and experience with these or similar tools and processes; specific chemistries or recipes of chemicals from multiple processes; professional engineering consultation and industry specific knowledge. If there is a change in the formulation of chemicals in the manufacturing process, the facility will recalculate the emission factors and analyze whether they will cause an increase in emissions that may exceed the PSEL. The facility must notify DEQ of any change in emission factors.

Total fluorides are calculated by multiplying total calculated HF emissions by the empirically determined ratio of fluorides to HF. This EF is based on previous fluorides source testing results and is specified in Section 17 Emission Factors.

The EFs are for emissions that pass through an emission point. Fugitive VOC emissions are also emitted from Fab processes, and are calculated based on a mass balance methodology.

SOURCE TESTING

20. Microchip is required to conduct a source test of the wet scrubber systems, in accordance with a DEQ-approved pretest plan, to confirm that the HF and HCl destruction removal efficiency is at least 90% or that the facility-wide volumetric flow-weighted average outlet concentration of HF and HCl in the wet scrubber systems is less than 1 part per million by volume (ppmv) each.

The source test will be conducted for each of the wet scrubber systems in accordance with the DEQ-approved pretest plan. The removal efficiency will be determined by measuring the inlet HF and HCl mass and the outlet HF and HCl mass at the same time.

Source testing must be completed once during this permit cycle at least 180 days prior to the scheduled expiration date.

At semiconductor facilities, it is common for the inlet concentration of acid gases and other pollutants of interest to have very low (less than 1 ppmv) inlet concentrations. At low concentrations, measuring removal efficiency is problematic and the scrubbers themselves may not be as efficient. Therefore, if the facility-wide volumetric flow-weighted average outlet concentration of HF and HCl is found to be less than 1 ppmv each during the source test, but the HF or HCl removal efficiency for one or more wet scrubber systems is less than 90%, the facility is deemed compliant.

To determine the facility-wide volumetric flow-weighted average HF and HCl concentrations, the following equation is used.

$$C_x = \sum VF_n \times C_{xn} / \sum VF_n$$

Where:

C = Volumetric flow-weighted average concentration of pollutant x (HF or HCl)
VF_n = volumetric flow rate of wet scrubber system n
C_{xn} = Concentration of pollutant x in each of the n wet scrubber systems
n = facility wet scrubber systems 1 through 6
x = pollutant HF or HCl

PRIOR TESTING RESULTS

21. The results of the most recent source tests are listed below:

Emission Device	Test Date	Production Rate	Pollutant	Measured Value
PEI-001	6/3/2015	6433 WIP 9864 WM	HF	$<2.8\times10^{-7}$lbs/WIP $<1.9\times10^{-7}$lbs/WM <0.0017 lbs/hr
			HCl	$<1.5\times10^{-6}$lbs/WIP $<9.7\times10^{-7}$lbs/WM <0.0091 lbs/hr
			Fluorides	$<2.6\times10^{-7}$lbs/WIP $<1.7\times10^{-7}$lbs/WM <0.0016 lbs/hr
PES-003	6/4/2015	7285 WIP 10,404 WM	HF	$<4.8\times10^{-7}$lbs/WIP $<3.4\times10^{-7}$lbs/WM <0.0032 lbs/hr
			HCl	$<1.8\times10^{-6}$lbs/WIP $<1.3\times10^{-6}$lbs/WM

Emission Device	Test Date	Production Rate	Pollutant	Measured Value
				<0.012 lbs/hr
			Fluorides	$3.3x10^{-7}$lbs/WIP $2.3x10^{-7}$lbs/WM 0.0055 lbs/hr
PES-002	6/4/2015	6914 WIP 9800 WM	HF	$<5.5x10^{-7}$lbs/WIP $<3.9x10^{-7}$lbs/WM 0.0036 lbs/hr
			HCl	$<1.9x10^{-6}$lbs/WIP $<1.4x10^{-6}$lbs/WM <0.012 lbs/hr
			Fluorides	$<3.6x10^{-7}$lbs/WIP $<2.8x10^{-7}$lbs/WM <0.0059 lbs/hr
PES-001	6/5/2015	6441 WIP 9356 WM	HF	$<5.4x10^{-7}$lbs/WIP $<3.7x10^{-7}$lbs/WM <0.0033 lbs/hr
			HCl	$<2.1x10^{-6}$lbs/WIP $<1.4x10^{-6}$lbs/WM <0.013 lbs/hr
			Fluorides	$<5.8x10^{-8}$lbs/WIP $<3.5x10^{-8}$lbs/WM <0.0036 lbs/hr
PEC-002	6/6/2015	6376 WIP 9586 WM	HF	$<4.5x10^{-7}$lbs/WIP $<3.0x10^{-7}$lbs/WM <0.0027 lbs/hr
			HCl	$<1.6x10^{-6}$lbs/WIP $<1.1x10^{-6}$lbs/WM <0.0097 lbs/hr
			Fluorides	$<1.2x10^{-7}$lbs/WIP $<8.1x10^{-8}$lbs/WM <0.0034 lbs/hr
PEC-001	6/7/2015	6439 WIP 9072 WM	HF	$<4.1x10^{-7}$lbs/WIP $<2.9x10^{-7}$lbs/WM <0.0025 lbs/hr
			HCl	$<1.5x10^{-6}$lbs/WIP $<1.1x10^{-6}$lbs/WM <0.0093 lbs/hr

Emission Device	Test Date	Production Rate	Pollutant	Measured Value
			Fluorides	<1.7x10^{-7}lbs/WIP <1.2x10^{-7}lbs/WM <0.0035 lbs/hr
PEA-001	6/8/2015	7015 WIP 10,242 WM	HF	<7.9x10^{-7}lbs/WIP <5.4x10^{-7}lbs/WM <0.0051 lbs/hr
			HCl	<2.0x10^{-6}lbs/WIP <1.4x10^{-6}lbs/WM <0.013 lbs/hr
			Fluorides	<6.1x10^{-7}lbs/WIP <4.2x10^{-7}lbs/WM <0.0039 lbs/hr
PEN-001	6/9/2015	6813 WIP 9721 WM	HF	1.0x10^{-7}lbs/WIP 7.0x10^{-8}lbs/WM 0.0006 lbs/hr
			HCl	<7.8x10^{-7}lbs/WIP <5.5x10^{-7}lbs/WM <0.0048 lbs/hr
			Fluorides	<1.6x10^{-8}lbs/WIP <1.2x10^{-8}lbs/WM <0.0007 lbs/hr
PEA-004	6/10/2015	7077 WIP 10,324 WM	HF	<1.1x10^{-7}lbs/WIP <7.8x10^{-8}lbs/WM <0.0008 lbs/hr
			HCl	<4.3x10^{-7}lbs/WIP <2.9x10^{-7}lbs/WM <0.0029 lbs/hr
			Fluorides	<4.3x10^{-8}lbs/WIP <2.9x10^{-8}lbs/WM <0.0008 lbs/hr
PES-005	6/10/2015	7084 WIP 8990 WM	HF	<2.2x10^{-6}lbs/WIP <1.7x10^{-6}lbs/WM 0.014 lbs/hr
			HCl	<2.6x10^{-6}lbs/WIP <2.1x10^{-6}lbs/WM <0.018 lbs/hr
			Fluorides	<1.6x10^{-6}lbs/WIP

Emission Device	Test Date	Production Rate	Pollutant	Measured Value
				<1.3x10^{-6}lbs/WM 0.025 lbs/hr
PES-006	6/11/2015	6694 WIP 9038 WM	HF	3.0x10^{-7}lbs/WIP 2.2x10^{-7}lbs/WM 0.0019 lbs/hr
			HCl	<7.4x10^{-7}lbs/WIP <5.4x10^{-7}lbs/WM <0.0048 lbs/hr
			Fluorides	5.9x10^{-8}lbs/WIP 4.4x10^{-8}lbs/WM 0.0023 lbs/hr
Concentrator Inlet	6/4/2015	6847 WIP 8803 WM	VOC as propane	6.4 lbs/hr 47.5 ppmvd
Concentrator outlet	6/4/2015	6847 WIP 8803 WM	VOC as propane	0.18 lbs/hr 1.6 ppmvd
CTO Exhaust	6/4/2015	6847 WIP 8803 WM	VOC as propane	0.033 lbs/hr 2.1 ppmvd

WIP = Wafers in process
WM = Wafer moves
ppmvd = parts per million volume dry

MAJOR SOURCE APPLICABILITY

POLLUTANTS

Pollutant	Proposed PSEL (tons per year)	Major Source Threshold (tons per year)
PM	24	25
PM_{10}	14	15
$PM_{2.5}$	9	10
SO_2	39	40
NOx	39	40
CO	99	100
VOC	39	40
Single HAP	9	10
Combined HAPs	24	25
Fluorides	2.9	3.0
GHG	181,000	75,000

* Note: All PM emissions are assumed to be PM_{10} and $PM_{2.5}$.

22. A major source is a facility that has the potential to emit more than 100 tons per year of any criteria pollutant. Although the Fab emissions of this facility have the potential to produce in excess of 100 tons of VOCs uncontrolled, the presence of control devices which are intrinsic to the manufacturing process limits its potential-to-emit.

23. In addition, the permittee has elected to request federally enforceable PSELs below the major source threshold levels. Therefore, this facility is not a major source of criteria pollutants.

24. GHG emissions in excess of the significant emission rate do not trigger any additional program requirements (NSR or Title V) on their own, only if another pollutant triggers one of these programs. In other words, GHG does not make the facility a major source.

HAZARDOUS AIR POLLUTANTS

Pollutant	Annual Emissions (tons per year)	Major Source Threshold (tons per year)
Hydrogen Chloride	0.3	10
Hydrogen Fluoride	2.1	10
Other minor HAPs	0.3	10
Total HAPs	2.7	25

25. A major source is a facility that has the potential to emit 10 or more tons/year of any single HAP or 25 or more tons/year of combined HAPs. Although the Fab emissions of this facility has the potential to produce in excess 10 tons of individual HAPs or 25 tons of combined HAPs uncontrolled, the presence of control devices which are intrinsic to the manufacturing process limits its potential-to-emit.

26. In addition, the permittee has elected to request federally enforceable PSELs below the major source threshold levels. Therefore, this facility is not a major source of individual or combined HAPs.

ADDITIONAL REQUIREMENTS

NSPS APPLICABILITY

27. 40 CFR Part 60, Subpart Dc is applicable to all three boilers in Building 2 since they were constructed after June 9, 1989 and are greater than 10 mmBtu/hr in capacity.

28. 40 CFR 60, Subpart IIII does not apply to the Compression ignition engines at the facility because they all predate the subpart applicability date.

NESHAPS/MACT APPLICABILITY

29. A National Emission Standard for Hazardous Air Pollutants (NESHAP Subpart BBBBB) for semiconductor manufacturing facilities was proposed by EPA on February 2, 2003. This facility is not subject to this NESHAP since it is not a major source of HAPs.

30. NESHAP Subpart ZZZZ is applicable to the reciprocating internal combustion engines at the facility and the subpart requirements have been included in the permit.

RACT APPLICABILITY

31. The facility is located in the Portland AQMA, but it is not one of the listed source categories in OAR 340-232-0010, thus the categorical RACT rules do not apply.

32. The pre-control emissions of VOC are greater than 100 tons per year, and, per OAR 340-232-0020(4) and 340-232-0040(1), the facility is subject to case by case Reasonably Available Control Technology (RACT) requirements. However, the CTO controls VOC emissions by a minimum of 90%. In addition, the permittee has requested a federally enforceable PSEL below the RACT threshold level.

TACT APPLICABILITY

33. A formal TACT analysis has not be conducted, but the source is likely meeting the state's TACT by conducting the following activities:
    a. VOC emissions are controlled by the CTO to a minimum DRE of 90%;
    b. Acid gas emissions are controlled by the wet scrubber systems to a DRE of 90% or a facility-wide volumetric flow-weighted outlet concentration of HF and HCl of less than 1 ppmv each; and
    c. All boilers are equipped with low-NO_x burners and are primarily fueled with natural gas.

GREENHOUSE GASES

34. This permit renewal increases the PSEL for Greenhouse Gases (GHG). The PSEL was previously set at 98,000 tons/year to keep the facility below the Title V threshold, because actual emissions are greater than the reporting threshold (deminimis level) of 2,756 tons/year (2,500 metric tons/year) of carbon dioxide equivalent (CO_2e). The GHG PSEL is being increased in this permit renewal to allow the facility to utilize existing capacity. GHG emissions do not trigger either New Source Review or Title V permitting on their own, only if another pollutant triggers one of those programs. A Baseline for GHG emissions has not been established, but could be reviewed in the future.

PUBLIC NOTICE

35. Pursuant to OAR 340-216-0066(4)(a)(A), issuance of Standard Air Contaminant Discharge Permits require public notice in accordance with OAR 340-209-0030(3)(c), which requires DEQ to provide notice of the proposed permit action and a minimum of 35 days for interested persons to submit written comments. In addition, a hearing will be scheduled to allow interested persons to submit oral or written comments. If DEQ receives written request for a hearing from ten persons, or from an organization representing at least ten persons, within 35 days of the mailing of the public notice. If a hearing is scheduled, DEQ will provide a minimum of 30 days notice for the hearing. **The public notice was emailed/mailed on Friday May 17, 2019 and the comment period ended on Friday June 21, 2019 at 5 p.m.**

- One comment was received during the public notice. That comment and DEQs response is attached below.

Microchip Technology Standard ACDP 26-3240-ST-01

Response to Comments

Public Comment from Gregg Lande of Northwest Portland lande.gregg@gmail.com

Comment
It appears the Public Notice is missing the usual Table 2 of Emissions for HAP. This is a significant oversight.
In addition, the information about specific HAP covered in the permit is extremely limited. Aside from HF, what are other fluorides being released; as particles or gases? Are there no metal HAP emissions? Since HAP emissions are associated more with local impacts than area-wide impacts as are the criteria pollutants, it would be preferable to have a site map which shows where these emissions are located.
The public deserves to be given this information, and I believe the Department may even be required to provide it.

DEQ response
Table 2 for HAPs was not included in the public notice cover page because of the level of emissions expected from the facility. However, the HAP information is included in the review report, that was attached as part of the public notice package, along with source test data to support the emission estimates.

Under the current DEQ air quality program additional requirements are only triggered if a HAP is emitted at major source threshold levels (10 tons/year of individual HAP or 25 tons/year of combined HAPs). Since the total estimated HAP emissions are 2.7 tons/year, and there are no

area source NESHAPs that apply to the manufacturing process at Microchip, DEQ did not repeat the information from the review report into the public notice cover page.

Current DEQ regulations are for airshed management and do not address localized impacts or the form fluorides and HAPs are emitted. Localized impacts of toxic air pollutants will be addressed when Microchip is called into the Cleaner Air Oregon program or they make a major modification that triggers CAO requirements. Note: Fluorides are included in the list of toxic air pollutants.

The public notice cover page along with the permit and review report provide the information that is required by the DEQ regulations. If additional information is desired all of DEQs records are open for public inspection. If an individual wants to refer to a site map or other detailed information they could review the files for such an item.

Oregon
Kate Brown, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah St Ste 600
Portland, OR 97232-4100
(503) 229-5263
FAX (503) 229-6945
TTY 711

June 21, 2019

Bret Herbert
Microchip Technology Inc
21015 SE Stark Street
Gresham OR 9730 2015

Re: Renewal of a Standard Air Contaminant Discharge Permit
Permit Number **26-3240-ST-01** Application Number **029474**

The Department of Environmental Quality has completed its review and public notice for Microchip Technology's Standard permit renewal. The facility is located at 21015 SE Stark Street in Portland. Based on the information in the renewal application and public notice, DEQ has issued the enclosed permit.

The effective date of the permit modification is the date it was signed by the regional Air Quality Manager. The signature and date appear on the first page of the document. The permit modification is issued pursuant to Oregon Revised Statutes 468A and Oregon Administrative Rules (OAR) 340-14-005 through 340-14-050, and 216-0010 through 216-0100.

You may appeal conditions or limitations contained in the attached permit modification by applying to the Environmental Quality Commission, or its authorized representative, within twenty days from the date of this letter. Appeals are pursuant to ORS Chapter 183 and OAR Chapter 340, Division 14-025 (6). Appeal procedures are contained in OAR Division 11-005 through 11-140.

A copy of the current permit along with the modification must be available at the facility at all times. Failure to comply with permit conditions may result in civil penalties. **You are expected to read the permit carefully and comply with all conditions** to protect the environment of Oregon.

If you have any questions, please contact Dave Kauth at 503-229-5053.

Sincerely,

Matt Hoffman, Air Quality Manager
DEQ Northwest Region

Enclosure
Cc: HQ/AQ

State of Oregon
Department of
Environmental
Quality

STANDARD
AIR CONTAMINANT DISCHARGE PERMIT

Department of Environmental Quality
Northwest Region
700 NE Multnomah St., Suite 600
Portland, OR 97232

This permit is being issued in accordance with the provisions of ORS 468A.040 and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Microchip Technology Incorporated
21015 SE Stark Street
Gresham, OR 97030

INFORMATION RELIED UPON:

Application No.: 034318
Date Received: 09/21/2022

PLANT SITE LOCATION:

Gresham Fab 4
21015 SE Stark Street
Gresham, OR 97030

LAND USE COMPATIBILITY FINDING:

Approving Authority: City of Gresham
Approval Date: 06/29/1995

ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY

Joshua Alexander

Joshua Alexander, Northwest Region Air Quality Permit Manager

06/06/2023

Dated

Sources Permitted to Discharge Air Contaminants (OAR 340-216-8010):

Table 1 Code	Source Description	SIC (NAICS)
Part B, 85	Sources which would have the emission capacity of 10 or more tons of any single criteria pollutant. Semiconductor manufacturing.	3674 (334413)
Part B, 13	Oil-fired boilers whose total heat input rating at the source is over 10 MMBtu/hr; or individual natural gas boilers over 30 MMBtu/hr or greater heat input rating.	4961 (221330)

Addendum Number R-01

In accordance with OAR 340-216-0020, Conditions 1.7, 3.1, 4.2, 5.1, 6.1 and 9.1 are the only changes and now read as follows:

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1.0 GENERAL EMISSION STANDARDS AND LIMITS

1.7. Emergency Stationary RICE

The permittee must comply with the following requirements for each emergency stationary reciprocating internal combustion engine (RICE): [40 CFR 63.6640(f)]

a. Change oil and filter every 500 hours of operation or annually, whichever comes first. [40 CFR 63. 6603(a), table 2d(4)(a)] The permittee may elect to comply with the oil analysis requirements of 40 CFR 63.6625(i) in lieu of the oil change requirement. Oil analyses must be conducted at the same frequency as the oil change requirement;

b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; [40 CFR 63.6603(a), table 2d(4)(b)]

c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary; [40 CFR 63.6603(a), table 2d(4)(c)]

d. During periods of startup, minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply; and [40 CFR 63.6603(a), table 2d]

e. The permittee must install a non-resettable hour meter on each emergency stationary RICE, if one is not already installed. [40 CFR 63.6625(f)]

3.0 TYPICALLY ACHIEVABLE CONTROL TECHNOLOGY (TACT)

3.1. VOC Emissions

The permittee must control Volatile Organic Compound (VOC) emissions from Building 1 and Building 2 manufacturing operations with rotor concentrator thermal oxidizers (RCTOs) that must each achieve a minimum 90% destruction removal efficiency (DRE) of VOCs entering the RCTOs when the inlet VOC concentration (measured as propane) is 90 ppmv or greater. If/when the inlet VOC concentration falls below 90 ppmv, the outlet VOC concentration (measured as propane) must not exceed 10 ppmv.

4.0 OPERATION AND MAINTENANCE REQUIREMENTS

4.2. Highest and Best Practicable Treatment and Control

The permittee must comply with the following conditions pertaining to the operation of its thermal oxidizer(s): [OAR 340-226-0120]

a. The oxidizer temperature and desorption chamber temperature of each RCTO unit must be maintained such that the temperatures of the unit are sustained and do not drift more than 25 °F below the required minimum temperatures or the temperatures recorded during the most recent DEQ approved source test demonstrating compliance with

applicable emissions limits in Condition 3.1 based on a three-hour average:

i. The required minimum oxidizer temperature is 1,375 °F;

ii. The required minimum desorption chamber temperature is 360 °F;

iii. If the oxidizer or desorption chamber temperatures drop to more than 25 °F below the required temperatures or the temperatures recorded during the most recent DEQ approved source test demonstrating compliance with applicable emissions limits in Condition 3.1 based on a three-hour average, the permittee must immediately investigate and commence corrective action to return the temperatures to the established operating range; and

iv. The temperature falling below this emission action level is not a violation of this permit condition; however, it is a violation of this permit condition if the permittee fails to immediately investigate and commence corrective actions to correct the operating temperature after it has fallen below the range.

b. A continuous temperature monitoring system must be used to monitor and record the oxidizer temperature and desorption chamber temperature of each RCTO unit at all times the unit is operating.

5.0 PLANT SITE EMISSION LIMITS

5.1. Plant Site Emission Limits (PSEL)

The permittee must not cause or allow plant site emissions to exceed the following: [OAR 340-222-0041 and OAR 340-222-0060]

Pollutant	Limit	Units
PM	9	tons per year
PM_{10}	9	tons per year
$PM_{2.5}$	9	tons per year
SO_2	3	tons per year
NO_X	39	tons per year
CO	84	tons per year
VOC	34	tons per year
GHGs (CO2e)	279,300	tons per year
Single HAP	5	tons per year
Combined HAPs	9	tons per year
Fluorides	2.9	tons per year

All PM is assumed to be PM_{10} and all PM_{10} is assumed to be $PM_{2.5}$. Fluorides are calculated using the site specific fluorides emission factor based on 2015 emission testing results. HAP PSELs are included because uncontrolled PTE is greater than the major source threshold.

6.0 COMPLIANCE DEMONSTRATION AND SOURCE TESTING

6.1. Testing Requirements

The permittee must conduct a source test of the control devices as specified below: [OAR 340-212-0120]

a. Once during this permit cycle the permittee must perform a performance test of each wet scrubber system to determine the HF and HCl destruction removal efficiency (DRE);

b. Within 180 days after two of the new RCTO units are brought into normal operation the permittee must perform a performance test of each RCTO to determine the VOC DRE, unless an alternative date is approved by Oregon DEQ. Normal operation is defined when the RCTOs are fully operational and when VOC process exhaust is routed to two of the new RCTOs;

c. Source testing must be conducted while the facility is operating within 90% its normal operating capacity at the time of the test. Sampling must take place under worst case operating conditions observed during normal operations (i.e., redundant control devices should not be operating during testing);

d. Gas concentrations must be sampled at the inlet and outlet of each wet scrubber system and each RCTO to demonstrate the system's DRE. The source test report must include the DRE demonstrated during each test run as well as the average DRE for the three test runs. As an alternative, the permittee can sample only the outlet of the wet scrubber systems to demonstrate compliance with the 1 ppmv HF and HCl limitations as listed in Condition 3.2;

e. During each source test the following parameters must be monitored and recorded:
   i. RCTO oxidizer and desorption chamber temperatures;
   ii. Pressure drop across concentrator wheel of the RCTO;
   iii. RCTO natural gas usage;
   iv. Recirculation flow rate and pH of the wet scrubbers; and
   v. Other facility/process operating parameters identified prior to the test.

f. Only regular operating staff may adjust the combustion system or production processes and emission control parameters during the source test and within two hours prior to the tests. Any operating adjustments made during the source test, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source test invalid;

g. A pretest plan for each source test required above must be submitted for approval to DEQ’s Source Test Coordinator at the ODEQ Northwest Regional Office, at least 30 days prior to testing;

h. The reference test methods identified in the table below must be utilized in the source tests identified above. A test method modification/variance or substitution of an alternative test method must be pre-approved by the DEQ’s Source Test Coordinator and

i. All tests must be conducted in accordance with the DEQ’s Source Sampling Manual and with the pretest plan. All test data and results must be submitted to the Source Test

Coordinator for review within 60 days after completion of the testing cycle unless an

j. alternate submission date or extension is approved by DEQ.

Reference Test Method	Tested pollutant/parameter
EPA 1&2	Flow Rate
EPA 3	Dry Molecular Weight
EPA 4 or ODEQ Method	Moisture
EPA 25A	Total VOC
EPA 26, 26A, 320 or ASTM D6348-12	HF & HCl

9.0 MONITORING CONDITIONS

9.1. Continuous Monitoring

The permittee must monitor and maintain the following records related to the operation of control devices continuously during all hours of operation: [OAR 340-226-0120]

a. The oxidizer and desorption chamber temperature of each RCTO must be continuously monitored and reduced to an hourly average (one hour block average). For the purpose of this condition, "continuously monitored" means that measurements are taken at a frequency of not less than once every 15 minutes;

b. Wet scrubber recirculation flow rate and pH; and

c. The permittee is presumed to be in compliance with the 20% visible emissions standard and the 0.10 gr/dscf particulate emissions standard as long as the boilers burn natural gas.

Appendix E

Source Test Protocol and Acceptance

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5263
FAX (503) 229-6945
TTY 711

February 20, 2024

Becky Kim
Microchip Technology, Inc.
21015 Stark Street
Gresham, OR 97030

Steve Hall
Spectrum Environmental Solutions
2340 West Braker Lane, Suite A
Austin, TX 78758

Microchip Technology Inc.
Permit Number 26-3240-ST-01
Scrubber Source Testing
2024 Test Plan Approval

Becky Kim and Steve Hall:

The source test plan received on January 26, 2024 for source testing at the Microchip Technology, Inc. (Microchip) facility located in Gresham has been reviewed. The test plan states that twelve wet scrubber outlets will be tested for emissions of hydrogen chloride (HCl) and hydrogen fluoride (HF). Three acid gas scrubbers (PES-002, PES-005 & PES-006) and one ammonia scrubber (PEA-004) controlling emissions from Fab 4 building 1 will be tested. Three acid gas scrubbers (PES-001, PES-002 & PES-003), one ammonia scrubber (PEA-001), two chemical vapor deposition (CVD) scrubbers (PEC-001 & PEC-002), one nitric acid scrubber (PEN-001) and one ion implant scrubber (PEA-001) controlling emissions from Fab 4 building 2 will be tested. Testing will determine compliance with the flow weighted HCl and HF concentration limits of Permit Condition 3.2 and verify HAP emission factors. The source test plan is approved with the following conditions:

GENERAL PROCESS CONDITIONS

1. Only regular operating staff may adjust the production process and emission control parameters during the source performance tests and within two (2) hours prior to the tests. Any operating adjustments made during the source performance tests, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source performance test invalid.

2. It is acceptable to postpone a scheduled test or suspend a test in progress if the discontinuation is due to equipment failure beyond the facility's control, construction delays beyond the facility's control, severe meteorological conditions, and situations that would jeopardize the safety of the testing contractors and/or operators. If the test is underway, the permittee should make every effort to complete the test run. All recoverable test information (process & sample data) must be available for DEQ review.

   It is unacceptable to postpone or suspend a test run in progress if it is discontinued because the source is not able to comply with an emission limit or verify an emission

factor. The permittee must provide DEQ written documentation explaining the reasons for the postponement or stoppage, and any data collected prior to the stoppage.

3. Source testing must be conducted while the facility is operating within 90% its normal operating capacity at the time of the test. Sampling must take place under worst case operating conditions observed during normal operations (i.e., redundant control devices should not be operating during testing). Production data supporting that the conditions tested are representative maximum operating capacity must be included in the source test report. Supporting production data should be from the 12-month period immediately preceding testing.

4. During source testing the following process and control device operating parameters shall be monitored and recorded. All process and control device parameters are to be reported for each individual test run and averaged for all test runs if appropriate.
    - Scrubber recirculation flow rate (gpm)
    - Scrubber water pH
    - Applicable production rate(s) (wafer moves, wafer starts or wafers in progress per day)
    - HCl and HF precursor material usage (lb usage per day or month)

EPA METHODS 1-4 CONDITIONS

5. Sampling locations should meet EPA Method 1 & 2 criteria whenever possible. Documentation including clear diagrams must be provided in the source test report. If a location does <u>not</u> meet EPA Method 1 & 2 criteria, but the location is found to be not cyclonic (average null angle of < 20˚), the sampling location may be used with a 16-point traverse as proposed in the test plan. If cyclonic flow is found to be greater than 20˚, an alternative sampling location must be used, or flow straighteners must be installed.

6. The exhaust ducts must be checked for cyclonic flow prior to starting testing. Documentation of this must be provided in the test report.

7. A nominal molecular weight of 29 g/mol may be used if scrubber exhaust gas is confirmed to be essentially ambient air. O_2 and CO_2 must be measured prior to or during testing to verify scrubber exhaust has a molecular weight similar to ambient air. Exhaust gas results showing O_2 and CO_2 concentrations that are within 5% of atmospheric levels (ambient levels are 20.9% for O_2 and 0.04% for CO_2) or within 0.5% absolute will be considered essentially ambient air. If results fall outside the range specified, EPA Method 3A or an approved alternative must be used to quantify O_2 and CO_2 concentrations for the duration of testing. Documentation of the molecular weight confirmation procedure described above must be included in the appendix of the test report.

8. Moisture may be determined by FTIR (ASTM D6348-12) instead of EPA Method 4.

ASTM D6348-12 CONDITIONS

9. The sampling system(s) must be leak-checked before and after testing each scrubber (before the first run and after the last run). Results of the leak check are to be documented within the test report.

10. Spectra collected during testing must be provided to DEQ.

11. The ASTM D6348-12 quality assurance procedures outlined in section 4.5 of the test plan are approved with the following exception. The required pretest procedures outlined in section A4 of the test method must be conducted on each sampling system used prior testing. Target analytes, HCl and HF, must be used for the analyte spiking technique outlined in section A5 of the method. If the same sampling systems are reused to test other scrubbers, the initial spike recoveries can be used to satisfy this requirement. Other quality assurance procedures must be followed. However due to the large number of sources which will be tested during this campaign, DEQ has concerns about the integrity of the sampling system(s) degrading over the course of testing. **DEQ is requiring that a second round of analyte spiking to occur on all sampling systems used following the completion of testing to bracket the sampling and ensure significant deterioration has not occurred.** If the posttest spiking procedure does not meet method specifications DEQ may reject testing since the last day a passing spike recovery occurred. Spectrum may elect to perform additional spiking as desired to ensure integrity of sampling systems.

12. If a mass flow controller is used for the analyte spiking procedure (in lieu of tracer gas), the most recent calibration record must be included in the test report.

13. If concentrations of HCl and HF are below the detection limit, the value should be reported as less than the detection limit.

14. HCl and HF emissions must be reported as indicated below for each individual test run and averaged for all three test runs. Hand calculations must be provided for at least one test run.
    - ppmvd
    - ppmvd (Facility-wide flow weighted average)
    - lb/hour
    - lb HCl/HF emitted per lb HCl/HF precursor material used (If tested precursor material usage is deemed representative of normal monthly operations)

GENERAL TESTING CONDITIONS

15. The test report must be submitted to DEQ within 60 days after the completion of testing.

16. The DEQ must be notified of any changes in the source test plan and/or the specified methods prior to testing. Significant changes not acknowledged by the DEQ could be the basis for invalidating a test run and potentially the entire testing program. Documentation of any deviations must include an evaluation of the impact of the deviation on the test data.

17. Method-specific quality assurance/quality control (QA/QC) procedures must be performed to ensure that the data is valid for determining source compliance. This must be done whether or not DEQ representatives are on-site to observe the testing and whether or not a QA/QC requirement has been specifically acknowledged and approved by DEQ. Only method-specific requirements explicitly exempted by the EPA and/or DEQ need not be performed. Documentation of the procedures and results shall be presented in the source test report for review. Omission of this critical information will result in rejection of the data, requiring a retest.

18. STAR Reports: The Certification Form (only) of the Source Test Audit Reports (STAR) shall be completed and submitted with the Source Test Report. The Certification Form can either be bound in the report or it can be submitted separately. Submittal of the

method-specific STAR reports is no longer required. Copies of all of the STAR forms are available electronically.

19. In an attempt to conserve natural resources and to minimize storage space requirements, the test report and spectra may be submitted electronically and via thumb drive.

DEQ understands source testing has been tentatively scheduled to begin on February 28th, 2024 and last up to 15 days.

Please contact me at (971) 349-0956 if you have any questions or concerns.

Sincerely,

Josh Muswieck

Josh Muswieck
Source Test Coordinator
Environmental Engineer
DEQ Portland Office

cc: Weston Li, DEQ: AQ File

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Hi Becky,

Thanks for the recap of our conversation. No additions on my end.

-Josh Muswieck
(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Tuesday, January 23, 2024 5:13 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>; LI Weston * DEQ <Weston.LI@deq.oregon.gov>
Cc: Dana.Corkill@microchip.com; Lane.Meidinger@microchip.com
Subject: RE: Permit Source Testing

Hi Josh,

Thank you for the call today, I appreciate your time and expertise. To recap for folks who weren't on the call, Microchip will use the 12-month rolling average calculation method prescribed in the ODEQ Source Sampling Manual for calculating maximum operational capacity. This will put us closer to being able to achieve 90% OC due to production ramp down.

After testing is completed, ODEQ will request operational metrics to ensure Microchip was operating within acceptable limits during testing. If slightly below 90% OC, results can be accepted if it is shown that Microchip did everything possible to ensure a representative sample and test in current conditions.

Please let me know if you have any questions or comments to add.
Thank you, have a good evening.

Becky Kim
Environmental Engineer
Microchip Technology Inc.
21015 SE Stark Street, Gresham, OR 97030
Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Tuesday, January 23, 2024 2:28 PM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>; LI Weston * DEQ <Weston.LI@deq.oregon.gov>

Cc: Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>
Subject: RE: Permit Source Testing

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That works great. Talk soon.

-Josh Muswieck
(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Tuesday, January 23, 2024 2:27 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>; LI Weston * DEQ <Weston.LI@deq.oregon.gov>
Cc: Dana.Corkill@microchip.com; Lane.Meidinger@microchip.com
Subject: RE: Permit Source Testing

Hi Josh,

I appreciate your response and availability. I can give you a call around 3:00. Does that work for you?

Thank you,
Becky

Becky Kim
Environmental Engineer
Microchip Technology Inc.
21015 SE Stark Street, Gresham, OR 97030
Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Tuesday, January 23, 2024 2:17 PM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>; LI Weston * DEQ <Weston.LI@deq.oregon.gov>
Cc: Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>
Subject: RE: Permit Source Testing

You don't often get email from joshua.muswieck@deq.oregon.gov. Learn why this is important

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Hello Becky,

I have availability to discuss your concerns today or tomorrow. Feel free to give me a call at the number below or I can set up a MS Teams meeting so multiple people can join and we can screen share if needed. Please let me know what your preference is.

Thank you.

Josh Muswieck
Source Test Coordinator
Environmental Engineer
Oregon DEQ- NW Region
700 NE Multnomah St., Suite 600
Portland, OR 97232-4100
DEQ Cell: (971) 349-0956
joshua.muswieck@deq.oregon.gov
Currently Working Limited Hours
Tues-Wed 6:30am to 5pm

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Tuesday, January 23, 2024 1:54 PM
To: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: Dana.Corkill@microchip.com; Lane.Meidinger@microchip.com
Subject: RE: Permit Source Testing

You don't often get email from becky.kim@microchip.com. Learn why this is important

Hi Weston,

Thank you for the information and contact.

Josh- do you have a moment to discuss the below?

Thank you,
Becky

Becky Kim
Environmental Engineer
Microchip Technology Inc.
21015 SE Stark Street, Gresham, OR 97030
Office (503) 669-6012 Mobile (971) 266-7887

From: LI Weston * DEQ <Weston.LI@deq.oregon.gov>
Sent: Tuesday, January 23, 2024 1:52 PM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>; MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>
Subject: RE: Permit Source Testing

You don't often get email from weston.li@deq.oregon.gov. Learn why this is important

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Hi Becky,

Thanks for the information. Josh Muswieck (copied) is our source performance test coordinator and he can answer any questions related to source tests. Please work with Josh regarding the test.

Weston

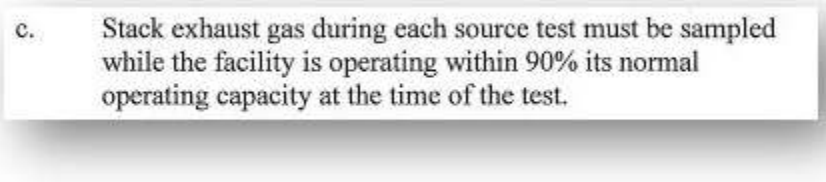
Weston Li

Air Quality Permits and Compliance | NW Region
Oregon Department of Environmental Quality
700 NE Multnomah St, Suite 600
Portland, OR 97232
P: 503-229-5332
Weston.Li@deq.oregon.gov

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Tuesday, January 23, 2024 1:44 PM
To: LI Weston * DEQ <Weston.LI@deq.oregon.gov>
Cc: Dana.Corkill@microchip.com; Lane.Meidinger@microchip.com
Subject: Permit Source Testing

Good afternoon Weston,

Microchip is prepping to perform the source testing required by our ACDP permit 26-3240-ST-01. We plan on submitting a test protocol this Friday (1/26/24) with the goal of testing 2/26/24-3/8/24. Due to the current state of the US economy, Microchip has been ramping down significantly compared to how we were running in 2023. While analyzing our metrics, we expect it will be difficult to meet permit condition 6.1(c).



c. Stack exhaust gas during each source test must be sampled while the facility is operating within 90% its normal operating capacity at the time of the test.

In discussions with our production manager, we expect to be at 80% of our 2023 operational capacity (tracked by wafer starts and production moves). We do not have the WIP (wafers in progress) or staff to maintain 90% of our 2023 operational capacity. Do you have time in the next couple of days for a quick meeting to discuss our options?

Please let me know your thoughts or if you have any additional questions.
Thank you,
Becky

Becky Kim
Environmental Engineer
Microchip Technology Inc.
21015 SE Stark Street, Gresham, OR 97030
Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Wednesday, February 28, 2024 4:40 PM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

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Hi Becky,

I was able to confirm that compliance with the alternative 10 ppmv limit (when Inlet VOC falls below 90 ppmv) should be shown using a flow-weighted average concentration from the TO and RCO exhaust ducts. Please let me know if you have any follow up questions.

Thanks.

-Josh Muswieck

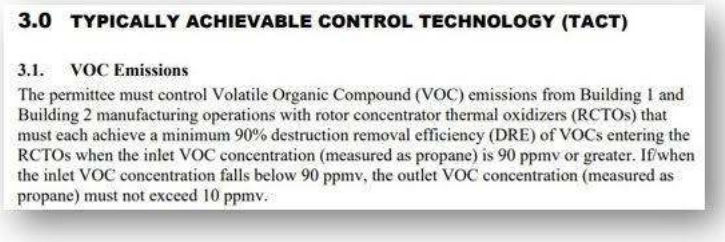
(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Tuesday, February 27, 2024 6:39 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane.Meidinger@microchip.com; Dana.Corkill@microchip.com; Oteri.Oghoghomeh@microchip.com
Subject: RE: Microchip Test Protocols

Hi Josh,

Thank you for coming to observe our RCTO source testing today. I hope it left you confident in the knowledge and procedures of both Spectrum and Microchip. Please don't hesitate to reach out with additional questions.

When looking at our permit, Section 3.0, Condition 3.1, we would like some clarification on the last sentence: "If/when the inlet VOC concentration falls below 90 ppmv, the outlet VOC concentration (measured as propane) must not exceed 10 ppmv." Is the 10 ppmv requirement a flow-weighted average between the thermal oxidizer and concentrator wheel outlets? Condition 3.1 is attached below for convenience.



3.0 TYPICALLY ACHIEVABLE CONTROL TECHNOLOGY (TACT)

3.1. VOC Emissions

The permittee must control Volatile Organic Compound (VOC) emissions from Building 1 and Building 2 manufacturing operations with rotor concentrator thermal oxidizers (RCTOs) that must each achieve a minimum 90% destruction removal efficiency (DRE) of VOCs entering the RCTOs when the inlet VOC concentration (measured as propane) is 90 ppmv or greater. If/when the inlet VOC concentration falls below 90 ppmv, the outlet VOC concentration (measured as propane) must not exceed 10 ppmv.

Please let me know if you have any questions or would prefer to discuss in a Teams meeting.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: Becky Kim - G66880
Sent: Monday, February 26, 2024 2:50 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

Hi Josh,

We have a small hiccup in our testing schedule. The HF calibration cylinder is delayed and won't be here until Friday. Spectrum's solution would be to do the original spiking with HCl only, then do a second round of spiking on Friday when the HF cylinder arrives. Then do the end-of-test spiking as planned, at the end of testing.

Please let me know if you have any questions. We can discuss tomorrow when you are on site.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Wednesday, February 21, 2024 10:44 AM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

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Hi Becky,

I didn't have any issues with this version. Thanks for resending.

-Josh Muswieck

(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Wednesday, February 21, 2024 10:18 AM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane.Meidinger@microchip.com; Dana.Corkill@microchip.com; Oteri.Oghoghomeh@microchip.com
Subject: RE: Microchip Test Protocols

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Hi Josh,

Thank you for sending over the RCTO approval letter. I have attached the second revised RCTO test protocol for you records, let me know if this one doesn't work and I can try sending in a different format.

I will discuss with Spectrum and let you know when we anticipate the spiking to occur next Wednesday 😊

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Wednesday, February 21, 2024 10:11 AM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

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Hi Becky,

Thanks for the clarification. The second revision of the test plan file appears to have been corrupted somehow. I reviewed the first revision submitted and have attached the approval letter. Approval conditions 9 and 10 provide some flexibility on where and how O2/CO2 measurements can be taken. Using grab samples instead of integrated samples for O2 measurements is approved as allowed by EPA Method 3 for MW determination. Please let me know if you have questions.

As far as the timing of my site visits next week. I'd like to arrive near the start of testing on the RCTO on Tuesday the 27th and early enough to observe the HF and HCl spiking procedure on one of the scrubbers on Wednesday the 28th. If you can let me know the anticipated start times for these events next week after equipment setup, that would be appreciated.

Thank you.

-Josh Muswieck

(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Tuesday, February 20, 2024 3:01 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane.Meidinger@microchip.com; Dana.Corkill@microchip.com; Oteri.Oghoghomeh@microchip.com
Subject: RE: Microchip Test Protocols

You don't often get email from becky.kim@microchip.com. Learn why this is important

Hi Josh,

Please see attached for the revised test plan that includes the O2 measurements taken using grab samples.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: Becky Kim - G66880
Sent: Tuesday, February 20, 2024 12:27 PM
To: 'MUSWIECK Joshua * DEQ' <Joshua.MUSWIECK@deq.oregon.gov>
Cc: 'LI Weston * DEQ' <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

Hi Josh,

I was just informed by the testers that the O2 measurement was misrepresented in the revised RCTO test protocol. It is listed as using integrated bag samples while they will be using grab bag samples.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: Becky Kim - G66880
Sent: Tuesday, February 20, 2024 12:19 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

Good morning Josh,

Thank you for sending over the approval letter for the scrubber testing.

Please see attached for the revised RCTO test plan. Please note the following edits:

- Using a 2nd FTIR at the RCO.
- Method 18 for methane and ethane at the inlet.
- O2 by Testo portable/handheld analyzer for O2/CO2 at all three locations from integrated bag samples.
    - Note that the O2 will be measured at the combined inlet and applied to each individual inlet.
- Moisture measurements at the RCO and TO by FTIR and at the inlet by ODEQ Method 4 (wet-bulb/dry-bulb).
    - Note that the inlet measurements will be at each individual inlet as the port at the combined does not allow for this diameter of a probe (and is being used for sampling).
- CO2 measurements at the two outlets by FTIR.

For your visit, if you could let me know which days/times you may be observing, I can let security know to expect you. For security access, I will get you an escort badge which just means you will need to stay with either a Microchip or Spectrum employee while on site. We provide earplugs/safety glasses on site and a hard hat if needed, no steel-toes required.

Please let me know if you have any additional questions.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Tuesday, February 20, 2024 7:28 AM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

Some people who received this message don't often get email from joshua.muswieck@deq.oregon.gov. Learn why this is important

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Good morning Becky,

Attached is the test plan approval letter for the planned scrubber testing. Please review the approval conditions with Spectrum and let me know if you have any questions or concerns.

I have the RCTO test plan approval letter drafted and should be able to issue it quickly after receiving the revised test plan.

I'm planning on coming on-site next week and observing a portion of the RCTO and Scrubber testing. Is there any safety training or entry procedures I need to be aware of prior to arriving on-site?

Thank you.

-Josh Muswieck

(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Wednesday, February 14, 2024 3:08 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane.Meidinger@microchip.com; Dana.Corkill@microchip.com; Oteri.Oghoghomeh@microchip.com
Subject: RE: Microchip Test Protocols

Hi Josh,

Thank you again for your time and input today, we appreciate it very much. Please see below for a recap on responses in green:

Scrubber Test Plan Review Responses

1. No other locations meet EPA Method 1. Spectrum will verify the flow against cyclonic flow requirements. These are the same locations testing occurred at during the previous source test (2015). DEQ will approve of sampling from non-criteria locations as long as they are not cyclonic (average null angle of <20 degrees). Spectrum will comply with this condition.
2. We expect very little flow to be coming from POU abatement combustion units. Spectrum will measure CO2 by FTIR, and if less than 5000 ppmv, will assume the gas is essentially ambient air per EPA Method 2 and assign a molecular weight of 29 g/mole. Because of combustion devices upstream and diverse process gases used for chip manufacturing, O2 and CO2 values must be measured initially to confirm assuming a MW of 29 is appropriate. Spectrum should already have a O2 analyzer onsite from the testing conducted at the RCTO. The draft approval condition in my initial email will be in the test plan approval letter unless an alternative approach is proposed. Spectrum will comply with this condition.
3. Spectrum will comply with this additional requested requirement. Clarification given by Josh: "system" is defined as sampling system, not scrubber system. Spectrum will comply with spiking at the beginning of the testing sequence and again at the end of the testing sequence.
4. We understand that lb/wafer moves or lb/WIP was measured during the last source test (2015), but the permitted emission factors in Section 17.0 do not account for these metrics and we do not utilize them for 12-month rolling calculations. Microchip will provide lb/hr, ppmvd, and ppmvd facility-wide flow weighted average. I spoke with Weston, and he agreed that reporting HF and HCl emission is terms of lb/wafer moves or lb/WIP is not necessary. However, we ask that in addition to reporting HF and HCl emissions in units of ppmvd, ppmvd facility-wide flow weighted average, and lb/hr that lb HF/HCl emitted per pound HF/HCl precursor material used also be reported to verify emission factors used in the permit application (Condition 7.7). This metric would be very hard to Microchip to verify via source testing due to the high variance in processes, chemicals, and gases used. We discussed possibly looking into using monthly data to create a daily/hourly average for precursor usage, but may not be able to provide this metric if it would not be good information to verify emission factor.

RCTO Test Plan Review Responses

1. Spectrum has no intention of measuring moisture using integrated bag samples. Spectrum requests to follow EPA Method 18 for the collection of an integrated bag sample, but using the FTIR on site for methane and ethane analysis that is already being used for the TO outlet following ASTM D6348-12. This will eliminate the hold time associated with shipping bags to a third-party lab. Spectrum is welcome to perform an EPA Method 18 analysis onsite, however the proposed approach does not align with method requirements and cannot be approved as proposed. I suggest using one of the options in my initial email unless Spectrum has another approach in mind which meets the specifications of the reference methods. Spectrum will use two FTIRs to comply with ASTM D6348-12 on the two outlets (TO and concentrator) and perform integrated bag sampling using a 3rd party lab analysis to comply with EPA Method 18 on the inlet.
2. The concentrator exhaust and the RCTO inlet stream are at ambient temperature and essentially ambient air. Therefore, Spectrum will comply with option 2(c) wet bulb/dry bulb measurement. Great, if Spectrum is not familiar with Oregon Method 4 (Oregon's approved wet bulb dry bulb method) the method can be found here starting on page 25/C-4. Moisture equation

4.4 Moisture Equation:

$$H_2O = \frac{e'' - \frac{(P_s - e'')(t_d - t_w)}{2800 - (1.3t_w)}}{P_s} x100 \qquad (Eq.\ 4.4\text{-}1)$$

where:

e'' = Vapor pressure of H_2O at t_w, in. Hg (See Table 4-1)
P_s = Exhaust gas pressure (absolute), in. Hg
t_d = Dry bulb temperature, °F
t_w = Wet bulb temperature, °F

Please let me know if you have any additional questions.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Wednesday, February 14, 2024 11:27 AM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

EXTERNAL EMAIL: Do not click links or open attachments unless you know the content is safe

Hi Becky,

I am still available around 2 to discuss. Talk soon.

-Josh Muswieck

(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Wednesday, February 14, 2024 8:42 AM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane.Meidinger@microchip.com; Dana.Corkill@microchip.com; Oteri.Oghoghomeh@microchip.com
Subject: RE: Microchip Test Protocols

You don't often get email from becky.kim@microchip.com. Learn why this is important

Hi Josh,

Thank you for the detailed response. I will discuss with our team and give you a call around 2 if that still works for you? 😊

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Tuesday, February 13, 2024 5:04 PM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

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Hi Becky,

Thanks for the detailed responses to my comments. I responded to your responses in red below. If Microchip/Spectrum can perform the additional requirements I proposed for the scrubber testing, I can send out the approval letter tomorrow. For the RCTO testing, I ask that a revised test plan be submitted as soon as practical. The revised test plan should include updated test approaches/methods for moisture, methane and ethane testing at the inlet and concentrator outlet. Alternatively, if you would like to further discuss any of my responses or expectations for the planned testing, I am currently available tomorrow between 2-4pm to talk.

Scrubber Test Plan Review Responses

1. No other locations meet EPA Method 1. Spectrum will verify the flow against cyclonic flow requirements. These are the same locations testing occurred at during the previous source test (2015). DEQ will approve of sampling from non-criteria locations as long as they are not cyclonic (average null angle of <20 degrees).
2. We expect very little flow to be coming from POU abatement combustion units. Spectrum will measure CO2 by FTIR, and if less than 5000 ppmv, will assume the gas is essentially ambient air per EPA Method 2 and assign a molecular weight of 29 g/mole. Because of combustion devices upstream and diverse process gases used for chip manufacturing, O2 and CO2 values must be measured initially to confirm assuming a MW of 29 is appropriate. Spectrum should already have a O2 analyzer onsite from the testing conducted at the RCTO. The draft approval condition in my initial email will be in the test plan approval letter unless an alternative approach is proposed.
3. Spectrum will comply with this additional requested requirement.
4. We understand that lb/wafer moves or lb/WIP was measured during the last source test (2015), but the permitted emission factors in Section 17.0 do not account for these metrics and we do not utilize them for 12-month rolling calculations. Microchip will provide lb/hr, ppmvd, and ppmvd facility-wide flow weighted average. I spoke with Weston, and he agreed that reporting HF and HCl emission is terms of lb/wafer moves or lb/WIP is not necessary. However, we ask that in addition to reporting HF and HCl emissions in units of ppmvd, ppmvd facility-wide flow weighted average, and lb/hr that lb HF/HCl emitted per pound HF/HCl precursor material used also be reported to verify emission factors used in the permit application (Condition 7.7).

RCTO Test Plan Review Responses

1. Spectrum has no intention of measuring moisture using integrated bag samples. Spectrum requests to follow EPA Method 18 for the collection of an integrated bag sample, but using the FTIR on site for methane and ethane analysis that is already being used for the TO outlet following ASTM D6348-12. This will eliminate the hold time associated with shipping bags to a third-party lab. Spectrum is welcome to perform an EPA Method 18 analysis onsite, however the proposed approach does not align with method requirements and cannot be approved as proposed. I suggest using one of the options in my initial email unless Spectrum has another approach in mind which meets the specifications of the reference methods.
2. The concentrator exhaust and the RCTO inlet stream are at ambient temperature and essentially ambient air. Therefore, Spectrum will comply with option 2(c) wet bulb/dry bulb measurement. Great, if Spectrum is not familiar with Oregon Method 4 (Oregon's approved wet bulb dry bulb method) the method can be found here starting on page 25/C-4.

4.4 Moisture Equation:

$$H_2O = \frac{e'' - \frac{(P_s - e'')(t_d - t_w)}{2800 - (1.3t_w)}}{P_s} x100 \qquad (Eq.\ 4.4\text{-}1)$$

where:

e" = Vapor pressure of H_2O at t_w, in. Hg (See Table 4-1)
P_s = Exhaust gas pressure (absolute), in. Hg
t_d = Dry bulb temperature, °F
t_w = Wet bulb temperature, °F

Moisture equation

-Josh Muswieck

(971) 349-0956

From: Becky.Kim@microchip.com <Becky.Kim@microchip.com>
Sent: Friday, February 9, 2024 4:29 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane.Meidinger@microchip.com; Dana.Corkill@microchip.com; Oteri.Oghoghomeh@microchip.com
Subject: RE: Microchip Test Protocols

You don't often get email from becky.kim@microchip.com. Learn why this is important

Hello Josh,

Please see below for our responses:

Scrubber Test Plan Review Responses

1. No other locations meet EPA Method 1. Spectrum will verify the flow against cyclonic flow requirements. These are the same locations testing occurred at during the previous source test (2015).
2. We expect very little flow to be coming from POU abatement combustion units. Spectrum will measure CO2 by FTIR, and if less than 5000 ppmv, will assume the gas is essentially ambient air per EPA Method 2 and assign a molecular weight of 29 g/mole.
3. Spectrum will comply with this additional requested requirement.
4. We understand that lb/wafer moves or lb/WIP was measured during the last source test (2015), but the permitted emission factors in Section 17.0 do not account for these metrics and we do not utilize them for 12-month rolling calculations. Microchip will provide lb/hr, ppmvd, and ppmvd facility-wide flow weighted average.

RCTO Test Plan Review Responses

1. Spectrum has no intention of measuring moisture using integrated bag samples. Spectrum requests to follow EPA Method 18 for the collection of an integrated bag sample, but using the FTIR on site for methane and ethane analysis that is already being used for the TO outlet following ASTM D6348-12. This will eliminate the hold time associated with shipping bags to a third-party lab.
2. The concentrator exhaust and the RCTO inlet stream are at ambient temperature and essentially ambient air. Therefore, Spectrum will comply with option 2(c) wet bulb/dry bulb measurement.

Please let me know if you have any questions based on the above. If you have availability on Tuesday (2/13) let me know if you are open to a phone call.
Thank you,
Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: Becky Kim - G66880
Sent: Wednesday, February 7, 2024 5:09 PM
To: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>; Oteri Oghoghomeh - G77603 <Oteri.Oghoghomeh@microchip.com>
Subject: RE: Microchip Test Protocols

Hello Josh,

Thank you for providing this feedback. We will discuss internally and let you know if feedback can be delivered via email or if we would like to set up a meeting.

Thank you,

Becky

Becky Kim

Environmental Engineer

Microchip Technology Inc.

21015 SE Stark Street, Gresham, OR 97030

Office (503) 669-6012 Mobile (971) 266-7887

From: MUSWIECK Joshua * DEQ <Joshua.MUSWIECK@deq.oregon.gov>
Sent: Wednesday, February 7, 2024 5:04 PM
To: Becky Kim - G66880 <Becky.Kim@microchip.com>
Cc: LI Weston * DEQ <Weston.LI@deq.oregon.gov>; Lane Meidinger - C62609 <Lane.Meidinger@microchip.com>; Dana Corkill - G77231 <Dana.Corkill@microchip.com>
Subject: Re: Microchip Test Protocols

Some people who received this message don't often get email from joshua.muswieck@deq.oregon.gov. Learn why this is important

EXTERNAL EMAIL: Do not click links or open attachments unless you know the content is safe

Good afternoon Becky,

I have reviewed both the scrubber and RCTO test protocols. In general, the protocols are well done, and the overall approach is acceptable. However, there are a few details that need to be ironed out before I can send out the test plan approval letters. I listed my review comments below covering aspects of the protocols that aren't currently approved and listed possible alternatives. Additionally, I had a few questions on the specifics of your facility. I'm happy to have a meeting with Microchip and or Spectrum to discuss my comments in more detail next week, if desired. Once we come to alignment on the test approach, a revised test plan for the RCTO will likely need to be submitted. The changes needed to the scrubber protocol can likely be addressed with the source test approval letter I will issue.

Scrubber Test Plan Review Comments/Questions

1. Several of the protocoled sampling locations do not meet EPA Method 1 criteria for minimum disturbance free flow. These include scrubbers PES-005, PEA-004, PEA-001 and PEN-001. Under the current configuration of exhaust ducting, can other sampling ports be installed at locations that meet EPA requirements (2 duct diameters downstream and 0.5 duct diameters upstream)?
2. Do both Fab 4 Buildings 1 and 2 have point of use abatement devices that use burners/combustion? If so, the molecular weight of stack gas must be measured onsite to confirm source gas has a similar MW to ambient air. Below is a draft approval condition which will be required if combustion is occurring prior to the house scrubber systems.
    a. A nominal molecular weight of 29 g/mol may be used if scrubber exhaust gas is confirmed to be essentially ambient air. O2 and CO2 must be measured prior to or during testing to verify scrubber exhaust has a molecular weight similar to ambient air. Exhaust gas results showing O2 and CO2 concentrations that are within 5% of atmospheric levels (ambient levels are 20.9% for O2 and 0.04% for CO2) or within 0.5% absolute will be considered essentially ambient air. If results fall outside the range specified, EPA Method 3A or an approved alternative must be used to quantify O2 and CO2 concentrations for the duration of testing. Documentation of the molecular weight confirmation procedure described above must be included in the appendix of the test report.
3. In addition to the ASTM D6348-12 procedures outlined in section 4.5 of the test plan, **DEQ is requiring that a second round of analyte spiking to occur on all FTIR sampling systems used following the completion of testing to bracket the sampling and ensure significant deterioration has not occurred.** This requirement is being added because of the large number of sources which will be tested during this campaign, DEQ has concerns about the integrity of the sampling systems degrading over the course of testing.
4. HF and HCl emissions should be reported in the following units in the test report: ppmvd, ppmvd facility-wide flow weighted average, lb/hr, lb/wafer moves and lb/wafers in process.

RCTO Test Plan Review Comments

1. The approach to use grab samples for methane and ethane (and moisture?) determination at the concentrator outlet and inlet with analysis by FTIR is not approved. Approvable alternatives would be as follows.

a. Conservatively assume THC= VOC for all sampling locations (don't perform methane and ethane subtraction)
b. Measure methane and ethane at the concentrator outlet and inlet using one of the following approaches

i. ASTM D6348-12 using an additional extractive system and FTIR

ii. EPA Method 18 – onsite or offsite analysis using integrated bag samples

iii. EPA Method 25A/18 or EPA Method 25A with non-methane cutter – FID with internal GC or FID with non-methane cutter to directly measure THC less methane and ethane

2. Moisture must be determined at the concentrator exhaust and inlet using one of the following approaches

a. ASTM D6348-12 using an additional extractive system and FTIR
b. EPA Method 4 – wet impingement
c. ODEQ Method 4 – wet bulb/dry bulb measurement

Josh Muswieck

Source Test Coordinator

Environmental Engineer

Oregon DEQ- NW Region

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Currently Working Limited Hours
Tues-Wed 6:30am to 5pm

	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24
Days	31	28	31	30	31	30	31	31	30	31	30	31	31	29
Production Moves Total	5,797,738	4,722,660	5,450,859	5,334,221	5,543,260	5,506,872	5,619,742	5,334,869	5,323,435	5,496,807	5,202,640	4,931,176	3,460,503	4,406,894
Production Moves Daily	187,024	168,666	175,834	177,807	178,815	183,562	181,282	172,093	177,448	177,316	173,421	159,070	111,629	151,962
Daily Average													169,745	168,353
90% of the Daily Average													**152,771**	**151,518**

Testing Days	Prod Moves	% of 12-m avg
2/27/2024	152,293	90%
2/27/2024	155,445	92%
3/1/2024	162,807	97%
3/2/2024	159,964	95%
3/4/2024	155,473	92%
3/5/2024	156,711	93%
3/6/2024	157,803	94%

2024 COMPLIANCE TESTING OF WET SCRUBBERS AT MICROCHIP'S GRESHAM, OR FACILITY

PERMIT 26-3240-ST-01

Prepared for:
Microchip Technology, Inc.
21015 Stark Street
Gresham, OR 97030

Date Prepared:
January 26, 2024

Prepared by:

2340 W Braker Lane, Suite A
Austin, TX 78727

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APPENDICES

A Field Data Sheets and Example Calculations

B Standard Air Contaminant Discharge Permit

LIST OF ACRONYMS AND ABBREVIATIONS

acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
cal	calibration (gases)
CO	Carbon Monoxide
CO_2	carbon dioxide
dscfm	dry standard cubic feet per minute
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FTIR	Fourier Transform Infrared Spectroscopy
HAP	hazardous air pollutant
HF	Hydrogen Fluoride or Hydrofluoric Acid
HCl	Hydrogen Chloride or Hydrochloric Acid
lb/hr	pounds per hour
lb/day	pounds per day
MDL	Minimum Detection Limit
MDC	Minimum Detectable Concentration
Microchip	Microchip Technology Incorporated
ml	milliliter
NIST	National Institute of Standards and Technology
O_2	oxygen
ODEQ	Oregon Department of Environmental Quality
PSELs	Plant Site Emission Limits
ppmv	parts per million by volume
QA	quality assurance
QA/QC	quality assurance/quality control
%R	Percent Recovery
Spectrum	Spectrum Environmental Solutions
scfm	standard cubic feet per minute

1.0 INTRODUCTION

Microchip Technology Incorporated (Microchip) has contracted Spectrum Environmental Solutions (Spectrum) to carry out annual performance testing on twelve (12) wet scrubber outlets located at their fabrication facility (Fab 4) in Gresham, Oregon. This performance testing is specific to emissions of Hazardous Air Pollutants (HAPs) and will be completed to demonstrate compliance with Permit 26-3240-ST-01. Please note the original permit was issued in 2019 and then revised in June, 2023. The particular HAPs to be monitored are hydrogen fluoride (HF) and hydrogen chloride (HCl).

Spectrum will perform FTIR and flow measurements as required to demonstrate compliance with Microchip's air permit. The compliance criteria are:

- A facility-wide volumetric flow-weighted average emission concentration limit of 1 ppmv or less for HF and 1 ppmv or less for HCl.

For ease of reference, Microchip's air permit (Permit Number 26-3240-ST01) as issued in 2019 and the permit modification issued in June 2023 are both provided in Appendix B. This test protocol was developed to satisfy the requirements of 2023 permit modification where it supersedes the 2019 permit, as well as the 2019 permit.

To support the permitted HAP emissions requirements, HF and HCl concentration data will be collected at each wet scrubber outlet on an individual basis. The volumetric flow rate at each scrubber outlet will also be measured. This data will be used to determine compliance with the concentration limit prescribed in the Microchip Technology Standard Air Contaminant Discharge Permit (ACDP), Permit 26-3240-ST-01 Condition 3.2 of the 2019 permit, which states:

> ***3.2. Acid Gas Emissions***
> *The permittee must control acid gases from Building 1 and Building 2 manufacturing operations with wet scrubber systems that achieves a minimum 90% DRE. As an alternative, the permittee may meet a facility-wide volumetric flow-weighted average emission concentration of 1 part per million by volume (ppmv) of HF and 1 ppmv of HCl, using results of a performance source test.*

The compliance demonstration via source testing will be performed on the wet scrubbers in accordance with the testing requirements in 2023 permit modification Conditions 6.1(c), (d), (e)(iv), (e)(v), (f), (g), (h), (i), and (j) which state:

> ***6.1. Testing Requirements***
> *The permittee must conduct a source test of the control devices as specified below: [OAR 340-212-0120]*

c. Source testing must be conducted while the facility is operating within 90% its normal operating capacity at the time of the test. Sampling must take place under worst case operating conditions observed during normal operations (i.e., redundant control devices should not be operating during testing);

d. Gas concentrations must be sampled at the inlet and outlet of each wet scrubber system and each RCTO to demonstrate the system's DRE. The source test report must include the DRE demonstrated during each test run as well as the average DRE for the three test runs. As an alternative, the permittee can sample only the outlet of the wet scrubber systems to demonstrate compliance with the 1 ppmv HF and HCl limitations as listed in Condition 3.2;

e. During each source test the following parameters must be monitored and recorded:

iv. Recirculation flow rate and pH of the wet scrubbers; and

v. Other facility/process operating parameters identified prior to the test.

f. Only regular operating staff may adjust the combustion system or production processes and emission control parameters during the source test and within two hours prior to the tests. Any operating adjustments made during the source test, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source test invalid;

g. A pretest plan for each source test required above must be submitted for approval to DEQ's Source Test Coordinator at the ODEQ Northwest Regional Office, at least 30 days prior to testing;

h. The reference test methods identified in the table below must be utilized in the source tests identified above. A test method modification/variance or substitution of an alternative test method must be pre-approved by the DEQ's Source Test Coordinator and

i. All tests must be conducted in accordance with the DEQ's Source Sampling Manual and with the pretest plan. All test data and results must be submitted to the Source Test Coordinator for review within 60 days after completion of the testing cycle unless an alternate submission date or extension is approved by DEQ.

j.

Reference Test Method	***Tested pollutant/parameter***
EPA 1&2	*Flow Rate*
EPA 3	*Dry Molecular Weight*
EPA 4 or ODEQ Method	*Moisture*
EPA 25A	*Total VOC*
EPA 26, 26A, 320 or ASTM D6348-12	*HF & HCl*

It should be noted that while Microchip has been increasing production during much of the last twelve months, production has slightly decreased in the last two months due to the current economic environment. While Microchip will do everything possible to satisfy Condition 6.1(c), 90% operational capacity may not be achieved. Microchip is still expected to provide a representative sample and test.

1.1 TEST PROGRAM OPERATIONS SUMMARY

A summary of the test program is provided in Table 1-1 below. A list of the parameters to be tested along with reporting units are presented in Table 1-2. Testing will be performed in accordance with ODEQ, ASTM, and Environmental Protection Agency (EPA) test methodologies with exception the proposed deviations listed in Section 3.2 of this Test Protocol.

Table 1-1. Test Program Summary

Category	Description
Project Name	Performance Testing of Microchip's Wet Scrubbers
Equipment Owner	Microchip Technology, Inc. 21015 Stark Street Gresham, OR 97030
Project Contact	Becky Kim Environmental Engineer Microchip Technology, Inc. 21015 Stark Street Gresham, OR 97030 (971)-266-7887
Equipment Tested	12 Wet Scrubber Outlets
Equipment Location	Microchip Technology, Inc. 21015 Stark Street Gresham, OR 97030
Regulatory Agency	ODEQ
ODEQ Permit No.	26-3240-ST-01
Source Test Firm	Spectrum Environmental Solutions 2340 West Braker Lane, Suite A Austin, TX 78758
Source Testing Project Manager	Steve Hall Phone (512) 587-1386 steve@spectrumenvsoln.com

Table 1-2. Reporting Units of Parameters to be Tested

Parameter	Units	Location
Volumetric Flow Rate	dscfm, acfm, scfm	Wet Scrubber Exhausts
Moisture	Percent by Volume	
HF	ppmv, lb/hr	
HCl		

dscfm – dry standard cubic feet per minute
acfm – actual cubic feet per minute
lb/hr – pounds per hour
ppmv – parts per million by volume

2.0 FACILITY AND UNIT DESCRIPTION

2.1 FACILITY DESCRIPTION

Microchip's Fab 4 facility conducts semiconductor manufacturing operations and processes. The wet scrubbers are used to abate water-soluble pollutants from the acid and ammonia process exhaust streams. Microchip further segregates their acid and ammonia process effluents sending them to house scrubbers designed and operated to abate acid and ammonia gas streams. Microchip operates the wet scrubbers on a 365 x 24 schedule.

2.2 UNIT DESCRIPTION

The wet acid scrubbers in Building 4-1 and 4-2 are vertical counter-current packed-bed abatement devices. Each scrubber contains about 7' to 9' of packing material used to optimize water-to-gas interactions. The wet scrubbers are located at each building as follows:

- Four (4) wet scrubber outlets are located at Building 4-1,
- Eight (8) wet scrubber outlets are located at Building 4-2.

The Scrubbers operate as follows:

- Process gas is drawn into the bottom of the vertical counter-current packed-bed wet scrubbers. Water is pumped from a sump in the bottom of the scrubber and distributed to a series of spray nozzles. The spray nozzles evenly distribute water atop a 7' to 9' height of packing material where the mass transfer of pollutants in the exhaust air to the water takes place as the water drops through the packing.
- In the scrubber mass-transfer zone, the flow of gas is opposite to the water flow and is very turbulent due to the flow disruption caused by the packing material. The combination of the packing and the water spray nozzles optimize gas-to-liquid mass transfer interaction in which HF and HCl are dissolved in the scrubbing solution.
- The treated exhaust air flows through a fan to the exhaust stack for atmospheric discharge.

The scrubbing solution in the scrubber sump is pH controlled and has recirculation, blowdown, and water make-up rates that have been set by the manufacturer and/or Microchip specifications to assist in soluble gas removal efficiency.

The PES units located at both Fab 4-1 and 4-2 are acid scrubbers. Fab 4-2 has three acid scrubbers and each acid scrubber uses sodium hydroxide for pH control. Fab 4-1 also has three acid scrubbers with sodium hydroxide addition. Both Fab 4-1 and 4-2 also have an ammonia scrubber (PEA units) to control ammonia emissions. Fab 4-2 has the following additional scrubbers:

- A scrubber (PEI) used to abate emissions from the ion implant process area,
- Two scrubbers (PEC) used to control emissions from chemical vapor deposition (CVD) process area and
- A nitric acid scrubber (PEN). This scrubber is designed to abate nitric acid vapor and nitric acid mist. It uses 25% sodium hydroxide to control the scrubber liquor pH and is equipped with a mist eliminator and a high performance CECO filter.

The specific ID number, design airflow and process type feeding each scrubber are summarized in Table 2-1.

Table 2-1. Microchip Wet Scrubbers

Location	Scrubber Name	Unit ID	Design Airflow (CFM)	Process Effluent Type
Building 4-1	PES-002	120-000-1701	28,000	Acid
	PES-005	120-000-0100	36,000	Acid
	PES-006	120-000-0110	16,000	Acid
	PEA-004	120-000-0120	13,500	Ammonia
Building 4-2	PES-001	2-PES-SC-001-2S	42,300	Acid
	PES-002	2-PES-SC-002-2S	42,300	Acid
	PES-003	2-PES-SC-003-2S	42,300	Acid
	PEC-001	2-PEC-SC-001-2S	30,000	CVD
	PEC-002	2-PEC-SC-002-2S	30,000	CVD
	PEA-001	2-PEA-SC-001-2S	26,900	Ammonia
	PEN-001	2-PEN-SC-001-2S	7,400	Nitric Acid
	PEI-001	2-PEI-SC-001-2S	14,500	Ion Implant

All scrubbers manufactured by Harrington Industrial Plastics, Inc.

2.3 UNIT OPERATION

The wet scrubbers will be operated under normal conditions and in accordance with manufacturer specifications. The operating parameters to be recorded by Microchip during testing and submitted with the source test report are presented in Table 2-2.

Table 2-2. Operating Parameters to be Recorded

Parameter	Units
Scrubber Recirculation Flow Rate	Gal/min
Scrubber Liquid pH	unitless

2.4 SAMPLING LOCATIONS

Microchip houses the scrubbers indoors but the sample locations, with exception to one scrubber in Building 4-1, are located on the rooftops of the respective fab in which they operate. Each scrubber exhaust location is circular and all have a minimum of two accessible sample ports set at 90° from each other. The orientation of the sample ports, port depths, port diameters, port distance from up and downstream disturbances, and the exhaust diameters vary across the scrubbers. Table 2-3 summarizes the pertinent sample information for each scrubber and is based on historical measurements. Spectrum will verify this information as part of the 2024 compliance testing.

Table 2-3. Scrubber Test Location Information

Location	Scrubber Name	Unit ID	Scrubber Exhaust Diameter (in)	Nearest Disturbance (DD)		Traverse Points
				Upstream	Downstream	
Building 4-1	PES-002	120-000-1701	42.75	4.2	3.4	16
	PES-005	120-000-0100	47.00	0.3	1.3	16
	PES-006	120-000-0110	54.00	2.3	2.4	16
	PEA-004	120-000-0120	36.00	0.3	1.3	16
Building 4-2	PES-001	2-PES-SC-001-2S	54.00	2.3	2.4	16
	PES-002	2-PES-SC-002-2S	54.00	2.3	2.4	16
	PES-003	2-PES-SC-003-2S	54.00	2.3	2.4	16
	PEC-001	2-PEC-SC-001-2S	54.00	2.3	2.4	16
	PEC-002	2-PEC-SC-002-2S	54.00	2.3	2.4	16
	PEA-001	2-PEA-SC-001-2S	54.00	0.2	1.8	16
	PEN-001	2-PEN-SC-001-2S	23.00	2.5	1.3	16
	PEI-001	2-PEI-SC-001-2S	36.00	4.7	3.7	16

DD – Duct Diameters

3.0 TECHNICAL APPROACH

The number of samples and sample duration are designed to meet applicable permit requirements. The average of three, 1-hours runs of FTIR test results will be used to report HF and HCl emissions from each scrubber outlet. All FTIR measurements will be performed in accordance with ASTM D6348-12, *Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy.* Additionally, flow measurements will be determined per EPA reference Methods 1-3. Moisture concentration will be collected by FTIR and used for calculation of total volumetric flow on a wet basis as needed. Testing will be performed during normal Fab operation and is expected to take up to 15 onsite testing days to complete.

Spectrum will sample each scrubber individually and sampling will consist of extracting the sample gas from each scrubber outlet using a heated (150˚C) sample line that will deliver the gas to the heated (150˚C) FTIR sample analysis cell. Spectrum will perform analyte spiking for the FTIR system using HF and HCl as the target analyte at a selected scrubber sometime during the testing. Additionally, and as specified by the ASTM D6348-12 method, a calibration transfer standard (CTS) gas will be injected to the FTIR before commencement of testing and at least once each test day thereafter. The CTS may be injected through the sample system to also demonstrate a leak check as a sample system, that is slightly under vacuum, would not recover the CTS accurately were there a significant leak.

3.1 SAMPLING MATRIX

The sampling matrix, including the methods used, number of runs, analytical device, etc., is presented in Table 3-1 for the compliance test. Using this aggregate of these measurements, site-wide volumetric flow-weighted average HF and HCl concentration will be calculated over the total three-hour test and used for compliance demonstration.

Table 3-1. Performance Test Sampling Matrix

Location	Sample/Type Pollutant	Sampling Method	Analytical Org.	Run Time (hr)	Analytical Method
Building 4-1 Scrubber Outlets (4)	Volumetric Flow Rate	EPA 1-2	Spectrum	NA	Pitot/Temp
	Moisture	ASTM D6348-12	Spectrum	3, 1-hr Runs	FTIR[1]
	HF, HCl	ASTM D6348-12	Spectrum	3, 1-hr Runs	FTIR[1]
Building 4-2 Scrubber Outlets (8)	Volumetric Flow Rate	EPA 1-2	Spectrum	NA	Pitot/Temp
	Moisture	FTIR	Spectrum	3, 1-hr Runs	Gravimetric
	HF, HCl	ASTM D6348-12	Spectrum	3, 1-hr Runs	FTIR[1]

[1] FTIR will be used to quantify HF, HCl, and Moisture. However, QA analyte spikes will only be performed for HF and HCl.
NA – Not applicable. Flow measurements will be collected once per run and do not have a required run time.

3.2 METHOD MODIFICATIONS

A number of sampling and analytical method deviations are proposed for use during the Performance Tests of Microchip's wet scrubbers. The requested method modifications and the justification for each are as follows;

1. Spectrum is proposing using FTIR results in accordance with ASTM D6348-12 for moisture in lieu of EPA Method 4 for all locations. Since the FTIR is already onsite and can measure moisture concentration with every minute, it is logical to use this data for moisture. Additionally, the FTIR can measure water very accurately at the low concentrations (essentially air) expected. When using EPA Method 4 for low-moisture streams, any small errors (scale calibration, not completely drying off the outside of the impingers before weighing, etc) will have a larger impact on accuracy due to the small overall weight gain.

2. Several of the sample locations do not meet the minimum upstream disturbance distance (less than 2 duct diameters) as required in EPA Method 1. However, during prior flow measurements, such as the 2015 compliance testing, cyclonic flow was checked and found to be absent. As such, each scrubber will be tested for cyclonic flow as part of the compliance test and, if found to be absent, the scrubber outlets will be tested as is.

3. Although not a deviation as it is allowed per EPA Method 2 it is worth noting that a dry molecular weight of 29 g/mol will be used as the gas is mostly ambient air. Oxygen will not be measured and the FTIR moisture measurement will be used to convert between wet and dry basis as needed.

4.0 SAMPLING AND ANALYTICAL METHODS

Source emission testing will be performed according to EPA and/or ASTM reference methods. The test methods are available online and discussed in the following subsections.

4.1 EPA METHOD 1: SAMPLING AND VELOCITY TRAVERSE POINT LOCATIONS

EPA Method 1, "Sampling and Velocity Traverse Point Locations," will be used to determine the number and position of the sample traverse point for gas velocity determination by Pitot tube measurement. The dimensions of each exhaust (i.e., inside diameter at the sampling plane, and upstream and downstream disturbances) will be measured in association with each scrubber, prior to the start of testing. The number of required traverse points will be confirmed based on these measurements. The Method 1 measurement will be documented on their respective data sheet presented in Appendix A.

4.2 EPA METHOD 2: DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," will be used to measure exhaust gas velocity. A Type S Pitot tube, constructed according to Method 2 criteria will be connected to an electronic manometer (e.g., a Shortridge or similar) or an incline manometer. During the collection of each flow measurement, differential pressure measurements across a Type-S Pitot tube (delta p) will be recorded. The effluent gas temperature will also be measured using a Type-K thermocouple. This data will be recorded on the Data Sheet as shown in Appendix A.

4.3 DRY MOLECULAR WEIGHT

Since EPA Method 2, Section 8.6 states "For processes emitting essentially air, an analysis need not be conducted; use a dry molecular weight of 29.0", a dry MW of 29.0 g/mol will be used for flow calculations. Oxygen and carbon dioxide will not be measured.

4.4 ASTM METHOD 6348-12: DETERMINATION OF MOISTURE CONTENT IN STACK GASES

ASTM Method 6348-12 will be used to determine the wet scrubber effluent moisture content, and will be performed in conjunction with each test run. The FTIR will measure moisture simultaneous with the HCl, and HF measurements. The moisture will be used to convert flow and concentration results between a dry and wet basis. The average over the three, 1-hour test will be used in all appropriate calculations.

4.5 ASTM METHOD 6348-12: FTIR DETERMINATION OF SPECIATED HF AND HCL

Fourier Transform Infrared Spectroscopy (FTIR) will be used to determine the HF and HCl composition of the wet scrubber outlet gas streams. A fully integrated FTIR will continuously measure (data point every 1-5 minutes) these target analytes in the extracted gas sample from the scrubber effluent. ASTM Method

D6348-12 will be followed with HF and HCl being the target analytes used for the QA Spikes of Annex A5. Spectrum will target an analyte spike of HF and HCl at 1 ppm or less depending on the native gas to demonstrate the capability of the FTIR and sampling system to quantify and transport all the target analytes. Per the ASTM Method, a single analyte spike is required at the onset of testing. Additionally, and as specified by the ASTM D6348-12 method, a calibration transfer standard (CTS) gas will be injected to the FTIR before the first test and at least once per test day thereafter throughout the duration of the testing. The CTS may be injected through the sample system to also demonstrate a leak check (a system operated under a slight vacuum that contained a significant leak would not recover the CTS accurately).

4.5.1 FTIR Detection Limits

It is not uncommon with FTIR measurements of semiconductor operations to observe periods where the analyte(s) of interest are observed above and below their respective minimum detection limit (MDL). In all cases for this testing the MDL will be the detection limit calculated from actual field data. For averaging, the MDL will be substituted as the actual concentration for instances where the analyte concentration was below detection limit. This will provide the most conservative concentration to be compared with the permitted HF and HCl flow-averaged concentrations. Where applicable, a data set that is absent of the target analyte(s) as verified upon spectral validation, will be used. The MDL will be calculated as 3* the standard deviation of the returned values for the analyte(s) in this data set. This is the minimum detectable concentration 2, or MDC#2, in the ASTM D6348-12 method; specifically, equation A2.4 found in Appendix A2. Should this method of MDL determination not prove possible, then MDC#3 will be used to determine the detection limit. This will use the average of residual spectra. Should the target analyte be present throughout the entirety of the testing, no MDL will be calculated.

5.0 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Spectrum source test projects includes the following areas of focus: sampling, sample analysis, documentation, equipment maintenance, calibration, data reduction, and reporting. This protocol specifies procedures that ensure that work performed in each one of these areas is performed in a manner consistent with providing emission test data that are accurate and legally defensible. This section provides details on the procedures that are followed to accomplish this assurance of data quality. Spectrum QA objectives for precision and accuracy are based on the reference methods or published precision and accuracy data.

The usefulness and validity of all data are contingent upon 1) the results being representative of the source being tested, and 2) comparable with other results (either calculated or directly measured) generated by Spectrum, Microchip, or another source test organization. Spectrum has adopted the objective that all measurements will be representative and comparable. These objectives will be met by performing tests while the process is operating under known and documented conditions, following published reference methods, using standard data reduction techniques and reporting formats, and proper training of personnel.

5.1 DATA PRECISION, ACCURACY, AND COMPLETENESS

The QA/QC procedures described in this section are provided to ensure data precision, accuracy, and completeness. All data sheets and calculation spreadsheets to be used as part of this project will be controlled. Should any edits to controlled documents be required, they must be reviewed for accuracy and require signature approval by a Spectrum QA Officer. It is the responsibility of each project team member to: 1) complete all pertinent sections of the data sheets, 2) make comments, where appropriate, 3) notify Project Managers of sampling difficulties that may lead to invalid data, and 4) follow chain-of-custody procedures for all samples, data sheets, and documents. Additionally, it is the responsibility of the FTIR operator(s) to correctly perform all pertinent ASTM QA procedures, document (electronically or other) all issues and sampling narratives and perform validation of a select set of spectra from the testing.

Each test report undergoes an independent technical review by a designated scientist or technical reviewer. Procedures, results, and data are reviewed to verify adherence to method requirements, that appropriate procedures were followed, and that calculations were performed properly. These reviews are conducted independently from any project-related data reduction and reporting activities.

5.2 TRAINING

Training is an ongoing process for all personnel. Personnel completing any task will be properly trained in such task, or be under direct supervision of someone trained in the task. There are certain skills that all technical personnel are expected to acquire and perform professionally and safely. All source test personnel must review the applicable portions of the following technical documents before being involved in any capacity in any program:

- EPA 40 Code of Federal Regulations Part 60
- Developed Standard Operating Procedures (SOPs);
- EPA QA Handbook for Air Pollution Measurement Systems, Volume III; and
- Air Pollution Districts' Specific Source Test Methods.

In addition to the general awareness training discussed previously, each person responsible for the performance of a test procedure is required to demonstrate proficiency in the method(s) involved. This demonstration will be accomplished through: 1) reading the source test method involved, 2) reading the manual of the equipment being used, 3) reading and understanding of the SOP associated with each method and 4) demonstrating aptitude and knowledge of the methodology via performance under a mentor or field lead(s). Qualified testing individuals are documented on a per method/SOP basis. Information related to training for specific methods is provided below.

- Monitoring of Emissions: EPA Methods
  1. Understanding of the sampling schematic drawing;
  2. Understanding of the sampling systems;
  3. Leak checks;
  4. Analyzer adjustments and calibrations;
  5. Sample system bias calibration checks;
  6. Strip chart recorder operation and documentation;
  7. Data Acquisition System operation and access;
  8. Gaseous stratification checks; and
  9. Correction for sample system bias and analyzer drift.
- Sampling Location Criteria: EPA Method 1
  1. Identify sampling locations;
  2. Inspect inside of duct to identify any obstructions;
  3. Determine upstream and downstream distances;
  4. Perform stack area calculations;
  5. Determine number and location of sample points; and
  6. Perform cyclonic flow checks and determine sample location acceptability.
- Stack Gas Velocity and Volumetric Flow Rate: EPA Method 2
  1. Assemble pitot tube/thermocouple;
  2. Perform leak checks;
  3. Record differential pressure and temperature;
  4. Record static pressure;
  5. Record barometric pressure; and
  6. Calculate stack gas velocity and volumetric flow rate.

- FTIR Emissions Monitoring: Spectrum Developed SOP and Protocol
    1. Perform complete FTIR operational checks in Spectrum laboratory;
    2. Assemble sample extractive system;
    3. Perform CTS direct and through sample system
    4. Perform leak checks;
    5. Collect FTIR background;
    6. Collect "zero" FTIR spectrum;
    7. Perform mechanical response test;
    8. Perform equilibrium test;
    9. Perform QA analyte spiking; and
    10. Perform routine spectral analysis during and after collection.

5.3 SAMPLING PROCEDURES

Spectrum maintains complete and current copies of federal, state, and local regulatory agency source test methods that serve as the final authority on sampling procedures. Spectrum strives to follow the appropriate source test methods whenever possible. Source test methods are listed in all Source Test Protocols for review by both clients and regulatory agencies.

The steps listed below are taken to ensure that the source test method sampling procedures are followed:

1. Training of personnel;
2. Copies of reference methods and SOPs are available to all personnel and are taken to every job site;
3. Appropriate selection of Project Managers; and
4. QA reviews of test programs.

Occasionally, due to the sample location limitations, or other factors, variations from the standard methods will sometimes be necessary. Any variations from the methods will be assessed to determine the effect on data quality. In all occasions, variations will be included in the Source Test Protocol and receive approval prior to implementation of the program. Any variations will be clearly documented in the source test report.

5.4 CHAIN-OF-CUSTODY PROCEDURES

The Project Manager collects and maintains possession of all data sheets or keeps them in secured storage. Upon return to the office, a copy of all field data sheets is made and placed in a secured file. The original field data sheets are used for report preparation and are kept with the final report. Data sheets, test plans, and reports are kept in files, organized by client and project.

5.5 CALIBRATION PROCEDURES AND FREQUENCY

All major equipment components are calibrated according to the procedures established by EPA which are presumed to meet any that may be specified by ODEQ. When regulations differ, the stricter of the regulation will be followed. Table 5-1 summarizes the procedures and frequency of the calibration performed on the major equipment components.

Table 5-1. Calibration Requirements for Source Test Sampling Equipment

Sampling Equipment	Calibration Frequency	Calibration Procedure	Acceptable Calibration Criteria
Extractive FTIR	Minimum of daily during testing	Calibration Transfer Standard (CTS)	± 5% certified calibration gas value
FTIR Mechanical Response Time	Once per test campaign unless extractive system is altered	Flow CTS through entire sample system	None stated
FTIR Equilibration Response Time	Once per test campaign unless extractive system is altered	Flow most reactive analyte through entire sample system	None stated
FTIR System Recovery Check	Once prior to testing [1]	Annex A5 of the ASTM D6348 Methodology	± 30% recovery
FTIR System Zero	Once per test campaign unless extractive system is altered	Direct N_2 through the entire sample system	None stated
Extractive Sampling	During set-up	Leak Check	Acceptable recover of CTS through extractive system or <0.20 lpm on FTIR sample system or <0.2cfm or <4% of sample system volume/minute on FTIR sample system
Pitot Tubes	Prior to first field use	Dimension calibration	Meets Method 2 dimensional criteria
Pitot Tubes	Prior to each use	Visual inspection	Meets Method 2 dimensional criteria
Barometric Pressure – Shortridge Instruments, Inc.	Monthly	Adjusted to std. Local Airport and/or Mercury Barometer	± 0.1 in. Hg
Dry Gas Meter	Semi-annually	Calibration at 4 flow rates using NIST traceable standard orifices	Y_d between 0.95 and 1.05 Variation of cal. ± 2%
Dry Gas Meter	After each test run series	Per Alternative Method (ALT-009)	± 5% per test runs series
Temperature Sensors	Semi-annually	3-point calibration vs. NIST traceable standard	Agree within ±1.5% absolute

[1] ASTM D6348-12 only requires an initial spike assuming all sample matrices are similar.

5.6 Extractive Sampling System Equipment Quality Control

The calibration gases for the FTIR are certified to an analytical accuracy of ±5 percent (±2 percent where available).

5.7 Performance and System Audits

The appropriate regulatory agency is notified of all scheduled compliance test programs. The regulatory agency is allowed the opportunity to perform side-by-side tests and/or observe the sampling test program. Spectrum will fully cooperate in any pre-arranged regulatory agency audit.

5.8 Equipment Maintenance

Routine and preventative maintenance is performed on all major sampling equipment. These procedures are in addition to method-specific requirements. Table 5-2 summarizes the equipment maintenance schedule. This preventative maintenance schedule should minimize equipment failures and downtime in the field. On the occasion where equipment does break down in the field, a replacement is used or the equipment is repaired in the field.

Table 5-2. Test Equipment Maintenance Schedule

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pump	1. Absence of leaks 2. Ability to draw within reported specifications	Every 500 hours of operation or 6 months, whichever is less	Visual inspection
Flow Meter	1. Free mechanical movement 2. Absence of malfunction	Every 500 hours of operation or 5 months, whichever is less	1. Visual inspection 2. Clean 3. Calibrate
Emission Analyzers	1. Absence of malfunction 2. Proper response to zero, span gas	As recommended by manufacturer	As recommended by manufacturer
Sampling System	Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
FTIR Pressure Sensor	± 2% f.s.	Checked in-lab as part of prep work for each project	Adjust pressure offset to remain consistent with Hg manometer or local barometric pressure
Detector Linearity	Not specified	Checked in-lab as part of prep work for each project	Re-set linearity
Resolution Checks	Not specified	Checked in-lab as part of prep work for each project	Clean/replace optics
Line Position	± 15% of resolution	Checked in-lab as part of prep work for each project	Clean/replace optics – verify laser operation
Sampling Line	Sampling degradation after each test less than 1% of test series		Clean with solvent. Flush with gas until dry.

5.9 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction generally occurs in two phases. Phase I consists of preliminary data reduction on the job site. On-site data reduction may be performed by scientists or the Project Manager. Preliminary calculations may include, exhaust flow, spike recovery, average concentration measured, and/or emission rate measurement results. Draft test results are normally available prior to leaving the job site. Calculations are performed manually, with a calculator, or computer. Whenever possible, controlled spreadsheets are used to reduce data.

The second phase of data reduction occurs during the preparation of the test report. All data are reduced, entered into the spreadsheets, or checked for accuracy from the prior entry. Final results are generated after the Project Manager has reviewed the data entry, calculations, and reporting units. The standard calculations are available in the test method references and in sample calculations included in the report appendices.

All data, data entry, and calculations are double-checked by the originator and undergo independent technical review by a qualified scientist. Reviews can include re-calculation of results, data entry checks, links, amongst spreadsheets, and calculation audit of known and accepted data sets using the existing spreadsheet.

Spectrum uses audited and controlled spreadsheets to calculate all source test results. Data reduction QA is simplified to ensure proper numerical data entry.

The final report will include the test results of all parameters measured in comparison to the applicable permit limits. Facility process data detailing unit operation during testing will also be included in the final report.

Spectrum promotes the use of a standard reporting format. The format has been developed to be effective in documentation of source test projects.

6.0 REPORTING

6.1 TEST REPORT FORMAT

The Test Report will include the applicable information as described in Appendix A-2 of the ODEQ Source Sampling Manual Volume 1. The Spectrum source test report format generally consists of the following:

- Cover Page;
- Table of Contents;
- Executive Summary
- Introduction;
- Equipment and Process Description;
- Sampling Methods and Analytical Procedures;
- Test Results and Test Critique;
- Spectrum QA/QC Plan; and
- Appendix data (i.e., field data sheets, test results, source test results, preliminary data and calculation sheets, laboratory data, and QA/QC data).

The Executive Summary will include applicable rules, permit conditions, and the comparison source test data computed to satisfy permit requirements. The test critique will also include a summary of the test events and a detailed account of any problems encountered during the testing. A brief equipment and process description will be included in the final report, indicating equipment operating parameters during the testing. A simple schematic of the process will show all sampling locations, including upstream and downstream disturbances.

All sampling and analytical procedures will be described specifically detailing all aspects of sampling and analysis. Diagrams of test equipment will be shown.

The appendix to the final report will include complete raw field data, including production data indicative of the testing interval, lab analysis, and test results. All calculations will be shown. The appendix will also contain current calibration data for all applicable equipment and calibration gases used for the testing.

6.2 DATA REDUCTION

Spectrum uses controlled spreadsheets that have been audited for accuracy to calculate all source test results. Data reduction QA is simplified to ensure proper numerical data entry. The final report will include the test results of all parameters measured in comparison to the applicable permit limits. Facility process data detailing unit operation during testing will also be included in the final report.

7.0 PERSONNEL RESPONSIBILITIES AND TEST SCHEDULE

7.1 TEST SITE ORGANIZATION

Spectrum will perform the entirety of the onsite testing. Spectrum will handle all the FTIR testing and duty of performing the flow measurements.

Steve Hall will serve a dual role as project manager and principal investigator for the project. Alex Bellon and Sean Springer will share the principal investigator role with Steve. In this role Sean, Steve or Alex will be the leads onsite and will communicate the test progress and any sampling issues encountered onsite. Alina Flores, Jeremiah Johnson or another Spectrum scientist may serve as a project scientist and provide support throughout the project.

7.2 TEST PREPARATIONS

Several pre-test preparations are required to be in place before commencement of the compliance testing. This section discusses what is required from the facility for the testing to successfully occur.

7.2.1 SERVICES PROVIDED BY FACILITY

Microchip will record process operations data as required during testing. A copy of these data will be included in the test report.

7.2.2 ACCESS TO SAMPLING SITES

The facility will provide safe access to the sampling locations. Spectrum has inspected the proposed sampling locations and has determined that they are acceptable with the scaffolding as required.

7.3 TEST SCHEDULE

A test date will be arranged following ODEQ approval of the test protocol. The scrubber performance testing is currently anticipated to begin on or about February 28th, 2024 at 10 AM. Testing is expected to require a total of approximately 10-15 test days on-site and may include some weekend testing.

Appendix A

Field Data Sheets and Example Calculation

SAMPLED VOLUME OF METERED GAS SAMPLE, DRY STANDARD CUBIC FEET

Vmstd = [(Tstd + 460)/Pstd] * Y * Vm * (Pbar + Delta-H/13.6) / (460 + tm)
= [60 + 460)/29.92] * 1.000 * 37.866 * (28.44 + 1.65/13.6) / (460 + 80.0)
= 34.80773

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET

Vwstd = 0.04707 * Vlc * (460 + Tstd) / 528
= 0.04707 * 1073.9 * (460 + 60) / 528
= 49.78259

MOISTURE CONTENT, PERCENT BY VOLUME

%H2O = Vwstd / (Vwstd + Vmstd)
= 49.783 / (49.783 + 34.808)
= 58.851

DRY MOLE FRACTION, LB-MOLE/LB-MOLE

Mfd = 1 - %H2O / 100
= 1 - 58.9 / 100
= 0.41149

DRY MOLECULAR WEIGHT OF FLUE GAS, LB/LB-MOLE

Md = (%CO2 * (fwtCO2/100) + (%O2 * (fwtO2/100))) + ((100-%CO2-%O2) * (fwtCO&N2/100))
= (0.00 * (44/100) + (20.90 * (32/100))) + ((100-0.00-20.90) * (28/100))
= 28.836

WET MOLECULAR WEIGHT OF FLUE GAS, LB/LB-MOLE

Ms = (Md * Mfd) + (fwtH2O) * (%H20/100)
= (28.84 * 0.411) + ((18.0) * (58.85/100))
= 22.459

ABSOLUTE FLUE GAS PRESSURE, INCHES MERCURY

Ps = Pbar + (Pg/13.6)
= 28.4 + (-0.44/13.6)
= 28.41

FLUE GAS VELOCITY AT SAMPLE POINT, FEET PER SECOND. FOR EXAMPLE, POINT N-8

vp = 2.9 * Cp * SQRT[dP * (460+ts) * (29.92/Ps) * (28.95/Ms)]
= 2.9 * 0.84 * SQRT[0.18 *(460+100) * (29.92/28.4) * (28.95/22.5)]
= 28.50

AVERAGE FLUE GAS VELOCITY, FEET PER SECOND

vs = ∑(vp at each point)/Number of Traversing Points
= (28.50 + 28.50 + 32.18 + …)/16
= 27.24

SAMPLED VOLUME OF METERED GAS SAMPLE, DRY STANDARD CUBIC FEET

Vmstd = [(Tstd + 460)/Pstd] * Y * Vm * (Pbar + Delta-H/13.6) / (460 + tm)
= [60 + 460)/29.92] * 1.000 * 37.866 * (28.44 + 1.65/13.6) / (460 + 80.0)
= 34.80773

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET

Vwstd = 0.04707 * Vlc * (460 + Tstd) / 528
= 0.04707 * 1073.9 * (460 + 60) / 528
= 49.78259

MOISTURE CONTENT, PERCENT BY VOLUME

%H2O = Vwstd / (Vwstd + Vmstd)
= 49.783 / (49.783 + 34.808)
= 58.851

DRY MOLE FRACTION, LB-MOLE/LB-MOLE

Mfd = 1 - %H2O / 100
= 1 - 58.9 / 100
= 0.41149

DRY MOLECULAR WEIGHT OF FLUE GAS, LB/LB-MOLE

Md = (%CO2 * (fwtCO2/100) + (%O2 * (fwtO2/100))) + ((100-%CO2-%O2) * (fwtCO&N2/100))
= (0.00 * (44/100) + (20.90 * (32/100))) + ((100-0.00-20.90) * (28/100))
= 28.836

WET MOLECULAR WEIGHT OF FLUE GAS, LB/LB-MOLE

Ms = (Md * Mfd) + (fwtH2O) * (%H20/100)
= (28.84 * 0.411) + ((18.0) * (58.85/100))
= 22.459

ABSOLUTE FLUE GAS PRESSURE, INCHES MERCURY

Ps = Pbar + (Pg/13.6)
= 28.4 + (-0.44/13.6)
= 28.41

FLUE GAS VELOCITY AT SAMPLE POINT, FEET PER SECOND. FOR EXAMPLE, POINT N-8

vp = 2.9 * Cp * SQRT[dP * (460+ts) * (29.92/Ps) * (28.95/Ms)]
= 2.9 * 0.84 * SQRT[0.18 *(460+100) * (29.92/28.4) * (28.95/22.5)]
= 28.50

AVERAGE FLUE GAS VELOCITY, FEET PER SECOND

vs = ∑(vp at each point)/Number of Traversing Points
= (28.50 + 28.50 + 32.18 + …)/16
= 27.24

FLUE GAS VOLUMETRIC FLOW RATE, ACTUAL CUBIC FEET PER MINUTE (ACFM)
Q = (60/144) * vs * A
= (60/144) * 27.24 * 153.9
= 1747

FLUE GAS VOLUMETRIC FLOW RATE, WET STANDARD CUBIC FEET PER MINUTE (WSCFM)
Qws = Q * (Tstd+460) / (ts+460) * (Ps/Pstd)
= 1747 * (60+460) / (100+460) * (28.41/29.92)
= 1541

FLUE GAS VOLUMETRIC FLOW RATE, DRY STANDARD CUBIC FEET PER MINUTE (DSCFM)
Qsd = Qws * Mfd
= 1541 * 0.411
= 634

Wet to Dry Correction (for THC)

PPM, dry = PPM / (1 - (Measured% Moisture / 100))

Method 1 – Circular Duct – Determination of Traverse Points

Project _____

Project Number _____

Facility _____

Source _____

Operator _____

Date _____

□ Velocity Only □ Isokinetic Sampling	Upstream Distance (ft/in) _____ □ Measurement □ Plant Information
Number of Ports to be sampled _____	
Duct Diameter (in) _____ □ Measurement □ Plant Information	Downstream Distance (ft/in) _____ □ Measurement □ Plant Information

Total number of Traverse Points (from Figure 2 (velocity) or 1 (all isokinetic sampling))	
Number of traverse points per port	
Port Depth	

Traverse Point	Percent of Diameter	Distance from Wall [2] (in)	Marking Location (in)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Traverse Point	Percent of Diameter	Distance from Wall (in)	Marking Location (in)
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

[2] According to Method 1, for stacks between 12 and 24", no point may be within ½ inch of the wall. For stacks greater than 24", no point may be within 1 inch of the wall.

Determination of Cyclonic Flow
Preliminary Velocity/Temperature Traverse
EPA Methods 1 and 2

Project _____ Console (or Temperature Readout) ID _____

Project Number _____ Barometric Pressure (" Hg) _____

Facility _____ Elevation (Relative to Barometer) (ft) _____

Source _____ Static Pressure (" wc) _____

Operator _____

Date _____

Time _____ **Pitot Tube Leak Check**

Pitot Tube No. _____ Initial (+) _____ (-) _____

PTCF _____ Final (+) _____ (-) _____

Traverse Point	Yaw Angle (°)	Velocity Head (ΔP) (in. wc)	Temperature (°F)

Traverse Point	Yaw Angle (°)	Velocity Head (ΔP) (in. wc)	Temperature (°F)

Average Yaw Angle: _____.(This is the average of the absolute value of the measurements)

If the average yaw angle exceeds 20°, Method 2 is not applicable for the determination of gas velocity.

Method 1– Determination of Cyclonic Flow

Project _____

Project Number _____ Pitot Tube No. _____

Facility _____ PTCF _____

Source _____ **Pitot Tube Leak Check**

Operator _____ Initial (+) _____ (-) _____

Date _____ Final (+) _____ (-) _____

Time _____

Traverse Point	Yaw Angle (°)

Traverse Point	Yaw Angle (°)

Average Yaw Angle: _____.(This is the average of the absolute value of the measurements)

If the average yaw angle exceeds 20°, Method 2 is not applicable for the determination of gas velocity.

Figure 1 - Traverse Points for Isokinetic Sampling

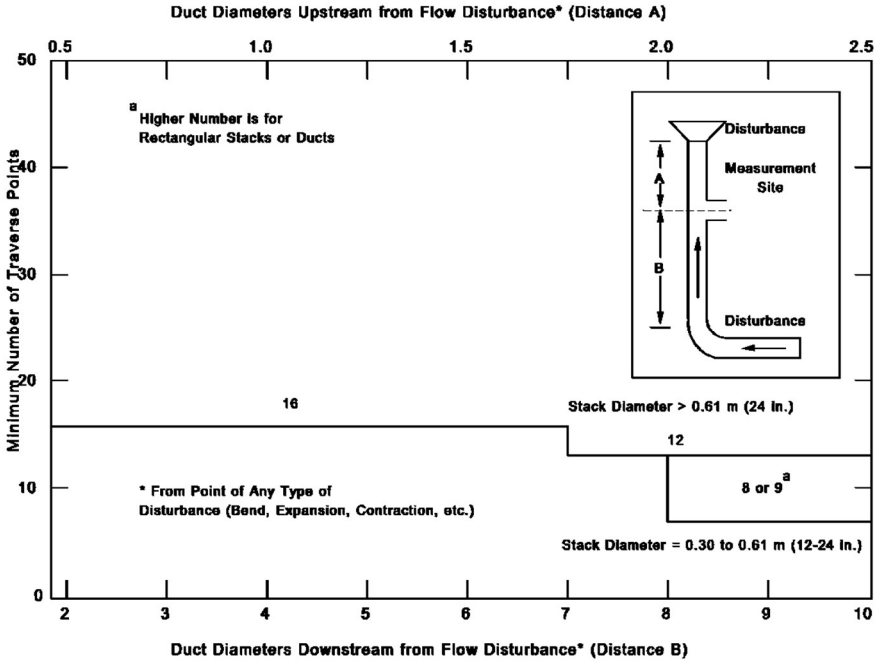


Figure 2 - Traverse Points for Velocity Determination

Traverse Point Number on a Diameter	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												99.9

Isokinetic Sampling Data Sheet

Isokinetic Sampling Cover Sheet

Client:		**Pitot Tube Cp:**	
Facility:		**Probe Length (Feet):**	
Test Location:		**Probe Liner Material:**	
Project #:		**Sample Plane:**	Hrztl. or Vert.
Test Method(s):		**Port Length (“):**	
Test Engineer:		**Port Diameter (“):**	
Test Technician:		**Port Type:**	
Upstream Diameters:		**Duct Shape:**	Circ. or Rect.
Downstream Diameters:		**Diameter (Feet):**	
# of Ports Sampled:		**Length (Feet):**	
# of Points per Port:		**Width (Feet):**	
Source Condition:		**Duct Area (Sq. Feet):**	
Diluent Model/SN:		**Minutes per Point:**	
Mid Gas ID/concentration:	/%CO_2 %O_2	**Total Traverse Points:**	
High Gas ID/concentration:	/%CO_2 %O_2	**Test Length (Min.):**	
Moisture Balance ID:		**Train Type:**	

	R#_____		R#_____		R#_____		
Meter ID:							
Pitot ID:							
Filter ID:							
Filter Pre-Weight (g):							
Nozzle Diameter (“):							
Meter Cal Factor (Y):							
Meter Orifice Setting (ΔH):							
Nozzle Kit ID:							
Individual Nozzle ID:							
Pre Pitot Leak Check:	@	“H_2O	@	“H_2O	@	“H_2O	
Post Pitot Leak Check:	@	“H_2O	@	“H_2O	@	“H_2O	
Pre Nozzle Leak Check:	@	“Hg	@	“Hg	@	“Hg	
Post Nozzle Leak Check:	@	“Hg	@	“Hg	@	“Hg	
Barometric Pressure,“Hg:							
Static Pressure, “H_2O:							
CO_2 %:							
O_2 %:							

Comments:

DS-004 Isokinetic Sampling Cover Sheet Rev. 3.2 1/1/2021

Isokinetic Sampling Field Data Sheet

Project Number: _____ Date: _____ Test Number: _____

Client: _____ Test Location: _____ Operator: _____ Test Tech: _____

Plant: _____ Test Method: _____ Page Number: _____ of _____

Port-Point #.	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3 , Actual	Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft^3 ,per point	Theoretical Meter Volume, (V_m) ft^3 , total	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, " Hg	Probe Temp. °F	Filter Temp. °F	CPM Filter Temp. °F	Impinger Outlet Well Temp °F

Spectrum ENVIRONMENTAL SOLUTIONS

Spectrum ENVIRONMENTAL SOLUTIONS

Chain of Custody Record

Particulate Matter from Sampling Trains

Page ____ of ____

Project							
Site							
Project Number							
Prepared by							
Sample ID Code	**Sample Matrix**	Date/Time			Hold	MS/MSD	Comments

Remarks: Provide results in total milligrams per sample. Raw data package required

Relinquished by:	Date	Time	Received by:	Date	Time	Relinquished by:	Date	Time
Received by:	Date	Time	Relinquished by:	Date	Time			
Received for Laboratory by	Date	Time	Airbill No.	Opened by:	Seal #	Date	Time	Temp (C)
Seal #	Condition							
Remarks								

Appendix F

Operations Data

timestamp	PES_002_AIT_150_VAL0	PES_002_FIT_100_1_VAL0	PES_002_FIT_100_2_VAL0	PES_002_FIT_100_2_VAL1
3/6/2024 18:21	7.366625	116.440625	104.1796875	220.6203125
3/6/2024 18:22	7.3670625	114.8984375	102.6921875	217.590625
3/6/2024 18:23	7.3679375	114.66875	102.8671875	217.5359375
3/6/2024 18:24	7.3696875	116.1890625	103.11875	219.3078125
3/6/2024 18:25	7.3696875	115.7078125	103.446875	219.1546875
3/6/2024 18:26	7.371	115.7296875	103.1734375	218.903125
3/6/2024 18:27	7.371	114.9859375	104.3546875	219.340625
3/6/2024 18:28	7.3740625	114.078125	104.0921875	218.1703125
3/6/2024 18:29	7.3740625	115.4015625	104.4421875	219.84375
3/6/2024 18:30	7.3758125	113.75	105.04375	218.79375
3/6/2024 18:31	7.375375	116.440625	102.3421875	218.7828125
3/6/2024 18:32	7.375375	115.084375	102.55	217.634375
3/6/2024 18:33	7.3758125	116.6375	103.840625	220.478125
3/6/2024 18:34	7.377125	115.8390625	103.90625	219.7453125
3/6/2024 18:35	7.3766875	111.5296875	96.95	208.4796875
3/6/2024 18:36	7.3950625	112.9296875	104.496875	217.4265625
3/6/2024 18:37	7.37975	116.2765625	102.9984375	219.275
3/6/2024 18:38	7.3793125	114.5484375	104.78125	219.3296875
3/6/2024 18:39	7.3766875	116.1015625	103.840625	219.9421875
3/6/2024 18:40	7.3766875	113.0828125	105.21875	218.3015625
3/6/2024 18:41	7.377125	115.8171875	101.7515625	217.56875
3/6/2024 18:42	7.377125	114.9203125	103.5234375	218.44375
3/6/2024 18:43	7.377125	114.340625	103.9171875	218.2578125
3/6/2024 18:44	7.3810625	116.221875	101.5109375	217.7328125
3/6/2024 18:45	7.4038125	110.2390625	95.9875	206.2265625
3/6/2024 18:46	7.384125	114.7125	104.1578125	218.8703125
3/6/2024 18:47	7.377125	115.1171875	104.6609375	219.778125
3/6/2024 18:48	7.3766875	114.4390625	102.025	216.4640625
3/6/2024 18:49	7.375375	114.9421875	104.934375	219.8765625
3/6/2024 18:50	7.375375	115.7515625	102.265625	218.0171875
3/6/2024 18:51	7.375375	114.9421875	105.04375	219.9859375
3/6/2024 18:52	7.3740625	114.3953125	102.7578125	217.153125
3/6/2024 18:53	7.3740625	115.6421875	101.171875	216.8140625
3/6/2024 18:54	7.3985625	110.971875	98.9625	209.934375
3/6/2024 18:55	7.3810625	115.9375	104.0703125	220.0078125
3/6/2024 18:56	7.3749375	114.034375	104.0375	218.071875
3/6/2024 18:57	7.3740625	113.990625	103.6984375	217.6890625
3/6/2024 18:58	7.371	115.959375	103.11875	219.078125
3/6/2024 18:59	7.371	114.078125	103.03125	217.109375
3/6/2024 19:00	7.371	114.3625	101.565625	215.928125
3/6/2024 19:01	7.371	114.734375	102.965625	217.7
3/6/2024 19:02	7.3766875	114.84375	104.9234375	219.7671875
3/6/2024 19:03	7.3845625	114.865625	105.196875	220.0625
3/6/2024 19:04	7.406875	115.4234375	104.8796875	220.303125
3/6/2024 19:05	7.3950625	116.003125	102.8671875	218.8703125
3/6/2024 19:06	7.3985625	117.1953125	104.3984375	221.59375
3/6/2024 19:07	7.4011875	117.2609375	103.5890625	220.85
3/6/2024 19:08	7.4038125	116.659375	105.153125	221.8125
3/6/2024 19:09	7.4064375	114.821875	104.1796875	219.0015625
3/6/2024 19:10	7.41125	115.784375	104.65	220.434375
3/6/2024 19:11	7.4143125	118.5078125	104.803125	223.3109375
3/6/2024 19:12	7.4536875	115.959375	104.1359375	220.0953125
3/6/2024 19:13	7.4585	117.1296875	103.796875	220.9265625
3/6/2024 19:14	7.455	114.75625	104.8140625	219.5703125
3/6/2024 19:15	7.468125	114.384375	105.6015625	219.9859375
3/6/2024 19:16	7.469	117.4140625	107.05625	224.4703125
3/6/2024 19:17	7.4650625	115.5328125	104.890625	220.4234375

timestamp	PES_002_AIT_150_VAL0	PES_002_FIT_100_1_VAL0	PES_002_FIT_100_2_VAL0	PES_002_FIT_100_2_VAL1
3/6/2024 19:18	7.4624375	118.95625	104.803125	223.759375
3/6/2024 19:19	7.4725	115.346875	103.90625	219.253125
3/6/2024 19:20	7.4353125	116.3859375	106.2578125	222.64375
3/6/2024 19:21	7.422625	115.828125	106.0609375	221.8890625
3/6/2024 19:22	7.4195625	114.9640625	105.3609375	220.325
3/6/2024 19:23	7.41825	115.171875	106.465625	221.6375
3/6/2024 19:24	7.4151875	114.40625	104.60625	219.0125
3/6/2024 19:25	7.4165	117.38125	104.4203125	221.8015625
3/6/2024 19:26	7.4169375	116.7796875	106.09375	222.8734375
3/6/2024 19:27	7.41825	115.740625	105.0984375	220.8390625
3/6/2024 19:28	7.41825	118.7046875	105.459375	224.1640625
3/6/2024 19:29	7.4195625	115.346875	106.2578125	221.6046875
3/6/2024 19:30	7.419125	117.1625	103.6984375	220.8609375
3/6/2024 19:31	7.4195625	117.796875	101.4890625	219.2859375
3/6/2024 19:32	7.4213125	114.5265625	103.0203125	217.546875
3/6/2024 19:33	7.4169375	116.7578125	105.984375	222.7421875
3/6/2024 19:34	7.419125	115.6203125	104.759375	220.3796875
3/6/2024 19:35	7.4239375	115.9046875	104.51875	220.4234375
3/6/2024 19:36	7.422625	117.38125	104.8359375	222.2171875
3/6/2024 19:37	7.422625	116.8234375	104.715625	221.5390625
3/6/2024 19:38	7.422625	115.2046875	105.2625	220.4671875
3/6/2024 19:39	7.4213125	118.3546875	104.7375	223.0921875
3/6/2024 19:40	7.422625	115.565625	105.5796875	221.1453125
3/6/2024 19:41	7.422625	116.55	104.16875	220.71875
3/6/2024 19:42	7.42525	114.8546875	105.1203125	219.975
3/6/2024 19:43	7.427	115.084375	104.321875	219.40625
3/6/2024 19:44	7.4265625	116.4625	105.3390625	221.8015625
3/6/2024 19:45	7.4283125	116.4296875	103.25	219.6796875
3/6/2024 19:46	7.427875	115.1171875	104.321875	219.4390625
3/6/2024 19:47	7.427875	114.0890625	105.634375	219.7234375
3/6/2024 19:48	7.429625	116.484375	105.2296875	221.7140625
3/6/2024 19:49	7.4309375	118.2453125	105.896875	224.1421875
3/6/2024 19:50	7.4305	116.0796875	106.378125	222.4578125
3/6/2024 19:51	7.434	115.3796875	105.74375	221.1234375
3/6/2024 19:52	7.4326875	116.9765625	105.109375	222.0859375
3/6/2024 19:53	7.43225	116.615625	104.3	220.915625
3/6/2024 19:54	7.43575	114.7015625	105.5140625	220.215625
3/6/2024 19:55	7.4370625	116.41875	105.9515625	222.3703125
3/6/2024 19:56	7.4370625	115.609375	103.5453125	219.1546875
3/6/2024 19:57	7.4370625	116.090625	105.459375	221.55
3/6/2024 19:58	7.438375	115.740625	105.1859375	220.9265625
3/6/2024 19:59	7.438375	114.6796875	105.2625	219.9421875
3/6/2024 20:00	7.4379375	116.9109375	104.4421875	221.353125
3/6/2024 20:01	7.4396875	114.4828125	104.3546875	218.8375
3/6/2024 20:02	7.4396875	115.871875	104.9453125	220.8171875
3/6/2024 20:03	7.4423125	115.9703125	104.8140625	220.784375
3/6/2024 20:04	7.441	114.428125	104.9125	219.340625
3/6/2024 20:05	7.4423125	116.0796875	105.65625	221.7359375
3/6/2024 20:06	7.4423125	114.8	104.2671875	219.0671875
3/6/2024 20:07	7.4423125	117.884375	104.125	222.009375
3/6/2024 20:08	7.4423125	115.45625	104.7484375	220.2046875
3/6/2024 20:09	7.443625	116.4515625	104.715625	221.1671875
3/6/2024 20:10	7.4449375	115.3140625	105.940625	221.2546875
3/6/2024 20:11	7.4458125	115.2375	105.6890625	220.9265625
3/6/2024 20:12	7.4449375	115.4234375	103.884375	219.3078125
3/6/2024 20:13	7.4449375	116.3640625	104.2015625	220.565625
3/6/2024 20:14	7.447125	117.775	104.584375	222.359375

timestamp	PES_002_AIT_150_VAL0	PES_002_FIT_100_1_VAL0	PES_002_FIT_100_2_VAL0	PES_002_FIT_100_2_VAL1
3/6/2024 20:15	7.448	117.075	103.90625	220.98125
3/6/2024 20:16	7.448	115.85	106.1484375	221.9984375
3/6/2024 20:17	7.448	116.8890625	104.759375	221.6484375
3/6/2024 20:18	7.4493125	114.1984375	106.4984375	220.696875
3/6/2024 20:19	7.4493125	116.85625	105.7109375	222.5671875
3/6/2024 20:20	7.44975	116.0578125	106.44375	222.5015625
3/6/2024 20:21	7.4510625	114.8875	105.4375	220.325
3/6/2024 20:22	7.4510625	116.6921875	104.0265625	220.71875
3/6/2024 20:23	7.450625	115.8171875	103.90625	219.7234375
3/6/2024 20:24	7.4536875	116.5609375	105.9078125	222.46875
3/6/2024 20:25	7.4536875	116.9765625	105.4375	222.4140625
3/6/2024 20:26	7.455	115.128125	105.91875	221.046875
3/6/2024 20:27	7.45675	114.7125	103.03125	217.74375
3/6/2024 20:28	7.4563125	116.24375	107.0125	223.25625
3/6/2024 20:29	7.45675	115.3140625	105.1203125	220.434375
3/6/2024 20:30	7.4563125	116.353125	103.621875	219.975
3/6/2024 20:31	7.4580625	114.9859375	105.4703125	220.45625
3/6/2024 20:32	7.4598125	116.571875	103.7421875	220.3140625
3/6/2024 20:33	7.459375	116.3203125	103.709375	220.0296875
3/6/2024 20:34	7.4598125	115.1828125	102.7796875	217.9625
3/6/2024 20:35	7.461125	115.9265625	105.56875	221.4953125
3/6/2024 20:36	7.4624375	115.7078125	104.6609375	220.36875
3/6/2024 20:37	7.4624375	116.4625	105.9078125	222.3703125
3/6/2024 20:38	7.4624375	114.5703125	104.8578125	219.428125
3/6/2024 20:39	7.46375	115.303125	105.415625	220.71875
3/6/2024 20:40	7.464625	114.8765625	105.5578125	220.434375
3/6/2024 20:41	7.4650625	114.9640625	104.409375	219.3734375
3/6/2024 20:42	7.4650625	115.478125	104.8140625	220.2921875
3/6/2024 20:43	7.466375	116.5609375	106.225	222.7859375
3/6/2024 20:44	7.466375	116.003125	105.415625	221.41875
3/6/2024 20:45	7.466375	115.98125	105.721875	221.703125
3/6/2024 20:46	7.466375	115.0296875	104.5953125	219.625
3/6/2024 20:47	7.4676875	114.9640625	104.60625	219.5703125
3/6/2024 20:48	7.469	113.6953125	104.759375	218.4546875
3/6/2024 20:49	7.47075	116.24375	105.1859375	221.4296875
3/6/2024 20:50	7.47075	115.3578125	105.7328125	221.090625
3/6/2024 20:51	7.4720625	116.4296875	105.721875	222.1515625
3/6/2024 20:52	7.4711875	115.478125	105.459375	220.9375
3/6/2024 20:53	7.4725	115.7296875	106.421875	222.1515625
3/6/2024 20:54	7.4725	116.003125	105.6453125	221.6484375
3/6/2024 20:55	7.4738125	116.1015625	105.196875	221.2984375
3/6/2024 20:56	7.4738125	116.725	105.2734375	221.9984375
3/6/2024 20:57	7.475125	117.03125	103.1296875	220.1609375
3/6/2024 20:58	7.4755625	116.878125	105.415625	222.29375
3/6/2024 20:59	7.475125	116.528125	104.890625	221.41875
3/6/2024 21:00	7.4764375	115.71875	104.2234375	219.9421875
3/6/2024 21:01	7.4764375	117.1625	105.4703125	222.6328125
3/6/2024 21:02	7.4781875	114.0015625	103.796875	217.7984375
3/6/2024 21:03	7.47775	117.403125	105.6671875	223.0703125
3/6/2024 21:04	7.47775	116.3859375	103.5890625	219.975
3/6/2024 21:05	7.5079375	114.58125	99.4109375	213.9921875
3/6/2024 21:06	7.483875	116.265625	104.43125	220.696875
3/6/2024 21:07	7.4808125	116.9	104.7375	221.6375
3/6/2024 21:08	7.4795	115.3796875	104.3328125	219.7125
3/6/2024 21:09	7.4795	115.4671875	104.3109375	219.778125
3/6/2024 21:10	7.480375	115.9921875	105.4921875	221.484375
3/6/2024 21:11	7.4808125	114.93125	104.9671875	219.8984375

timestamp	PES_002_AIT_150_VAL0	PES_002_FIT_100_1_VAL0	PES_002_FIT_100_2_VAL0	PES_002_FIT_100_2_VAL1
3/6/2024 21:12	7.4808125	116.0578125	104.3328125	220.390625
3/6/2024 21:13	7.4808125	116.59375	103.8078125	220.4015625
3/6/2024 21:14	7.4825625	117.25	105.8421875	223.0921875
3/6/2024 21:15	7.504	112.35	97.8578125	210.2078125
3/6/2024 21:16	7.4851875	115.346875	104.365625	219.7125
3/6/2024 21:17	7.483875	114.1765625	105.1859375	219.3625
3/6/2024 21:18	7.4825625	115.01875	104.3109375	219.3296875
3/6/2024 21:19	7.480375	116.7140625	105.2515625	221.965625
3/6/2024 21:20	7.4816875	115.6859375	104.34375	220.0296875
3/6/2024 21:21	7.4825625	115.4890625	105.13125	220.6203125
3/6/2024 21:22	7.4816875	114.996875	106.771875	221.76875
3/6/2024 21:23	7.4825625	115.4890625	107.8546875	223.34375
3/6/2024 21:24	7.483875	116.0359375	104.5953125	220.63125
3/6/2024 21:25	7.483875	113.8046875	98.021875	211.8265625
3/6/2024 21:26	7.4921875	115.8390625	105.940625	221.7796875
3/6/2024 21:27	7.4851875	115.4890625	105.853125	221.3421875
3/6/2024 21:28	7.483875	116.85625	104.8796875	221.7359375
3/6/2024 21:29	7.483875	117.90625	104.059375	221.965625
3/6/2024 21:30	7.483875	113.3234375	104.8796875	218.203125
3/6/2024 21:31	7.483875	114.1328125	105.13125	219.2640625
3/6/2024 21:32	7.4834375	115.084375	102.221875	217.30625
3/6/2024 21:33	7.483875	117.5671875	104.7046875	222.271875
3/6/2024 21:34	7.4851875	116.33125	105.39375	221.725
3/6/2024 21:35	7.4869375	112.5578125	98.8640625	211.421875
3/6/2024 21:36	7.4921875	115.6203125	104.496875	220.1171875

	Recirc Rate (GPM)	Water pH
Run1	115.40	7.40
Run2	115.97	7.44
Run3	115.64	7.48

	Start	End
Run1	18:21	19:36
Run2	19:36	20:36
Run3	20:36	21:36

Test completed 3/6/24

timestamp	HVAC_1PES_005_AIT_150_VAL0	PES_001_FT_150_VAL0
3/5/2024 18:51	6.9785625	324.6272313
3/5/2024 18:52	6.9855625	338.9378913
3/5/2024 18:53	6.9995625	326.851805
3/5/2024 18:54	7.020125	331.9430975
3/5/2024 18:55	7.028	328.6635713
3/5/2024 18:56	7.0468125	325.0629725
3/5/2024 18:57	7.0385	321.714645
3/5/2024 18:58	7.0608125	326.39313
3/5/2024 18:59	7.0555625	327.7232875
3/5/2024 19:00	7.065625	328.0214263
3/5/2024 19:01	7.056875	321.0954338
3/5/2024 19:02	7.0669375	331.2092175
3/5/2024 19:03	7.0721875	324.5125625
3/5/2024 19:04	7.0529375	326.8747388
3/5/2024 19:05	7.0494375	324.3520263
3/5/2024 19:06	7.055125	329.7414575
3/5/2024 19:07	7.0485625	324.8795025
3/5/2024 19:08	7.0380625	320.613825
3/5/2024 19:09	7.0196875	326.6912688
3/5/2024 19:10	7	334.1447375
3/5/2024 19:11	7.0240625	324.37496
3/5/2024 19:12	6.99475	325.7968525
3/5/2024 19:13	6.9873125	327.9755588
3/5/2024 19:14	6.9890625	323.5264113
3/5/2024 19:15	6.9873125	327.4480825
3/5/2024 19:16	6.972875	326.9206063
3/5/2024 19:17	6.965875	331.4614888
3/5/2024 19:18	6.9545	330.79641
3/5/2024 19:19	6.9584375	331.3926875
3/5/2024 19:20	6.9374375	329.2598488
3/5/2024 19:21	6.9356875	324.099755
3/5/2024 19:22	6.944	331.2780188
3/5/2024 19:23	6.9330625	334.6951475
3/5/2024 19:24	6.9330625	325.4528463
3/5/2024 19:25	6.9545	323.8016163
3/5/2024 19:26	6.965875	328.2507638
3/5/2024 19:27	6.965875	322.5173263
3/5/2024 19:28	6.9820625	330.154265
3/5/2024 19:29	6.972875	328.6406375
3/5/2024 19:30	6.9759375	333.7548638
3/5/2024 19:31	6.9899375	329.2598488
3/5/2024 19:32	7.0091875	327.8379563
3/5/2024 19:33	7.0301875	329.9937288
3/5/2024 19:34	7.03675	322.1503863

timestamp	HVAC_1PES_005_AIT_150_VAL0	PES_001_FT_150_VAL0
3/5/2024 19:35	7.0494375	329.4891863
3/5/2024 19:36	7.0695625	330.9110788
3/5/2024 19:37	7.086625	332.81458
3/5/2024 19:38	7.105	331.3926875
3/5/2024 19:39	7.1106875	330.3606688
3/5/2024 19:40	7.1071875	324.0538875
3/5/2024 19:41	7.093625	322.6549288
3/5/2024 19:42	7.0774375	328.0902275
3/5/2024 19:43	7.0581875	317.9764438
3/5/2024 19:44	7.0468125	326.4160638
3/5/2024 19:45	7.020125	328.6177038
3/5/2024 19:46	6.99475	335.291425
3/5/2024 19:47	6.9741875	330.2689338
3/5/2024 19:48	6.9873125	325.9803225
3/5/2024 19:49	6.9584375	329.1222463
3/5/2024 19:50	6.95275	326.8059375
3/5/2024 19:51	6.9475	327.12701
3/5/2024 19:52	6.925625	326.8747388
3/5/2024 19:53	6.937	326.4160638
3/5/2024 19:54	6.923	327.0582088
3/5/2024 19:55	6.909875	327.8838238
3/5/2024 19:56	6.9059375	328.04436
3/5/2024 19:57	6.92825	337.5389325
3/5/2024 19:58	6.955375	329.9019938
3/5/2024 19:59	6.99475	329.9478613
3/5/2024 20:00	7.0240625	329.4662525
3/5/2024 20:01	7.041125	331.622025
3/5/2024 20:02	7.08225	322.72373
3/5/2024 20:03	7.12775	319.05433
3/5/2024 20:04	7.1036875	328.0672938
3/5/2024 20:05	7.1290625	326.4160638
3/5/2024 20:06	7.132125	332.26417
3/5/2024 20:07	7.1124375	322.0357175
3/5/2024 20:08	7.125125	319.3066013
3/5/2024 20:09	7.12075	329.1222463
3/5/2024 20:10	7.08225	331.7596275
3/5/2024 20:11	7.102375	334.741015
3/5/2024 20:12	7.0695625	324.466695
3/5/2024 20:13	7.0643125	332.2871038
3/5/2024 20:14	7.0669375	329.3515838
3/5/2024 20:15	7.065625	326.4160638
3/5/2024 20:16	7.056875	325.65925
3/5/2024 20:17	7.079625	326.6912688
3/5/2024 20:18	7.08225	325.6133825

timestamp	HVAC_1PES_005_AIT_150_VAL0	PES_001_FT_150_VAL0
3/5/2024 20:19	7.08225	320.3156863
3/5/2024 20:20	7.098	336.7133175
3/5/2024 20:21	7.0835625	326.2555275
3/5/2024 20:22	7.0993125	324.9941713
3/5/2024 20:23	7.09975	322.8613325
3/5/2024 20:24	7.0966875	325.4987138
3/5/2024 20:25	7.1238125	321.8293138
3/5/2024 20:26	7.1133125	325.1776413
3/5/2024 20:27	7.11375	322.5861275
3/5/2024 20:28	7.1365	323.182405
3/5/2024 20:29	7.1395625	320.9119638
3/5/2024 20:30	7.125125	320.5679575
3/5/2024 20:31	7.14525	328.3424988
3/5/2024 20:32	7.1439375	326.4160638
3/5/2024 20:33	7.137375	324.2144238
3/5/2024 20:34	7.133875	328.0902275
3/5/2024 20:35	7.119875	329.9019938
3/5/2024 20:36	7.12425	325.7051175
3/5/2024 20:37	7.137375	327.3334138
3/5/2024 20:38	7.119875	323.3888088
3/5/2024 20:39	7.1325625	322.1274525
3/5/2024 20:40	7.102375	327.2646125
3/5/2024 20:41	7.074375	326.484865
3/5/2024 20:42	7.069125	329.8102588
3/5/2024 20:43	7.0328125	327.5627513
3/5/2024 20:44	7.0083125	333.6631288
3/5/2024 20:45	6.981625	327.1499438
3/5/2024 20:46	6.958875	323.2053388
3/5/2024 20:47	6.93	327.9296913
3/5/2024 20:48	6.91425	334.28234
3/5/2024 20:49	6.881875	326.301395
3/5/2024 20:50	6.8893125	330.3606688
3/5/2024 20:51	6.864375	317.3572325
3/5/2024 20:52	6.867875	327.5168838
3/5/2024 20:53	6.841625	320.797295
3/5/2024 20:54	6.8648125	325.65925
3/5/2024 20:55	6.845125	330.7276088
3/5/2024 20:56	6.90025	324.3061588
3/5/2024 20:57	6.92825	329.2827825
3/5/2024 20:58	6.9724375	327.3563475
3/5/2024 20:59	6.99825	328.8241075
3/5/2024 21:00	7.0455	325.3611113
3/5/2024 21:01	7.0643125	324.2144238
3/5/2024 21:02	7.0945	329.787325

timestamp	HVAC_1PES_005_AIT_150_VAL0	PES_001_FT_150_VAL0
3/5/2024 21:03	7.0739375	325.4069788
3/5/2024 21:04	7.0791875	329.9019938
3/5/2024 21:05	7.105	324.00802
3/5/2024 21:06	7.11375	318.4809863
3/5/2024 21:07	7.1036875	324.0538875
3/5/2024 21:08	7.133875	328.0214263
3/5/2024 21:09	7.1211875	334.0300688
3/5/2024 21:10	7.111125	326.5536663
3/5/2024 21:11	7.1325625	324.7189663
3/5/2024 21:12	7.111125	333.36499
3/5/2024 21:13	7.1001875	329.69559
3/5/2024 21:14	7.0739375	326.5307325
3/5/2024 21:15	7.0713125	325.9573888
3/5/2024 21:16	7.0546875	328.503035
3/5/2024 21:17	7.03675	321.9439825
3/5/2024 21:18	7.0258125	326.20966
3/5/2024 21:19	7.0240625	327.035275
3/5/2024 21:20	7.0083125	327.218745
3/5/2024 21:21	7.0196875	324.9941713
3/5/2024 21:22	7.007	328.6177038
3/5/2024 21:23	7.00875	324.9024363
3/5/2024 21:24	7.007	323.6640138
3/5/2024 21:25	6.97375	325.0859063
3/5/2024 21:26	6.965875	334.3970088
3/5/2024 21:27	6.97025	327.1040763
3/5/2024 21:28	6.9610625	324.3061588
3/5/2024 21:29	6.9523125	327.6315525
3/5/2024 21:30	6.94575	322.3338563
3/5/2024 21:31	6.9558125	319.5588725
3/5/2024 21:32	6.941375	328.503035
3/5/2024 21:33	6.9356875	321.0495663
3/5/2024 21:34	6.9374375	321.3247713
3/5/2024 21:35	6.941375	336.2775763
3/5/2024 21:36	6.9724375	326.0032563
3/5/2024 21:37	6.99125	313.8713025
3/5/2024 21:38	7.02975	329.1222463
3/5/2024 21:39	7.048125	327.3334138
3/5/2024 21:40	7.0538125	331.2780188
3/5/2024 21:41	7.0721875	323.2282725
3/5/2024 21:42	7.0739375	327.769155
3/5/2024 21:43	7.0669375	326.20966
3/5/2024 21:44	7.0818125	330.4753375
3/5/2024 21:45	7.0581875	332.5623088
3/5/2024 21:46	7.0665	324.1456225

timestamp	HVAC_1PES_005_AIT_150_VAL0	PES_001_FT_150_VAL0
3/5/2024 21:47	7.0651875	327.4710163
3/5/2024 21:48	7.0476875	324.4437613
3/5/2024 21:49	7.0494375	319.6506075
3/5/2024 21:50	7.0105	334.1676713
3/5/2024 21:51	7.0109375	321.3706388

	Recirc Rate (GPM)	Water pH
Run1	327.75	7.01
Run2	326.97	7.05
Run3	326.34	7.02

	Start	End
Run1	18:51	19:51
Run2	19:51	20:51
Run3	20:51	21:51

timestamp	PES_006_AIT_150_VAL0	PES_006_FIT_100_VAL0
3/6/2024 10:22	7.1483125	164.864775
3/6/2024 10:23	7.1526875	165.45705
3/6/2024 10:24	7.1544375	165.39
3/6/2024 10:25	7.1544375	167.42385
3/6/2024 10:26	7.1614375	164.998875
3/6/2024 10:27	7.1631875	166.26165
3/6/2024 10:28	7.15225	159.478425
3/6/2024 10:29	7.137375	163.389675
3/6/2024 10:30	7.149625	168.45195
3/6/2024 10:31	7.14875	161.88105
3/6/2024 10:32	7.1351875	165.09945
3/6/2024 10:33	7.1225	160.215975
3/6/2024 10:34	7.121625	167.591475
3/6/2024 10:35	7.12425	163.367325
3/6/2024 10:36	7.133	166.473975
3/6/2024 10:37	7.1351875	168.27315
3/6/2024 10:38	7.1316875	156.103575
3/6/2024 10:39	7.1211875	172.664925
3/6/2024 10:40	7.1225	159.187875
3/6/2024 10:41	7.12425	158.427975
3/6/2024 10:42	7.1246875	159.791325
3/6/2024 10:43	7.12425	157.556325
3/6/2024 10:44	7.14	164.92065
3/6/2024 10:45	7.144375	167.37915
3/6/2024 10:46	7.1544375	159.791325
3/6/2024 10:47	7.14175	162.19395
3/6/2024 10:48	7.135625	160.059525
3/6/2024 10:49	7.1404375	168.731325
3/6/2024 10:50	7.139125	169.893525
3/6/2024 10:51	7.1491875	163.602
3/6/2024 10:52	7.1526875	166.183425
3/6/2024 10:53	7.1491875	161.400525
3/6/2024 10:54	7.139125	152.3376
3/6/2024 10:55	7.1365	164.16075
3/6/2024 10:56	7.1413125	168.954825
3/6/2024 10:57	7.14	162.9315
3/6/2024 10:58	7.1369375	166.21695
3/6/2024 10:59	7.1386875	160.80825
3/6/2024 11:00	7.1526875	169.5024
3/6/2024 11:01	7.158375	165.334125
3/6/2024 11:02	7.1745625	162.607425
3/6/2024 11:03	7.1850625	163.1103
3/6/2024 11:04	7.186375	167.211525
3/6/2024 11:05	7.203875	164.29485

timestamp	PES_006_AIT_150_VAL0	PES_006_FIT_100_VAL0
3/6/2024 11:06	7.2008125	167.256225
3/6/2024 11:07	7.2095625	157.712775
3/6/2024 11:08	7.2051875	158.942025
3/6/2024 11:09	7.2139375	160.1154
3/6/2024 11:10	7.2165625	164.440125
3/6/2024 11:11	7.216125	167.0886
3/6/2024 11:12	7.21	168.1167
3/6/2024 11:13	7.2218125	169.88235
3/6/2024 11:14	7.21525	167.837325
3/6/2024 11:15	7.2183125	163.747275
3/6/2024 11:16	7.20825	166.6863
3/6/2024 11:17	7.207375	163.367325
3/6/2024 11:18	7.20825	169.223025
3/6/2024 11:19	7.21525	155.500125
3/6/2024 11:20	7.2130625	163.9149
3/6/2024 11:21	7.2139375	167.144475
3/6/2024 11:22	7.2209375	163.62435
3/6/2024 11:23	7.2323125	163.62435
3/6/2024 11:24	7.235375	171.58095
3/6/2024 11:25	7.2183125	167.770275
3/6/2024 11:26	7.2174375	154.6173
3/6/2024 11:27	7.21	164.820075
3/6/2024 11:28	7.2156875	165.85935
3/6/2024 11:29	7.223125	156.33825
3/6/2024 11:30	7.2296875	175.64865
3/6/2024 11:31	7.2270625	178.654725
3/6/2024 11:32	7.2139375	153.957975
3/6/2024 11:33	7.2069375	156.69585
3/6/2024 11:34	7.1964375	160.618275
3/6/2024 11:35	7.1929375	161.288775
3/6/2024 11:36	7.198625	153.07515
3/6/2024 11:37	7.2069375	168.932475
3/6/2024 11:38	7.2095625	161.83635
3/6/2024 11:39	7.2069375	162.719175
3/6/2024 11:40	7.2065	164.6301
3/6/2024 11:41	7.2065	171.22335
3/6/2024 11:42	7.2095625	163.31145
3/6/2024 11:43	7.21	145.397925
3/6/2024 11:44	7.21525	160.0707
3/6/2024 11:45	7.2139375	153.0081
3/6/2024 11:46	7.2069375	166.8651
3/6/2024 11:47	7.2139375	169.07775
3/6/2024 11:48	7.2113125	160.707675
3/6/2024 11:49	7.21525	156.796425

timestamp	PES_006_AIT_150_VAL0	PES_006_FIT_100_VAL0
3/6/2024 11:50	7.2183125	154.628475
3/6/2024 11:51	7.2226875	160.283025
3/6/2024 11:52	7.2135	159.590175
3/6/2024 11:53	7.21525	160.36125
3/6/2024 11:54	7.2095625	180.2751
3/6/2024 11:55	7.20825	159.634875
3/6/2024 11:56	7.1981875	163.0209
3/6/2024 11:57	7.207375	166.608075
3/6/2024 11:58	7.2139375	169.468875
3/6/2024 11:59	7.2113125	166.48515
3/6/2024 12:00	7.2183125	162.99855
3/6/2024 12:01	7.223125	169.379475
3/6/2024 12:02	7.22225	157.466925
3/6/2024 12:03	7.2174375	156.058875
3/6/2024 12:04	7.2121875	162.450975
3/6/2024 12:05	7.202125	160.76355
3/6/2024 12:06	7.2008125	163.53495
3/6/2024 12:07	7.1955625	159.456075
3/6/2024 12:08	7.1911875	166.26165
3/6/2024 12:09	7.2095625	163.814325
3/6/2024 12:10	7.2104375	160.5177
3/6/2024 12:11	7.2139375	160.98705
3/6/2024 12:12	7.2165625	170.6646
3/6/2024 12:13	7.2139375	164.02665
3/6/2024 12:14	7.21525	160.752375
3/6/2024 12:15	7.2139375	167.412675
3/6/2024 12:16	7.2183125	164.16075
3/6/2024 12:17	7.216125	163.7808
3/6/2024 12:18	7.22575	165.837
3/6/2024 12:19	7.2183125	167.882025
3/6/2024 12:20	7.22575	161.758125
3/6/2024 12:21	7.2340625	163.501425
3/6/2024 12:22	7.22225	164.596575
3/6/2024 12:23	7.2235625	162.719175
3/6/2024 12:24	7.2226875	163.479075
3/6/2024 12:25	7.23625	166.786875
3/6/2024 12:26	7.2358125	173.27955
3/6/2024 12:27	7.2226875	166.161075
3/6/2024 12:28	7.2016875	163.7808
3/6/2024 12:29	7.2043125	160.2495
3/6/2024 12:30	7.1925	166.26165
3/6/2024 12:31	7.167125	162.68565
3/6/2024 12:32	7.154875	166.0158
3/6/2024 12:33	7.1526875	165.9711

timestamp	PES_006_AIT_150_VAL0	PES_006_FIT_100_VAL0
3/6/2024 12:34	7.137375	163.3338
3/6/2024 12:35	7.14	156.595275
3/6/2024 12:36	7.1483125	161.624025
3/6/2024 12:37	7.149625	165.14415
3/6/2024 12:38	7.15575	160.506525
3/6/2024 12:39	7.1614375	174.0618
3/6/2024 12:40	7.1640625	168.966
3/6/2024 12:41	7.156625	166.988025
3/6/2024 12:42	7.15575	164.373075
3/6/2024 12:43	7.15575	165.110625
3/6/2024 12:44	7.1544375	171.882675
3/6/2024 12:45	7.1535625	166.094025
3/6/2024 12:46	7.1544375	164.775375
3/6/2024 12:47	5.590375	162.95385
3/6/2024 12:48	6.2164375	133.5189
3/6/2024 12:49	7.704375	155.13135
3/6/2024 12:50	8.1169375	162.0375
3/6/2024 12:51	8.201375	160.45065
3/6/2024 12:52	8.1668125	161.400525
3/6/2024 12:53	8.0815	159.2214
3/6/2024 12:54	7.989625	168.3402
3/6/2024 12:55	7.8815625	165.356475
3/6/2024 12:56	7.748125	168.641925
3/6/2024 12:57	7.6155625	163.71375
3/6/2024 12:58	7.455875	161.21055
3/6/2024 12:59	7.308	165.311775
3/6/2024 13:00	7.167125	168.9213
3/6/2024 13:01	7.07875	161.556975
3/6/2024 13:02	7.028875	165.378825
3/6/2024 13:03	7.00875	162.026325
3/6/2024 13:04	6.9978125	168.887775
3/6/2024 13:05	6.9873125	164.373075
3/6/2024 13:06	6.9873125	167.591475
3/6/2024 13:07	6.9689375	163.5573
3/6/2024 13:08	6.9615	167.703225
3/6/2024 13:09	6.9663125	161.38935
3/6/2024 13:10	6.9978125	167.0439
3/6/2024 13:11	7.0538125	165.6582
3/6/2024 13:12	7.135625	159.657225
3/6/2024 13:13	7.123375	160.8306
3/6/2024 13:14	7.0870625	158.807925
3/6/2024 13:15	7.039375	169.044225
3/6/2024 13:16	7.013125	169.65885
3/6/2024 13:17	7.0030625	161.288775

timestamp	PES_006_AIT_150_VAL0	PES_006_FIT_100_VAL0
3/6/2024 13:18	7.006125	159.903075
3/6/2024 13:19	6.983375	156.91935
3/6/2024 13:20	6.979	159.0426
3/6/2024 13:21	6.9776875	170.06115
3/6/2024 13:22	6.967625	165.222375

	Recirc Rate (GPM)	Water pH
Run1	164.08	7.16
Run2	163.13	7.21
Run3	163.82	7.20

	Start	End
Run1	10:22	11:22
Run2	11:22	12:22
Run3	12:22	13:22

Test completed 3/6/24

timestamp	PEA_001_AT_150_VAL0	PEA_001_FT_150_VAL0
3/5/2024 15:21	9.1083125	257.078125
3/5/2024 15:22	9.1039375	258.3125
3/5/2024 15:23	9.0978125	250.6875
3/5/2024 15:24	9.0908125	258.21875
3/5/2024 15:25	9.085125	256.640625
3/5/2024 15:26	9.0794375	258.234375
3/5/2024 15:27	9.0825	255.609375
3/5/2024 15:28	9.0899375	253.265625
3/5/2024 15:29	9.0986875	257.109375
3/5/2024 15:30	9.12275	256.78125
3/5/2024 15:31	9.1293125	255.15625
3/5/2024 15:32	9.1433125	252.109375
3/5/2024 15:33	9.1555625	255.203125
3/5/2024 15:34	9.1660625	256.34375
3/5/2024 15:35	9.17875	257.96875
3/5/2024 15:36	7.800625	255.75
3/5/2024 15:37	7.8098125	253.40625
3/5/2024 15:38	7.667625	260.453125
3/5/2024 15:39	7.592375	257.78125
3/5/2024 15:40	7.5429375	258.359375
3/5/2024 15:41	7.5184375	254.828125
3/5/2024 15:42	7.4598125	254.96875
3/5/2024 15:43	9.226	251.234375
3/5/2024 15:44	9.2299375	259.734375
3/5/2024 15:45	9.2386875	255.546875
3/5/2024 15:46	9.24175	257.09375
3/5/2024 15:47	9.247	262.125
3/5/2024 15:48	9.244375	254.734375
3/5/2024 15:49	9.2378125	256.53125
3/5/2024 15:50	9.24175	252.90625
3/5/2024 15:51	9.2395625	258.640625
3/5/2024 15:52	7.203875	252.21875
3/5/2024 15:53	9.24875	251.140625
3/5/2024 15:54	9.253125	254.328125
3/5/2024 15:55	9.2456875	261.1875
3/5/2024 15:56	9.2404375	254.1875
3/5/2024 15:57	9.233	253.421875
3/5/2024 15:58	9.219	259.015625
3/5/2024 15:59	9.1931875	256.1875
3/5/2024 16:00	9.1791875	255.671875
3/5/2024 16:01	9.1643125	261.4375
3/5/2024 16:02	9.1634375	258.59375
3/5/2024 16:03	9.17175	254.859375
3/5/2024 16:04	9.191875	261.90625

timestamp	PEA_001_AT_150_VAL0	PEA_001_FT_150_VAL0
3/5/2024 16:05	9.2229375	251.53125
3/5/2024 16:06	9.2430625	257.296875
3/5/2024 16:07	9.268875	250.40625
3/5/2024 16:08	9.2911875	254.828125
3/5/2024 16:09	9.3086875	257.796875
3/5/2024 16:10	9.3270625	256.734375
3/5/2024 16:11	9.34325	251.453125
3/5/2024 16:12	9.3594375	258.65625
3/5/2024 16:13	9.37125	259.3125
3/5/2024 16:14	9.3874375	258.1875
3/5/2024 16:15	9.3996875	258.625
3/5/2024 16:16	9.414125	255.109375
3/5/2024 16:17	9.4255	258.25
3/5/2024 16:18	9.4395	262.375
3/5/2024 16:19	9.4434375	258.375
3/5/2024 16:20	9.457875	256.78125
3/5/2024 16:21	9.4635625	258.109375
3/5/2024 16:22	9.4688125	256.46875
3/5/2024 16:23	9.4749375	259.515625
3/5/2024 16:24	9.47975	258.171875
3/5/2024 16:25	9.4793125	256.109375
3/5/2024 16:26	9.485	258.484375
3/5/2024 16:27	9.491125	254.234375
3/5/2024 16:28	9.49375	260.359375
3/5/2024 16:29	9.4968125	256.546875
3/5/2024 16:30	9.4994375	258.03125
3/5/2024 16:31	9.4968125	263.09375
3/5/2024 16:32	9.48675	253.765625
3/5/2024 16:33	9.475375	255.53125
3/5/2024 16:34	9.457875	257.3125
3/5/2024 16:35	9.4434375	257.84375
3/5/2024 16:36	9.429	258.1875
3/5/2024 16:37	9.410625	254.1875
3/5/2024 16:38	9.3926875	257.109375
3/5/2024 16:39	9.38175	260.59375
3/5/2024 16:40	9.3603125	253.578125
3/5/2024 16:41	9.3428125	254.296875
3/5/2024 16:42	9.328375	258.75
3/5/2024 16:43	9.31875	256.75
3/5/2024 16:44	9.3139375	257
3/5/2024 16:45	9.3174375	257.625
3/5/2024 16:46	9.3174375	262.484375
3/5/2024 16:47	9.3200625	252.40625
3/5/2024 16:48	9.3275	259.828125

timestamp	PEA_001_AT_150_VAL0	PEA_001_FT_150_VAL0
3/5/2024 16:49	9.328375	254.71875
3/5/2024 16:50	9.33275	256.828125
3/5/2024 16:51	9.3401875	253.0625
3/5/2024 16:52	9.3401875	258.453125
3/5/2024 16:53	9.338875	257.40625
3/5/2024 16:54	9.337125	257.484375
3/5/2024 16:55	9.3401875	256.21875
3/5/2024 16:56	9.33975	260.265625
3/5/2024 16:57	9.3340625	257.625
3/5/2024 16:58	9.3340625	257.234375
3/5/2024 16:59	9.3340625	256.21875
3/5/2024 17:00	9.3275	261.46875
3/5/2024 17:01	9.314375	262.5625
3/5/2024 17:02	9.3078125	259.84375
3/5/2024 17:03	9.2973125	254.15625
3/5/2024 17:04	9.2885625	255.25
3/5/2024 17:05	9.2785	258.71875
3/5/2024 17:06	9.2715	263
3/5/2024 17:07	9.261875	255.0625
3/5/2024 17:08	9.2561875	259.5
3/5/2024 17:09	9.246125	258.296875
3/5/2024 17:10	9.24175	260.75
3/5/2024 17:11	9.233	256.171875
3/5/2024 17:12	9.22425	255.203125
3/5/2024 17:13	9.216375	255.71875
3/5/2024 17:14	9.2089375	260.640625
3/5/2024 17:15	9.2071875	255.78125
3/5/2024 17:16	9.2133125	262.84375
3/5/2024 17:17	9.228625	261.265625
3/5/2024 17:18	9.2605625	258.75
3/5/2024 17:19	9.282875	259.734375
3/5/2024 17:20	9.31	258.046875
3/5/2024 17:21	9.3270625	259.578125
3/5/2024 17:22	9.3585625	259.828125
3/5/2024 17:23	9.3813125	259.296875
3/5/2024 17:24	9.398375	256.453125
3/5/2024 17:25	9.419375	258.59375
3/5/2024 17:26	9.445625	264.015625
3/5/2024 17:27	9.459625	259.984375
3/5/2024 17:28	9.4766875	260.015625
3/5/2024 17:29	9.4968125	261.765625
3/5/2024 17:30	9.506	255.90625
3/5/2024 17:31	9.5204375	259.203125
3/5/2024 17:32	9.5291875	259

timestamp	PEA_001_AT_150_VAL0	PEA_001_FT_150_VAL0
3/5/2024 17:33	9.5379375	255.9375
3/5/2024 17:34	9.548	251.671875
3/5/2024 17:35	9.5554375	262.171875
3/5/2024 17:36	9.559375	259.859375
3/5/2024 17:37	9.5676875	263.625
3/5/2024 17:38	9.575125	260.46875
3/5/2024 17:39	9.5764375	253.15625
3/5/2024 17:40	9.5834375	259.78125
3/5/2024 17:41	9.5913125	259.71875
3/5/2024 17:42	9.59175	259.59375
3/5/2024 17:43	9.59525	255.6875
3/5/2024 17:44	9.59175	259.46875
3/5/2024 17:45	9.5878125	259.015625
3/5/2024 17:46	9.5764375	257.125
3/5/2024 17:47	9.5659375	258.65625
3/5/2024 17:48	9.555	259.875
3/5/2024 17:49	9.5379375	261.828125
3/5/2024 17:50	9.522625	260.140625
3/5/2024 17:51	9.503375	256.734375
3/5/2024 17:52	9.4810625	256.34375
3/5/2024 17:53	9.4609375	255.9375
3/5/2024 17:54	9.4395	257.359375
3/5/2024 17:55	9.415	260.9375
3/5/2024 17:56	9.3953125	260.453125
3/5/2024 17:57	9.37125	260.8125
3/5/2024 17:58	9.3445625	260.140625
3/5/2024 17:59	9.323125	260.21875
3/5/2024 18:00	9.298625	258.125
3/5/2024 18:01	9.2719375	259.015625
3/5/2024 18:02	9.2456875	257.828125
3/5/2024 18:03	9.2246875	256.046875
3/5/2024 18:04	9.2015	260.984375
3/5/2024 18:05	9.1721875	258.3125
3/5/2024 18:06	9.1450625	256.203125
3/5/2024 18:07	9.11925	259.59375
3/5/2024 18:08	9.0951875	256.078125
3/5/2024 18:09	9.076375	260
3/5/2024 18:10	9.04925	256.53125
3/5/2024 18:11	9.0269375	264.265625
3/5/2024 18:12	9.0055	258.203125
3/5/2024 18:13	8.9849375	257.578125
3/5/2024 18:14	8.97225	257.875
3/5/2024 18:15	8.97225	252.09375
3/5/2024 18:16	8.990625	257.203125

timestamp	PEA_001_AT_150_VAL0	PEA_001_FT_150_VAL0
3/5/2024 18:17	9.016875	252.21875
3/5/2024 18:18	9.0549375	253.828125
3/5/2024 18:19	9.0916875	258.171875
3/5/2024 18:20	9.1433125	259.484375
3/5/2024 18:21	9.1695625	262.8125
3/5/2024 18:22	9.188375	257.3125
3/5/2024 18:23	9.198875	251.59375

	Recirc Rate (GPM)	Water pH
Run1	256.38	9.02
Run2	257.74	9.35
Run3	258.50	9.35
	Start	**End**
Run1	15:21	16:21
Run2	16:21	17:21
Run3	17:21	18:23

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 10:14	290	7
3/2/2024 10:15	279.5	7
3/2/2024 10:16	252	7.0035
3/2/2024 10:17	278.5	7.0035
3/2/2024 10:18	256.25	7.0035
3/2/2024 10:19	269.5	7.0035
3/2/2024 10:20	285.5	7.0035
3/2/2024 10:21	263	7.0035
3/2/2024 10:22	255.625	7.0035
3/2/2024 10:23	281	7.0035
3/2/2024 10:24	272.75	7.007
3/2/2024 10:25	255.75	7.0035
3/2/2024 10:26	274.75	7.0035
3/2/2024 10:27	283.75	7.007
3/2/2024 10:28	272.25	7.0035
3/2/2024 10:29	256.5	7.007
3/2/2024 10:30	278	7.007
3/2/2024 10:31	265.5	7.007
3/2/2024 10:32	277.625	7.0035
3/2/2024 10:33	282.5	7.0035
3/2/2024 10:34	257.625	7
3/2/2024 10:35	286.5	7.0035
3/2/2024 10:36	286.75	7.007
3/2/2024 10:37	256.625	7.0035
3/2/2024 10:38	300.25	7.007
3/2/2024 10:39	289.25	7.007
3/2/2024 10:40	301.75	7.007
3/2/2024 10:41	263.375	7.007
3/2/2024 10:42	275.25	7.0105
3/2/2024 10:43	283	7.0105
3/2/2024 10:44	252.25	7.007
3/2/2024 10:45	278.5	7.007
3/2/2024 10:46	288	7.0105
3/2/2024 10:47	259.5	7.007
3/2/2024 10:48	284.75	7.007
3/2/2024 10:49	288.75	7.007
3/2/2024 10:50	276	7.007
3/2/2024 10:51	285.25	7.0105
3/2/2024 10:52	276.5	7.007
3/2/2024 10:53	279.25	7.007
3/2/2024 10:54	286	7.007
3/2/2024 10:55	284.25	7.0105
3/2/2024 10:56	271.25	7.014
3/2/2024 10:57	286.25	7.014

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 10:58	280	7.014
3/2/2024 10:59	268.75	7.014
3/2/2024 11:00	288	7.0105
3/2/2024 11:01	269.5	7.014
3/2/2024 11:02	286	7.014
3/2/2024 11:03	280.625	7.021
3/2/2024 11:04	280	7.0175
3/2/2024 11:05	274.5	7.021
3/2/2024 11:06	280.5	7.0175
3/2/2024 11:07	285.625	7.0175
3/2/2024 11:08	271.5	7.021
3/2/2024 11:09	287.5	7.0245
3/2/2024 11:10	286.75	7.0175
3/2/2024 11:11	266.5	7.014
3/2/2024 11:12	272	7.021
3/2/2024 11:13	261.25	7.0175
3/2/2024 11:14	258.125	7.0175
3/2/2024 11:15	284	7.014
3/2/2024 11:16	262.5	7.014
3/2/2024 11:17	248.625	7.014
3/2/2024 11:18	280.5	7.0175
3/2/2024 11:19	279.125	7.014
3/2/2024 11:20	276	7.014
3/2/2024 11:21	250.5	7.0175
3/2/2024 11:22	292.25	7.0175
3/2/2024 11:23	277.375	7.0175
3/2/2024 11:24	279.5	7.0175
3/2/2024 11:25	240.75	7.0175
3/2/2024 11:26	268.875	7.0175
3/2/2024 11:27	279.625	7.0175
3/2/2024 11:28	273.75	7.014
3/2/2024 11:29	284.625	7.014
3/2/2024 11:30	288.375	7.014
3/2/2024 11:31	294	7.014
3/2/2024 11:32	296.5	7.014
3/2/2024 11:33	279.75	7.0105
3/2/2024 11:34	265.125	7.0105
3/2/2024 11:35	269	7.007
3/2/2024 11:36	272.5	7.0105
3/2/2024 11:37	265	7.0105
3/2/2024 11:38	289.5	7.0105
3/2/2024 11:39	267.5	7.007
3/2/2024 11:40	287.625	7.0105
3/2/2024 11:41	266.5	7.007

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 11:42	303.75	7.007
3/2/2024 11:43	280.75	7.007
3/2/2024 11:44	259.5	7.007
3/2/2024 11:45	260.75	7.007
3/2/2024 11:46	276	7.0105
3/2/2024 11:47	285.5	7.0105
3/2/2024 11:48	263.25	7.0105
3/2/2024 11:49	284.25	7.014
3/2/2024 11:50	271.25	7.014
3/2/2024 11:51	287.625	7.014
3/2/2024 11:52	267.25	7.014
3/2/2024 11:53	263	7.014
3/2/2024 11:54	283.5	7.014
3/2/2024 11:55	281.5	7.014
3/2/2024 11:56	286.625	7.014
3/2/2024 11:57	282.75	7.014
3/2/2024 11:58	288	7.0175
3/2/2024 11:59	272.25	7.014
3/2/2024 12:00	289	7.0175
3/2/2024 12:01	279.625	7.0175
3/2/2024 12:02	277	7.014
3/2/2024 12:03	272.5	7.014
3/2/2024 12:04	283.25	7.014
3/2/2024 12:05	258.75	7.014
3/2/2024 12:06	261	7.014
3/2/2024 12:07	247.75	7.014
3/2/2024 12:08	285.625	7.0175
3/2/2024 12:09	286.5	7.014
3/2/2024 12:10	265.25	7.014
3/2/2024 12:11	282.125	7.014
3/2/2024 12:12	286	7.014
3/2/2024 12:13	289	7.014
3/2/2024 12:14	283.625	7.0175
3/2/2024 12:15	247.5	7.014
3/2/2024 12:16	279.75	7.014
3/2/2024 12:17	290.75	7.014
3/2/2024 12:18	283	7.014
3/2/2024 12:19	273	7.014
3/2/2024 12:20	273.625	7.014
3/2/2024 12:21	247.75	7.021
3/2/2024 12:22	270.5	7.021
3/2/2024 12:23	262.625	7.0175
3/2/2024 12:24	279.375	7.0175

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 12:25	289	7.021
3/2/2024 12:26	264.5	7.021
3/2/2024 12:27	276.75	7.021
3/2/2024 12:28	267.75	7.021
3/2/2024 12:29	271.375	7.0175
3/2/2024 12:30	253.5	7.0175
3/2/2024 12:31	262.625	7.0175
3/2/2024 12:32	273	7.0175
3/2/2024 12:33	274.5	7.021
3/2/2024 12:34	271.375	7.021
3/2/2024 12:35	282.375	7.021
3/2/2024 12:36	284.125	7.0245
3/2/2024 12:37	280	7.021
3/2/2024 12:38	295.125	7.021
3/2/2024 12:39	288	7.021
3/2/2024 12:40	285.25	7.021
3/2/2024 12:41	266	7.021
3/2/2024 12:42	270.125	7.028
3/2/2024 12:43	289.625	7.021
3/2/2024 12:44	280	7.021
3/2/2024 12:45	257.75	7.021
3/2/2024 12:46	263.5	7.021
3/2/2024 12:47	279.625	7.021
3/2/2024 12:48	272.25	7.021
3/2/2024 12:49	283	7.021
3/2/2024 12:50	273.125	7.021
3/2/2024 12:51	275	7.0175
3/2/2024 12:52	290.25	7.014
3/2/2024 12:53	287.375	7.021
3/2/2024 12:54	280	7.0175
3/2/2024 12:55	275.75	7.0175
3/2/2024 12:56	266.625	7.0175
3/2/2024 12:57	285.75	7.014
3/2/2024 12:58	266.625	7.014
3/2/2024 12:59	279	7.0175
3/2/2024 13:00	289	7.0175
3/2/2024 13:01	286.625	7.014
3/2/2024 13:02	268.625	7.0175
3/2/2024 13:03	277.375	7.0175
3/2/2024 13:04	292.375	7.0175
3/2/2024 13:05	273.25	7.0175
3/2/2024 13:06	267.5	7.021
3/2/2024 13:07	277.5	7.021
3/2/2024 13:08	274.375	7.0175

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 13:09	296	7.0175
3/2/2024 13:10	277.5	7.0245
3/2/2024 13:11	288	7.0245
3/2/2024 13:12	268.125	7.021
3/2/2024 13:13	273.25	7.0245
3/2/2024 13:14	295.5	7.0175
3/2/2024 13:15	260	7.021
3/2/2024 13:16	270	7.0245
3/2/2024 13:17	288.25	7.021
3/2/2024 13:18	282.25	7.021
3/2/2024 13:19	276.125	7.0245
3/2/2024 13:20	262.875	7.021
3/2/2024 13:21	284.25	7.0245
3/2/2024 13:22	261.75	7.0245
3/2/2024 13:23	275	7.0245
3/2/2024 13:24	268	7.021
3/2/2024 13:25	273.125	7.0245
3/2/2024 13:26	274	7.0245
3/2/2024 13:27	271.625	7.0245
3/2/2024 13:28	265.75	7.028
3/2/2024 13:29	265.375	7.0245
3/2/2024 13:30	273.125	7.0245
3/2/2024 13:31	291.5	7.028
3/2/2024 13:32	282	7.021
3/2/2024 13:33	288.25	7.028
3/2/2024 13:34	259.125	7.0245
3/2/2024 13:35	287.25	7.0245
3/2/2024 13:36	280.25	7.0245
3/2/2024 13:37	274	7.0245
3/2/2024 13:38	284	7.0245
3/2/2024 13:39	275.75	7.028
3/2/2024 13:40	268.5	7.0245
3/2/2024 13:41	295	7.0245
3/2/2024 13:42	275.5	7.0245
3/2/2024 13:43	249.25	7.028
3/2/2024 13:44	276	7.028
3/2/2024 13:45	284	7.028
3/2/2024 13:46	268	7.0245
3/2/2024 13:47	277.75	7.028
3/2/2024 13:48	274.75	7.0315
3/2/2024 13:49	288	7.028
3/2/2024 13:50	287.125	7.0315
3/2/2024 13:51	257.125	7.035
3/2/2024 13:52	275.5	7.0315

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 13:53	270.25	7.0315
3/2/2024 13:54	251.625	7.0315
3/2/2024 13:55	283	7.0315
3/2/2024 13:56	288	7.035
3/2/2024 13:57	263.25	7.035
3/2/2024 13:58	286.5	7.0315
3/2/2024 13:59	264	7.035
3/2/2024 14:00	248.375	7.035
3/2/2024 14:01	281	7.035
3/2/2024 14:02	261	7.0385
3/2/2024 14:03	258.625	7.035
3/2/2024 14:04	267	7.035
3/2/2024 14:05	284	7.0385
3/2/2024 14:06	277.5	7.042
3/2/2024 14:07	262.75	7.0385
3/2/2024 14:08	271.125	7.035
3/2/2024 14:09	277	7.035
3/2/2024 14:10	270.625	7.0385
3/2/2024 14:11	275.75	7.0385
3/2/2024 14:12	285.25	7.0385
3/2/2024 14:13	271.625	7.042
3/2/2024 14:14	274.25	7.0385
3/2/2024 14:15	301	7.035
3/2/2024 14:16	274.625	7.042
3/2/2024 14:17	286.5	7.042
3/2/2024 14:18	291.75	7.042
3/2/2024 14:19	287	7.042
3/2/2024 14:20	280.25	7.0385
3/2/2024 14:21	260.625	7.042
3/2/2024 14:22	242	7.042
3/2/2024 14:23	275.375	7.042
3/2/2024 14:24	288.5	7.0385
3/2/2024 14:25	270.875	7.042
3/2/2024 14:26	285.5	7.042
3/2/2024 14:27	274.125	7.042
3/2/2024 14:28	268.25	7.042
3/2/2024 14:29	280.125	7.042
3/2/2024 14:30	273.25	7.042
3/2/2024 14:31	272	7.042
3/2/2024 14:32	255	7.042
3/2/2024 14:33	278.75	7.042
3/2/2024 14:34	260	7.042
3/2/2024 14:35	246.75	7.042

timestamp	PES_001_FT_140_VAL0	PES_001_AT_150_VAL0
3/2/2024 14:36	263.75	7.035
3/2/2024 14:37	287.375	7.0385
3/2/2024 14:38	291.625	7.035
3/2/2024 14:39	267	7.035
3/2/2024 14:40	280.25	7.0315
3/2/2024 14:41	271.75	7.0315
3/2/2024 14:42	268.75	7.0315
3/2/2024 14:43	279	7.0315
3/2/2024 14:44	269	7.028
3/2/2024 14:45	290.75	7.028
3/2/2024 14:46	277	7.028
3/2/2024 14:47	257.75	7.028
3/2/2024 14:48	277.625	7.0315
3/2/2024 14:49	276.125	7.0315
3/2/2024 14:50	271.125	7.035
3/2/2024 14:51	288.75	7.035
3/2/2024 14:52	283.5	7.035
3/2/2024 14:53	274	7.035
3/2/2024 14:54	273.625	7.042
3/2/2024 14:55	287.625	7.042
3/2/2024 14:56	286.875	7.042
3/2/2024 14:57	267	7.0455
3/2/2024 14:58	292	7.042
3/2/2024 14:59	260	7.042
3/2/2024 15:00	285.375	7.042

	Recirc Rate (GPM)	Water pH
Run1	276	7.01
Run2	276	7.02
Run3	275	7.04

	Start	End
Run1	10:14	12:07
Run2	12:07	14:00
Run3	14:00	15:00

Test completed 3/2/24

timestamp	PES_002_FT_140_VAL0	PES_002_AT_150_VAL0
3/1/2024 18:36	301	7.231
3/1/2024 18:37	319.5	7.231
3/1/2024 18:38	332	7.231
3/1/2024 18:39	327	7.231
3/1/2024 18:40	303.5	7.231
3/1/2024 18:41	314.25	7.231
3/1/2024 18:42	299.75	7.231
3/1/2024 18:43	322.5	7.231
3/1/2024 18:44	305	7.231
3/1/2024 18:45	310	7.231
3/1/2024 18:46	334.25	7.231
3/1/2024 18:47	329.5	7.231
3/1/2024 18:48	310	7.231
3/1/2024 18:49	327.5	7.231
3/1/2024 18:50	318	7.231
3/1/2024 18:51	320	7.231
3/1/2024 18:52	332	7.231
3/1/2024 18:53	302.375	7.231
3/1/2024 18:54	320	7.231
3/1/2024 18:55	319.5	7.231
3/1/2024 18:56	323.5	7.231
3/1/2024 18:57	308.25	7.231
3/1/2024 18:58	311.5	7.231
3/1/2024 18:59	322.5	7.231
3/1/2024 19:00	325	7.231
3/1/2024 19:01	322.5	7.231
3/1/2024 19:02	330	7.231
3/1/2024 19:03	316	7.231
3/1/2024 19:04	313	7.231
3/1/2024 19:05	337.5	7.231
3/1/2024 19:06	332	7.231
3/1/2024 19:07	317.375	7.231
3/1/2024 19:08	332.5	7.231
3/1/2024 19:09	320	7.231
3/1/2024 19:10	324.25	7.231
3/1/2024 19:11	317.5	7.231
3/1/2024 19:12	332.5	7.231
3/1/2024 19:13	327.5	7.231
3/1/2024 19:14	322.25	7.231
3/1/2024 19:15	314.25	7.231
3/1/2024 19:16	317	7.231
3/1/2024 19:17	325	7.231
3/1/2024 19:18	322.5	7.231
3/1/2024 19:19	310.25	7.231

timestamp	PES_002_FT_140_VAL0	PES_002_AT_150_VAL0
3/1/2024 19:20	310.625	7.231
3/1/2024 19:21	319	7.231
3/1/2024 19:22	325	7.231
3/1/2024 19:23	322	7.231
3/1/2024 19:24	313.125	7.231
3/1/2024 19:25	323.25	7.231
3/1/2024 19:26	327.5	7.231
3/1/2024 19:27	336.5	7.231
3/1/2024 19:28	327.5	7.231
3/1/2024 19:29	322.25	7.231
3/1/2024 19:30	332.375	7.231
3/1/2024 19:31	332.25	7.231
3/1/2024 19:32	334	7.231
3/1/2024 19:33	324.625	7.231
3/1/2024 19:34	327.25	7.231
3/1/2024 19:35	322	7.231
3/1/2024 19:36	312.375	7.231
3/1/2024 19:37	330	7.231
3/1/2024 19:38	328	7.231
3/1/2024 19:39	324	7.231
3/1/2024 19:40	311.5	7.231
3/1/2024 19:41	330.5	7.231
3/1/2024 19:42	322.5	7.231
3/1/2024 19:43	320	7.231
3/1/2024 19:44	320	7.231
3/1/2024 19:45	300	7.231
3/1/2024 19:46	330.75	7.231
3/1/2024 19:47	325.5	7.231
3/1/2024 19:48	327.25	7.231
3/1/2024 19:49	327.25	7.231
3/1/2024 19:50	332.625	7.231
3/1/2024 19:51	312.5	7.231
3/1/2024 19:52	305	7.231
3/1/2024 19:53	330	7.231
3/1/2024 19:54	330.5	7.231
3/1/2024 19:55	320	7.231
3/1/2024 19:56	327.375	7.231
3/1/2024 19:57	310	7.231
3/1/2024 19:58	318	7.231
3/1/2024 19:59	325	7.231
3/1/2024 20:00	337.5	7.231
3/1/2024 20:01	318.5	7.231
3/1/2024 20:02	315.5	7.231

timestamp	PES_002_FT_140_VAL0	PES_002_AT_150_VAL0
3/1/2024 20:03	319.25	7.231
3/1/2024 20:04	316	7.231
3/1/2024 20:05	310	7.231
3/1/2024 20:06	318.125	7.231
3/1/2024 20:07	318	7.231
3/1/2024 20:08	330	7.231
3/1/2024 20:09	315.625	7.231
3/1/2024 20:10	318	7.231
3/1/2024 20:11	327.125	7.231
3/1/2024 20:12	337.25	7.231
3/1/2024 20:13	312.5	7.231
3/1/2024 20:14	340	7.231
3/1/2024 20:15	330	7.231
3/1/2024 20:16	330	7.231
3/1/2024 20:17	327.5	7.231
3/1/2024 20:18	317.5	7.231
3/1/2024 20:19	327.375	7.231
3/1/2024 20:20	312.375	7.231
3/1/2024 20:21	319	7.231
3/1/2024 20:22	337.125	7.231
3/1/2024 20:23	317.5	7.231
3/1/2024 20:24	315.5	7.231
3/1/2024 20:25	316.375	7.231
3/1/2024 20:26	314.625	7.231
3/1/2024 20:27	319.25	7.231
3/1/2024 20:28	319.625	7.231
3/1/2024 20:29	305.25	7.231
3/1/2024 20:30	320	7.231
3/1/2024 20:31	336.75	7.231
3/1/2024 20:32	337	7.231
3/1/2024 20:33	316.5	7.231
3/1/2024 20:34	330	7.231
3/1/2024 20:35	321	7.231
3/1/2024 20:36	327.5	7.231
3/1/2024 20:37	342.5	7.231
3/1/2024 20:38	310	7.231
3/1/2024 20:39	324.625	7.231
3/1/2024 20:40	311.5	7.231
3/1/2024 20:41	330.75	7.231
3/1/2024 20:42	330	7.231
3/1/2024 20:43	310	7.231
3/1/2024 20:44	325.625	7.231
3/1/2024 20:45	322.25	7.231

timestamp	PES_002_FT_140_VAL0	PES_002_AT_150_VAL0
3/1/2024 20:46	318	7.231
3/1/2024 20:47	325	7.231
3/1/2024 20:48	328	7.231
3/1/2024 20:49	327.5	7.231
3/1/2024 20:50	330	7.231
3/1/2024 20:51	310.25	7.231
3/1/2024 20:52	310.5	7.231
3/1/2024 20:53	329	7.231
3/1/2024 20:54	310	7.231
3/1/2024 20:55	322.375	7.231
3/1/2024 20:56	317.625	7.231
3/1/2024 20:57	330	7.231
3/1/2024 20:58	312.625	7.231
3/1/2024 20:59	330.75	7.231
3/1/2024 21:00	332	7.231
3/1/2024 21:01	310	7.231
3/1/2024 21:02	309.5	7.231
3/1/2024 21:03	334	7.231
3/1/2024 21:04	312	7.231
3/1/2024 21:05	317.125	7.231
3/1/2024 21:06	320.625	7.231
3/1/2024 21:07	309	7.231
3/1/2024 21:08	328	7.231
3/1/2024 21:09	329.625	7.231
3/1/2024 21:10	314	7.231
3/1/2024 21:11	318.75	7.231
3/1/2024 21:12	316.25	7.231
3/1/2024 21:13	328	7.231
3/1/2024 21:14	309.25	7.231
3/1/2024 21:15	327.5	7.231
3/1/2024 21:16	324.125	7.231
3/1/2024 21:17	305.25	7.231
3/1/2024 21:18	322	7.231
3/1/2024 21:19	325	7.231
3/1/2024 21:20	315	7.231
3/1/2024 21:21	322.125	7.231
3/1/2024 21:22	340	7.231
3/1/2024 21:23	307.5	7.231
3/1/2024 21:24	317.375	7.231
3/1/2024 21:25	325	7.231
3/1/2024 21:26	332.5	7.231
3/1/2024 21:27	312.25	7.231
3/1/2024 21:28	319.5	7.231
3/1/2024 21:29	326.625	7.231

timestamp	PES_002_FT_140_VAL0	PES_002_AT_150_VAL0
3/1/2024 21:30	310.25	7.231
3/1/2024 21:31	326.5	7.231
3/1/2024 21:32	325.5	7.231
3/1/2024 21:33	320	7.231
3/1/2024 21:34	301	7.231
3/1/2024 21:35	329.5	7.231
3/1/2024 21:36	321.625	7.231

	Recirc Rate (GPM)	Water pH
Run1	321	7.23
Run2	322	7.23
Run3	321	7.23

	Start	End
Run1	18:36	19:36
Run2	19:36	20:36
Run3	20:36	21:36

Test completed 3/1/24

timestamp	PES_003_FT_140_VAL0	PES_003_AT_150_VAL0
3/1/2024 15:30	252	7.4235
3/1/2024 15:31	269.75	7.427
3/1/2024 15:32	272.25	7.4235
3/1/2024 15:33	259.125	7.42
3/1/2024 15:34	276.75	7.4235
3/1/2024 15:35	263	7.4235
3/1/2024 15:36	269	7.4235
3/1/2024 15:37	247.375	7.42
3/1/2024 15:38	250	7.42
3/1/2024 15:39	276.25	7.42
3/1/2024 15:40	258	7.42
3/1/2024 15:41	273.625	7.42
3/1/2024 15:42	269.5	7.42
3/1/2024 15:43	261.5	7.42
3/1/2024 15:44	256.375	7.4165
3/1/2024 15:45	269.125	7.42
3/1/2024 15:46	254.375	7.42
3/1/2024 15:47	256.375	7.42
3/1/2024 15:48	266.75	7.42
3/1/2024 15:49	264	7.4235
3/1/2024 15:50	274.25	7.42
3/1/2024 15:51	269.5	7.4235
3/1/2024 15:52	256.625	7.427
3/1/2024 15:53	265	7.427
3/1/2024 15:54	252.5	7.434
3/1/2024 15:55	269.25	7.427
3/1/2024 15:56	275	7.4235
3/1/2024 15:57	259.75	7.4235
3/1/2024 15:58	262.125	7.42
3/1/2024 15:59	267	7.42
3/1/2024 16:00	272.5	7.42
3/1/2024 16:01	259.25	7.42
3/1/2024 16:02	266.625	7.42
3/1/2024 16:03	259.25	7.4165
3/1/2024 16:04	280.75	7.406
3/1/2024 16:05	265.625	7.406
3/1/2024 16:06	276.625	7.399
3/1/2024 16:07	246.75	7.3955
3/1/2024 16:08	261.375	7.392
3/1/2024 16:09	264	7.392
3/1/2024 16:10	263	7.392
3/1/2024 16:11	254	7.392
3/1/2024 16:12	271.5	7.385
3/1/2024 16:13	274	7.385

timestamp	PES_003_FT_140_VAL0	PES_003_AT_150_VAL0
3/1/2024 16:14	257.625	7.392
3/1/2024 16:15	239.375	7.392
3/1/2024 16:16	269	7.3955
3/1/2024 16:17	266.75	7.399
3/1/2024 16:18	257.75	7.4095
3/1/2024 16:19	259.75	7.413
3/1/2024 16:20	260.25	7.42
3/1/2024 16:21	258.375	7.42
3/1/2024 16:22	266.375	7.4235
3/1/2024 16:23	246.75	7.427
3/1/2024 16:24	261.25	7.434
3/1/2024 16:25	269	7.434
3/1/2024 16:26	251	7.4375
3/1/2024 16:27	269.125	7.448
3/1/2024 16:28	276.625	7.448
3/1/2024 16:29	274.25	7.448
3/1/2024 16:30	266.5	7.4515
3/1/2024 16:31	259	7.455
3/1/2024 16:32	238.125	7.4585
3/1/2024 16:33	276.5	7.4585
3/1/2024 16:34	277.125	7.462
3/1/2024 16:35	268	7.469
3/1/2024 16:36	262.75	7.469
3/1/2024 16:37	253.25	7.476
3/1/2024 16:38	244.25	7.483
3/1/2024 16:39	268	7.483
3/1/2024 16:40	266	7.483
3/1/2024 16:41	245	7.49
3/1/2024 16:42	261.25	7.49
3/1/2024 16:43	266	7.4935
3/1/2024 16:44	264.5	7.504
3/1/2024 16:45	268.5	7.497
3/1/2024 16:46	274	7.504
3/1/2024 16:47	248.875	7.504
3/1/2024 16:48	266.25	7.5075
3/1/2024 16:49	261.625	7.504
3/1/2024 16:50	266.625	7.5075
3/1/2024 16:51	274	7.5145
3/1/2024 16:52	246.5	7.518
3/1/2024 16:53	269.625	7.5145
3/1/2024 16:54	269.25	7.518
3/1/2024 16:55	249	7.518
3/1/2024 16:56	266.5	7.525

timestamp	PES_003_FT_140_VAL0	PES_003_AT_150_VAL0
3/1/2024 16:57	271.5	7.525
3/1/2024 16:58	251.5	7.525
3/1/2024 16:59	259	7.525
3/1/2024 17:00	271.5	7.5285
3/1/2024 17:01	266	7.525
3/1/2024 17:02	259	7.525
3/1/2024 17:03	254.625	7.525
3/1/2024 17:04	276.5	7.525
3/1/2024 17:05	256.625	7.525
3/1/2024 17:06	269.5	7.525
3/1/2024 17:07	249.125	7.532
3/1/2024 17:08	267.625	7.532
3/1/2024 17:09	264.25	7.532
3/1/2024 17:10	261.625	7.532
3/1/2024 17:11	264	7.532
3/1/2024 17:12	259	7.539
3/1/2024 17:13	261.75	7.546
3/1/2024 17:14	274	7.5495
3/1/2024 17:15	267.625	7.5495
3/1/2024 17:16	256.5	7.5495
3/1/2024 17:17	256	7.56
3/1/2024 17:18	278.625	7.56
3/1/2024 17:19	256.75	7.5635
3/1/2024 17:20	264	7.5705
3/1/2024 17:21	276.5	7.5705
3/1/2024 17:22	256.625	7.5705
3/1/2024 17:23	268.5	7.574
3/1/2024 17:24	268	7.567
3/1/2024 17:25	254	7.567
3/1/2024 17:26	266.75	7.567
3/1/2024 17:27	258.5	7.567
3/1/2024 17:28	264.75	7.5635
3/1/2024 17:29	273.75	7.5635
3/1/2024 17:30	271.5	7.5635
3/1/2024 17:31	270.5	7.5635
3/1/2024 17:32	274.75	7.56
3/1/2024 17:33	271.625	7.56
3/1/2024 17:34	263.25	7.56
3/1/2024 17:35	271.125	7.56
3/1/2024 17:36	259.375	7.56
3/1/2024 17:37	254	7.5635
3/1/2024 17:38	276	7.56
3/1/2024 17:39	271.5	7.56

timestamp	PES_003_FT_140_VAL0	PES_003_AT_150_VAL0
3/1/2024 17:40	274	7.553
3/1/2024 17:41	264.5	7.553
3/1/2024 17:42	259.125	7.5495
3/1/2024 17:43	254	7.546
3/1/2024 17:44	256.5	7.546
3/1/2024 17:45	255.5	7.5425
3/1/2024 17:46	273.625	7.5355
3/1/2024 17:47	261.75	7.5355
3/1/2024 17:48	239.625	7.532
3/1/2024 17:49	263.25	7.532
3/1/2024 17:50	251.25	7.525
3/1/2024 17:51	262.5	7.525
3/1/2024 17:52	259	7.525
3/1/2024 17:53	264.125	7.525
3/1/2024 17:54	276.75	7.525
3/1/2024 17:55	238.75	7.518
3/1/2024 17:56	259.25	7.518
3/1/2024 17:57	258.625	7.518
3/1/2024 17:58	284.25	7.5145
3/1/2024 17:59	271.5	7.518
3/1/2024 18:00	269	7.511
3/1/2024 18:01	254.125	7.511
3/1/2024 18:02	251.5	7.5075
3/1/2024 18:03	246.5	7.504
3/1/2024 18:04	270.25	7.497
3/1/2024 18:05	249.125	7.4935
3/1/2024 18:06	248.75	7.49
3/1/2024 18:07	255.125	7.49
3/1/2024 18:08	254.75	7.483
3/1/2024 18:09	253.375	7.483
3/1/2024 18:10	261.125	7.483
3/1/2024 18:11	255	7.483
3/1/2024 18:12	254.25	7.476
3/1/2024 18:13	272	7.476
3/1/2024 18:14	266	7.469
3/1/2024 18:15	264.25	7.469
3/1/2024 18:16	261.5	7.4655
3/1/2024 18:17	260	7.462
3/1/2024 18:18	266.5	7.462
3/1/2024 18:19	264.25	7.462
3/1/2024 18:20	267.375	7.4515
3/1/2024 18:21	271.5	7.4515
3/1/2024 18:22	258.875	7.4515
3/1/2024 18:23	261.25	7.4515

timestamp	PES_003_FT_140_VAL0	PES_003_AT_150_VAL0
3/1/2024 18:24	274	7.448
3/1/2024 18:25	271.5	7.448
3/1/2024 18:26	261.625	7.441
3/1/2024 18:27	254	7.441
3/1/2024 18:28	266.5	7.434
3/1/2024 18:29	274.25	7.427
3/1/2024 18:30	254.25	7.427

	Recirc Rate (GPM)	Water pH
Run1	264	7.42
Run2	263	7.52
Run3	262	7.50

	Start	End
Run1	15:30	16:30
Run2	16:30	17:30
Run3	17:30	18:30

Test completed 3/1/24

timestamp	PEC_001_FT_140_VAL0	PEC_001_AT_150_VAL0
3/4/2024 9:18	222	7.5215
3/4/2024 9:19	195	7.5215
3/4/2024 9:20	188.25	7.5215
3/4/2024 9:21	194.75	7.5215
3/4/2024 9:22	206.25	7.525
3/4/2024 9:23	189.375	7.5215
3/4/2024 9:24	188.125	7.5215
3/4/2024 9:25	202.625	7.5215
3/4/2024 9:26	209.75	7.5215
3/4/2024 9:27	217.125	7.5215
3/4/2024 9:28	189.75	7.5215
3/4/2024 9:29	190	7.525
3/4/2024 9:30	210	7.5215
3/4/2024 9:31	214.875	7.5215
3/4/2024 9:32	204.75	7.5215
3/4/2024 9:33	210	7.5215
3/4/2024 9:34	175	7.5215
3/4/2024 9:35	205	7.525
3/4/2024 9:36	197.375	7.5215
3/4/2024 9:37	202.375	7.5215
3/4/2024 9:38	178	7.5215
3/4/2024 9:39	189.5	7.5215
3/4/2024 9:40	190.5	7.5215
3/4/2024 9:41	190	7.5215
3/4/2024 9:42	194	7.5215
3/4/2024 9:43	179.625	7.5215
3/4/2024 9:44	217.25	7.5215
3/4/2024 9:45	202.125	7.5215
3/4/2024 9:46	214.75	7.5215
3/4/2024 9:47	212.25	7.5215
3/4/2024 9:48	207.75	7.5215
3/4/2024 9:49	189.5	7.5215
3/4/2024 9:50	180	7.5215
3/4/2024 9:51	200	7.5215
3/4/2024 9:52	219.625	7.5215
3/4/2024 9:53	209.75	7.5215
3/4/2024 9:54	202.125	7.5215
3/4/2024 9:55	209.75	7.5215
3/4/2024 9:56	227.25	7.5215
3/4/2024 9:57	174.75	7.5215
3/4/2024 9:58	210.5	7.5215
3/4/2024 9:59	216.125	7.5215
3/4/2024 10:00	175.125	7.5215
3/4/2024 10:01	219.625	7.5215

timestamp	PEC_001_FT_140_VAL0	PEC_001_AT_150_VAL0
3/4/2024 10:02	218.5	7.5215
3/4/2024 10:03	192.25	7.5215
3/4/2024 10:04	193	7.5215
3/4/2024 10:05	208.625	7.5215
3/4/2024 10:06	175.75	7.5215
3/4/2024 10:07	187.25	7.5215
3/4/2024 10:08	217.5	7.5215
3/4/2024 10:09	183.125	7.5215
3/4/2024 10:10	182.5	7.5215
3/4/2024 10:11	195	7.5215
3/4/2024 10:12	207.125	7.5215
3/4/2024 10:13	217	7.5215
3/4/2024 10:14	183.625	7.5215
3/4/2024 10:15	197.375	7.5215
3/4/2024 10:16	214.125	7.5215
3/4/2024 10:17	224.75	7.5215
3/4/2024 10:18	190	7.5215
3/4/2024 10:19	217.25	7.5215
3/4/2024 10:20	195.375	7.5215
3/4/2024 10:21	183.75	7.5215
3/4/2024 10:22	188.5	7.5215
3/4/2024 10:23	183.5	7.5215
3/4/2024 10:24	206.5	7.5215
3/4/2024 10:25	208.5	7.5215
3/4/2024 10:26	200.75	7.5215
3/4/2024 10:27	209	7.5215
3/4/2024 10:28	212.25	7.5215
3/4/2024 10:29	211	7.5215
3/4/2024 10:30	174.5	7.5215
3/4/2024 10:31	209.75	7.5215
3/4/2024 10:32	212.125	7.5215
3/4/2024 10:33	202.5	7.5215
3/4/2024 10:34	192.625	7.5215
3/4/2024 10:35	197	7.5215
3/4/2024 10:36	207.375	7.5215
3/4/2024 10:37	192.5	7.5215
3/4/2024 10:38	207.375	7.5215
3/4/2024 10:39	217.5	7.5215
3/4/2024 10:40	202.5	7.5215
3/4/2024 10:41	208	7.5215
3/4/2024 10:42	209.375	7.5215
3/4/2024 10:43	191	7.5215
3/4/2024 10:44	206.375	7.5215

timestamp	PEC_001_FT_140_VAL0	PEC_001_AT_150_VAL0
3/4/2024 10:45	190.75	7.5215
3/4/2024 10:46	217.375	7.5215
3/4/2024 10:47	195.625	7.5215
3/4/2024 10:48	193.75	7.5215
3/4/2024 10:49	206.5	7.5215
3/4/2024 10:50	209.375	7.5215
3/4/2024 10:51	181.875	7.5215
3/4/2024 10:52	189.625	7.5215
3/4/2024 10:53	209.75	7.5215
3/4/2024 10:54	192.125	7.5215
3/4/2024 10:55	192.125	7.5215
3/4/2024 10:56	174.75	7.5215
3/4/2024 10:57	215	7.5215
3/4/2024 10:58	180	7.5215
3/4/2024 10:59	214.75	7.5215
3/4/2024 11:00	197.25	7.5215
3/4/2024 11:01	192.25	7.5215
3/4/2024 11:02	212.25	7.5215
3/4/2024 11:03	217.25	7.5215
3/4/2024 11:04	202.25	7.5215
3/4/2024 11:05	187.25	7.5215
3/4/2024 11:06	187	7.5215
3/4/2024 11:07	205.5	7.5215
3/4/2024 11:08	198.5	7.5215
3/4/2024 11:09	212.5	7.5215
3/4/2024 11:10	198	7.5215
3/4/2024 11:11	202.875	7.5215
3/4/2024 11:12	183.625	7.5215
3/4/2024 11:13	186.5	7.5215
3/4/2024 11:14	202	7.5215
3/4/2024 11:15	201.75	7.5215
3/4/2024 11:16	189.75	7.5215
3/4/2024 11:17	182.375	7.5215
3/4/2024 11:18	182.375	7.5215
3/4/2024 11:19	192	7.5215
3/4/2024 11:20	197	7.5215
3/4/2024 11:21	202.25	7.5215
3/4/2024 11:22	215	7.5215
3/4/2024 11:23	207.25	7.5215
3/4/2024 11:24	184.875	7.5215
3/4/2024 11:25	182.25	7.5215
3/4/2024 11:26	192	7.5215
3/4/2024 11:27	177.125	7.5215

timestamp	PEC_001_FT_140_VAL0	PEC_001_AT_150_VAL0
3/4/2024 11:28	184.875	7.5215
3/4/2024 11:29	182.25	7.5215
3/4/2024 11:30	194.875	7.5215
3/4/2024 11:31	206	7.5215
3/4/2024 11:32	195.375	7.5215
3/4/2024 11:33	182.25	7.5215
3/4/2024 11:34	179.75	7.5215
3/4/2024 11:35	185.5	7.5215
3/4/2024 11:36	193	7.525
3/4/2024 11:37	192.125	7.5215
3/4/2024 11:38	194.375	7.5215
3/4/2024 11:39	202.5	7.5215
3/4/2024 11:40	209.25	7.5215
3/4/2024 11:41	187.5	7.5215
3/4/2024 11:42	169.75	7.5215
3/4/2024 11:43	217.25	7.5215
3/4/2024 11:44	182.5	7.5215
3/4/2024 11:45	184.75	7.5215
3/4/2024 11:46	212.5	7.5215
3/4/2024 11:47	219.75	7.5215
3/4/2024 11:48	195	7.5215
3/4/2024 11:49	217.5	7.5215
3/4/2024 11:50	188.25	7.5215
3/4/2024 11:51	177.5	7.5215
3/4/2024 11:52	190	7.5215
3/4/2024 11:53	203.5	7.5215
3/4/2024 11:54	191	7.5215
3/4/2024 11:55	211.5	7.5215
3/4/2024 11:56	189.25	7.5215
3/4/2024 11:57	210.625	7.5215
3/4/2024 11:58	180.25	7.5215
3/4/2024 11:59	182.25	7.5215
3/4/2024 12:00	179	7.525
3/4/2024 12:01	216.5	7.5215
3/4/2024 12:02	217.5	7.5215
3/4/2024 12:03	196.75	7.5215
3/4/2024 12:04	207.25	7.5215
3/4/2024 12:05	199	7.5215
3/4/2024 12:06	204.625	7.5215
3/4/2024 12:07	212.25	7.5215
3/4/2024 12:08	212.5	7.5215
3/4/2024 12:09	180.625	7.5215
3/4/2024 12:10	192.125	7.5215
3/4/2024 12:11	200	7.5215

timestamp	PEC_001_FT_140_VAL0	PEC_001_AT_150_VAL0
3/4/2024 12:12	217.375	7.5215
3/4/2024 12:13	205	7.5215
3/4/2024 12:14	222.375	7.5215
3/4/2024 12:15	212.25	7.5215
3/4/2024 12:16	201.25	7.5215
3/4/2024 12:17	212.25	7.5215
3/4/2024 12:18	218.25	7.5215

	Recirc Rate (GPM)	Water pH
Run1	200	7.52
Run2	199	7.52
Run3	198	7.52

	Start	End
Run1	9:18	10:18
Run2	10:18	11:18
Run3	11:18	12:18

Test completed 3/4/24

timestamp	PEC_002_FT_140_VAL0	PEC_002_AT_150_VAL0
3/2/2024 16:10	213.25	7.8015
3/2/2024 16:11	212.5	7.798
3/2/2024 16:12	222.375	7.791
3/2/2024 16:13	217	7.791
3/2/2024 16:14	222.875	7.784
3/2/2024 16:15	224.375	7.7805
3/2/2024 16:16	224.625	7.7735
3/2/2024 16:17	205.625	7.763
3/2/2024 16:18	218.5	7.7595
3/2/2024 16:19	224.75	7.756
3/2/2024 16:20	215.5	7.749
3/2/2024 16:21	222.875	7.749
3/2/2024 16:22	221	7.742
3/2/2024 16:23	220	7.735
3/2/2024 16:24	222.5	7.728
3/2/2024 16:25	216.75	7.728
3/2/2024 16:26	221.75	7.721
3/2/2024 16:27	223.625	7.7175
3/2/2024 16:28	219.5	7.714
3/2/2024 16:29	219.5	7.714
3/2/2024 16:30	222.5	7.707
3/2/2024 16:31	218.375	7.707
3/2/2024 16:32	218.25	7.707
3/2/2024 16:33	223	7.707
3/2/2024 16:34	217	7.707
3/2/2024 16:35	222.375	7.7
3/2/2024 16:36	219.25	7.7
3/2/2024 16:37	217.75	7.707
3/2/2024 16:38	225.5	7.742
3/2/2024 16:39	223.25	7.763
3/2/2024 16:40	217.75	7.7875
3/2/2024 16:41	218.875	7.8155
3/2/2024 16:42	216.5	7.84
3/2/2024 16:43	218.375	7.8505
3/2/2024 16:44	215.375	7.868
3/2/2024 16:45	217.75	7.882
3/2/2024 16:46	216.125	7.882
3/2/2024 16:47	225.125	7.8925
3/2/2024 16:48	222.625	7.882
3/2/2024 16:49	219.75	7.8575
3/2/2024 16:50	217.875	7.8435
3/2/2024 16:51	217.25	7.826
3/2/2024 16:52	220.875	7.8085
3/2/2024 16:53	217.25	7.798

timestamp	PEC_002_FT_140_VAL0	PEC_002_AT_150_VAL0
3/2/2024 16:54	221.125	7.7875
3/2/2024 16:55	215.5	7.7735
3/2/2024 16:56	218.625	7.77
3/2/2024 16:57	217	7.763
3/2/2024 16:58	221.75	7.749
3/2/2024 16:59	218.75	7.749
3/2/2024 17:00	221.75	7.742
3/2/2024 17:01	225.25	7.7385
3/2/2024 17:02	222.75	7.735
3/2/2024 17:03	222	7.728
3/2/2024 17:04	221.5	7.728
3/2/2024 17:05	221	7.7175
3/2/2024 17:06	222	7.714
3/2/2024 17:07	218.75	7.714
3/2/2024 17:08	218.75	7.714
3/2/2024 17:09	222.25	7.707
3/2/2024 17:10	213.5	7.7315
3/2/2024 17:11	217.5	7.8225
3/2/2024 17:12	217.5	7.966
3/2/2024 17:13	217.25	8.043
3/2/2024 17:14	218.75	8.029
3/2/2024 17:15	221.125	8.001
3/2/2024 17:16	220.5	7.973
3/2/2024 17:17	221	7.9415
3/2/2024 17:18	218.125	7.917
3/2/2024 17:19	216.125	7.8855
3/2/2024 17:20	217	7.8575
3/2/2024 17:21	217.25	7.833
3/2/2024 17:22	217.875	7.819
3/2/2024 17:23	221	7.8085
3/2/2024 17:24	214.75	7.798
3/2/2024 17:25	222.625	7.7805
3/2/2024 17:26	211.625	7.77
3/2/2024 17:27	226.375	7.7735
3/2/2024 17:28	215.625	7.798
3/2/2024 17:29	225.875	7.826
3/2/2024 17:30	220.25	7.8505
3/2/2024 17:31	221.375	7.875
3/2/2024 17:32	221.5	7.8855
3/2/2024 17:33	219.25	7.903
3/2/2024 17:34	213.25	7.9205
3/2/2024 17:35	221	8.0115
3/2/2024 17:36	216.5	8.099

timestamp	PEC_002_FT_140_VAL0	PEC_002_AT_150_VAL0
3/2/2024 17:37	209.5	8.085
3/2/2024 17:38	221.125	8.071
3/2/2024 17:39	220	8.043
3/2/2024 17:40	222.25	8.0115
3/2/2024 17:41	219.75	7.987
3/2/2024 17:42	219.625	7.9695
3/2/2024 17:43	217.5	7.945
3/2/2024 17:44	221.375	7.924
3/2/2024 17:45	219.625	7.91
3/2/2024 17:46	223.625	7.8855
3/2/2024 17:47	215.75	7.875
3/2/2024 17:48	225	7.854
3/2/2024 17:49	217.25	7.84
3/2/2024 17:50	218.625	7.826
3/2/2024 17:51	216.125	7.8155
3/2/2024 17:52	221	7.805
3/2/2024 17:53	220	7.798
3/2/2024 17:54	219.125	7.791
3/2/2024 17:55	220	7.7875
3/2/2024 17:56	220.5	7.784
3/2/2024 17:57	223.75	7.7875
3/2/2024 17:58	222.5	7.784
3/2/2024 17:59	219.5	7.784
3/2/2024 18:00	214.875	7.784
3/2/2024 18:01	219.375	7.798
3/2/2024 18:02	214.375	7.826
3/2/2024 18:03	221.25	7.8155
3/2/2024 18:04	222.25	7.812
3/2/2024 18:05	222.5	7.8015
3/2/2024 18:06	222.375	7.7945
3/2/2024 18:07	218.125	7.7875
3/2/2024 18:08	217	7.784
3/2/2024 18:09	214.5	7.777
3/2/2024 18:10	221.5	7.7735
3/2/2024 18:11	219.625	7.7735
3/2/2024 18:12	210	7.77
3/2/2024 18:13	220.25	7.763
3/2/2024 18:14	220	7.763
3/2/2024 18:15	214.875	7.763
3/2/2024 18:16	218	7.7595
3/2/2024 18:17	216.125	7.7595
3/2/2024 18:18	221.5	7.7595
3/2/2024 18:19	223.75	7.756

timestamp	PEC_002_FT_140_VAL0	PEC_002_AT_150_VAL0
3/2/2024 18:20	214	7.756
3/2/2024 18:21	218	7.756
3/2/2024 18:22	214.375	7.749
3/2/2024 18:23	216.625	7.749
3/2/2024 18:24	216	7.7525
3/2/2024 18:25	214.5	7.749
3/2/2024 18:26	216.25	7.7525
3/2/2024 18:27	216.625	7.7735
3/2/2024 18:28	214.625	7.812
3/2/2024 18:29	219.625	7.833
3/2/2024 18:30	217.25	7.854
3/2/2024 18:31	220.125	7.8715
3/2/2024 18:32	219.375	7.896
3/2/2024 18:33	222	7.9135
3/2/2024 18:34	214.25	7.924
3/2/2024 18:35	216.75	7.938
3/2/2024 18:36	213.125	7.952
3/2/2024 18:37	215.625	7.9415
3/2/2024 18:38	218.125	7.931
3/2/2024 18:39	219.625	7.9135
3/2/2024 18:40	206.375	7.896
3/2/2024 18:41	212.875	7.8855
3/2/2024 18:42	213.375	7.875
3/2/2024 18:43	212.25	7.8645
3/2/2024 18:44	222.5	7.854
3/2/2024 18:45	214.625	7.847
3/2/2024 18:46	220.75	7.868
3/2/2024 18:47	216.25	7.875
3/2/2024 18:48	224	7.868
3/2/2024 18:49	219.5	7.8505
3/2/2024 18:50	217.75	7.833
3/2/2024 18:51	219.375	7.826
3/2/2024 18:52	210.5	7.812
3/2/2024 18:53	217.375	7.8015
3/2/2024 18:54	214	7.791
3/2/2024 18:55	217	7.784
3/2/2024 18:56	219.625	7.7735
3/2/2024 18:57	222.375	7.7735
3/2/2024 18:58	219.125	7.77
3/2/2024 18:59	217.375	7.7665
3/2/2024 19:00	217.625	7.756
3/2/2024 19:01	215	7.7595
3/2/2024 19:02	208	7.756
3/2/2024 19:03	213.75	7.756

timestamp	PEC_002_FT_140_VAL0	PEC_002_AT_150_VAL0
3/2/2024 19:04	220.5	7.756
3/2/2024 19:05	216.25	7.756
3/2/2024 19:06	221.25	7.7525
3/2/2024 19:07	224.25	7.7525
3/2/2024 19:08	222	7.749
3/2/2024 19:09	217.5	7.749
3/2/2024 19:10	214	7.7455

	Recirc Rate (GPM)	Water pH
Run1	220	7.77
Run2	219	7.87
Run3	217	7.81

	Start	End
Run1	16:10	17:10
Run2	17:10	18:10
Run3	18:10	19:10

Test completed 3/2/24

timestamp	PEA_001_FT_140_VAL0	PEA_001_AT_150_VAL0
3/4/2024 12:56	303.5	8.12
3/4/2024 12:57	306.5	8.1095
3/4/2024 12:58	281.625	8.1095
3/4/2024 12:59	309.25	8.1095
3/4/2024 13:00	301.25	8.1095
3/4/2024 13:01	309	8.113
3/4/2024 13:02	307.5	8.106
3/4/2024 13:03	291.375	8.106
3/4/2024 13:04	283.625	8.106
3/4/2024 13:05	309	8.106
3/4/2024 13:06	304	8.1235
3/4/2024 13:07	296.375	8.1375
3/4/2024 13:08	306.125	8.1375
3/4/2024 13:09	300	8.134
3/4/2024 13:10	310.625	8.134
3/4/2024 13:11	299	8.1375
3/4/2024 13:12	309	8.1375
3/4/2024 13:13	312	8.141
3/4/2024 13:14	314	8.1445
3/4/2024 13:15	309.25	8.141
3/4/2024 13:16	305.25	8.141
3/4/2024 13:17	303.5	8.141
3/4/2024 13:18	289.375	8.141
3/4/2024 13:19	311.625	8.141
3/4/2024 13:20	301.75	8.141
3/4/2024 13:21	286.25	8.141
3/4/2024 13:22	314	8.141
3/4/2024 13:23	316.75	8.141
3/4/2024 13:24	295.25	8.141
3/4/2024 13:25	298.625	8.141
3/4/2024 13:26	314	8.148
3/4/2024 13:27	308.625	8.1515
3/4/2024 13:28	301.5	8.162
3/4/2024 13:29	299	8.183
3/4/2024 13:30	299	8.19
3/4/2024 13:31	299.375	8.204
3/4/2024 13:32	301	8.2075
3/4/2024 13:33	316	8.211
3/4/2024 13:34	307	8.2145
3/4/2024 13:35	294.25	8.2145
3/4/2024 13:36	311.625	8.218
3/4/2024 13:37	301.5	8.211
3/4/2024 13:38	301.25	8.204
3/4/2024 13:39	301.625	8.2075

timestamp	PEA_001_FT_140_VAL0	PEA_001_AT_150_VAL0
3/4/2024 13:40	308.75	8.204
3/4/2024 13:41	298.875	8.2145
3/4/2024 13:42	316.5	8.218
3/4/2024 13:43	304.125	8.218
3/4/2024 13:44	306.625	8.211
3/4/2024 13:45	301.5	8.211
3/4/2024 13:46	306.5	8.2075
3/4/2024 13:47	319.25	8.204
3/4/2024 13:48	308.75	8.204
3/4/2024 13:49	291.125	8.1935
3/4/2024 13:50	315.75	8.19
3/4/2024 13:51	314.75	8.1865
3/4/2024 13:52	306	8.183
3/4/2024 13:53	306.5	8.176
3/4/2024 13:54	293	8.176
3/4/2024 13:55	309	8.169
3/4/2024 13:56	303	8.162
3/4/2024 13:57	306.25	8.162
3/4/2024 13:58	294.25	8.162
3/4/2024 13:59	306.5	8.155
3/4/2024 14:00	310	8.148
3/4/2024 14:01	308	8.148
3/4/2024 14:02	302.5	8.141
3/4/2024 14:03	310.375	8.141
3/4/2024 14:04	310.5	8.141
3/4/2024 14:05	303.5	8.141
3/4/2024 14:06	293.75	8.134
3/4/2024 14:07	302.625	8.134
3/4/2024 14:08	304	8.134
3/4/2024 14:09	298.25	8.127
3/4/2024 14:10	304.5	8.127
3/4/2024 14:11	304.625	8.1235
3/4/2024 14:12	312	8.12
3/4/2024 14:13	303	8.12
3/4/2024 14:14	322.25	8.12
3/4/2024 14:15	318.625	8.12
3/4/2024 14:16	306.125	8.12
3/4/2024 14:17	296.375	8.12
3/4/2024 14:18	316.5	8.113
3/4/2024 14:19	309.125	8.12
3/4/2024 14:20	299	8.12
3/4/2024 14:21	306.625	8.1235
3/4/2024 14:22	306.5	8.1235

timestamp	PEA_001_FT_140_VAL0	PEA_001_AT_150_VAL0
3/4/2024 14:23	304	8.1235
3/4/2024 14:24	301.625	8.12
3/4/2024 14:25	293.75	8.12
3/4/2024 14:26	291.375	8.12
3/4/2024 14:27	309	8.1235
3/4/2024 14:28	303.75	8.141
3/4/2024 14:29	298.125	8.1515
3/4/2024 14:30	291.5	8.162
3/4/2024 14:31	295.125	8.1655
3/4/2024 14:32	301.75	8.169
3/4/2024 14:33	314.5	8.176
3/4/2024 14:34	297.125	8.176
3/4/2024 14:35	309	8.1795
3/4/2024 14:36	320.5	8.183
3/4/2024 14:37	316.25	8.19
3/4/2024 14:38	316.5	8.19
3/4/2024 14:39	309	8.197
3/4/2024 14:40	301.25	8.204
3/4/2024 14:41	293	8.2075
3/4/2024 14:42	296.5	8.225
3/4/2024 14:43	309	8.232
3/4/2024 14:44	311.75	8.2425
3/4/2024 14:45	299.75	8.2495
3/4/2024 14:46	290.75	8.253
3/4/2024 14:47	314.125	8.253
3/4/2024 14:48	294	8.26
3/4/2024 14:49	306.625	8.267
3/4/2024 14:50	308.375	8.267
3/4/2024 14:51	316.625	8.267
3/4/2024 14:52	310.5	8.267
3/4/2024 14:53	306.5	8.267
3/4/2024 14:54	306.75	8.2635
3/4/2024 14:55	308.125	8.26
3/4/2024 14:56	285.625	8.26
3/4/2024 14:57	297.625	8.253
3/4/2024 14:58	310.5	8.253
3/4/2024 14:59	306.5	8.253
3/4/2024 15:00	294	8.2495
3/4/2024 15:01	308.5	8.246
3/4/2024 15:02	313.75	8.2425
3/4/2024 15:03	301.375	8.2355
3/4/2024 15:04	309	8.2355
3/4/2024 15:05	306.625	8.232

timestamp	PEA_001_FT_140_VAL0	PEA_001_AT_150_VAL0
3/4/2024 15:06	314	8.225
3/4/2024 15:07	317.25	8.225
3/4/2024 15:08	304	8.218
3/4/2024 15:09	302.75	8.218
3/4/2024 15:10	320.25	8.218
3/4/2024 15:11	299.625	8.225
3/4/2024 15:12	297.75	8.2215
3/4/2024 15:13	316.75	8.225
3/4/2024 15:14	308.75	8.232
3/4/2024 15:15	303.25	8.239
3/4/2024 15:16	299.75	8.2425
3/4/2024 15:17	293.5	8.2425
3/4/2024 15:18	303	8.246
3/4/2024 15:19	298.5	8.246
3/4/2024 15:20	303.75	8.2425
3/4/2024 15:21	303.5	8.2425
3/4/2024 15:22	306.375	8.239
3/4/2024 15:23	309	8.26
3/4/2024 15:24	308.875	8.2705
3/4/2024 15:25	304	8.2775
3/4/2024 15:26	302.75	8.2775
3/4/2024 15:27	298.75	8.2775
3/4/2024 15:28	299	8.281
3/4/2024 15:29	301.5	8.274
3/4/2024 15:30	294.75	8.288
3/4/2024 15:31	302.5	8.2915
3/4/2024 15:32	304.25	8.316
3/4/2024 15:33	292	8.323
3/4/2024 15:34	304	8.33
3/4/2024 15:35	299.75	8.33
3/4/2024 15:36	304.375	8.3265
3/4/2024 15:37	309.5	8.323
3/4/2024 15:38	309.25	8.316
3/4/2024 15:39	299.25	8.316
3/4/2024 15:40	311.75	8.316
3/4/2024 15:41	296.75	8.316
3/4/2024 15:42	294	8.309
3/4/2024 15:43	314	8.309
3/4/2024 15:44	299	8.302
3/4/2024 15:45	309	8.302
3/4/2024 15:46	304	8.2915
3/4/2024 15:47	301.5	8.288
3/4/2024 15:48	301.375	8.288
3/4/2024 15:49	303	8.2775

timestamp	PEA_001_FT_140_VAL0	PEA_001_AT_150_VAL0
3/4/2024 15:50	304	8.274
3/4/2024 15:51	309	8.274
3/4/2024 15:52	304.125	8.2705
3/4/2024 15:53	301	8.2635
3/4/2024 15:54	292.625	8.26
3/4/2024 15:55	295.625	8.253
3/4/2024 15:56	299.25	8.2495

	Recirc Rate (GPM)	Water pH
Run1	304	8.16
Run2	305	8.17
Run3	303	8.27

	Start	End
Run1	12:56	13:56
Run2	13:56	14:56
Run3	14:56	15:56

Test completed 3/4/24

timestamp	PEN_001_FT_140_VAL0	PEN_001_AT_150_VAL0
3/4/2024 16:16	74.475	9.002
3/4/2024 16:17	74.6625	9.016
3/4/2024 16:18	75.3	8.988
3/4/2024 16:19	74.55	9.009
3/4/2024 16:20	73.2375	9.0055
3/4/2024 16:21	74.325	8.988
3/4/2024 16:22	75.9	8.988
3/4/2024 16:23	74.025	9.037
3/4/2024 16:24	74.925	9.065
3/4/2024 16:25	72.15	9.079
3/4/2024 16:26	73.95	9.142
3/4/2024 16:27	72.15	9.1945
3/4/2024 16:28	74.625	9.24
3/4/2024 16:29	75.6	9.275
3/4/2024 16:30	73.575	9.394
3/4/2024 16:31	74.85	9.45
3/4/2024 16:32	74.475	9.5655
3/4/2024 16:33	71.925	9.618
3/4/2024 16:34	75.6	9.681
3/4/2024 16:35	72.375	9.744
3/4/2024 16:36	71.4	9.8
3/4/2024 16:37	74.7375	9.8175
3/4/2024 16:38	72.15	9.863
3/4/2024 16:39	75	9.912
3/4/2024 16:40	73.9125	9.933
3/4/2024 16:41	75.0375	9.9995
3/4/2024 16:42	74.7	10.01
3/4/2024 16:43	75.6	10.045
3/4/2024 16:44	74.925	10.08
3/4/2024 16:45	76.65	10.08
3/4/2024 16:46	73.275	10.052
3/4/2024 16:47	72	10.01
3/4/2024 16:48	76.0125	9.982
3/4/2024 16:49	75.375	9.926
3/4/2024 16:50	72.3	9.912
3/4/2024 16:51	72.675	9.856
3/4/2024 16:52	75.075	9.8315
3/4/2024 16:53	74.7375	9.786
3/4/2024 16:54	70.5375	9.751
3/4/2024 16:55	75.375	9.7195
3/4/2024 16:56	70.65	9.73
3/4/2024 16:57	70.9125	9.6635
3/4/2024 16:58	75.3	9.653
3/4/2024 16:59	71.55	9.674

timestamp	PEN_001_FT_140_VAL0	PEN_001_AT_150_VAL0
3/4/2024 17:00	75.375	9.744
3/4/2024 17:01	74.625	9.786
3/4/2024 17:02	75.45	9.758
3/4/2024 17:03	74.775	9.709
3/4/2024 17:04	75.45	9.695
3/4/2024 17:05	74.85	9.632
3/4/2024 17:06	73.95	9.6075
3/4/2024 17:07	75.375	9.576
3/4/2024 17:08	75	9.5305
3/4/2024 17:09	74.8125	9.499
3/4/2024 17:10	73.875	9.478
3/4/2024 17:11	75.075	9.457
3/4/2024 17:12	75.375	9.422
3/4/2024 17:13	73.8	9.415
3/4/2024 17:14	74.175	9.408
3/4/2024 17:15	76.2	9.3975
3/4/2024 17:16	73.8	9.394
3/4/2024 17:17	72.525	9.4185
3/4/2024 17:18	74.85	9.408
3/4/2024 17:19	72.825	9.429
3/4/2024 17:20	75.6	9.443
3/4/2024 17:21	72.45	9.506
3/4/2024 17:22	74.8125	9.604
3/4/2024 17:23	74.55	9.688
3/4/2024 17:24	72.0375	9.7265
3/4/2024 17:25	74.325	9.8245
3/4/2024 17:26	74.4375	9.863
3/4/2024 17:27	71.4	9.912
3/4/2024 17:28	74.925	9.954
3/4/2024 17:29	75.975	9.975
3/4/2024 17:30	73.6875	10.0415
3/4/2024 17:31	75.8625	10.045
3/4/2024 17:32	71.7375	10.094
3/4/2024 17:33	73.9875	10.108
3/4/2024 17:34	73.425	10.1185
3/4/2024 17:35	73.6875	10.136
3/4/2024 17:36	74.625	10.157
3/4/2024 17:37	75.4875	10.1815
3/4/2024 17:38	73.65	10.1745
3/4/2024 17:39	72.375	10.199
3/4/2024 17:40	72.825	10.199
3/4/2024 17:41	72.9	10.199
3/4/2024 17:42	72.225	10.199

timestamp	PEN_001_FT_140_VAL0	PEN_001_AT_150_VAL0
3/4/2024 17:43	73.8375	10.1955
3/4/2024 17:44	73.125	10.192
3/4/2024 17:45	74.625	10.1745
3/4/2024 17:46	74.475	10.1255
3/4/2024 17:47	75.5625	10.08
3/4/2024 17:48	75.6	10.031
3/4/2024 17:49	73.95	10.01
3/4/2024 17:50	72.6	9.996
3/4/2024 17:51	76.4625	9.968
3/4/2024 17:52	75.15	9.933
3/4/2024 17:53	74.625	9.891
3/4/2024 17:54	73.875	9.842
3/4/2024 17:55	75	9.8035
3/4/2024 17:56	72.75	9.758
3/4/2024 17:57	73.5	9.7055
3/4/2024 17:58	74.1	9.688
3/4/2024 17:59	75.975	9.604
3/4/2024 18:00	73.65	9.59
3/4/2024 18:01	75.6	9.611
3/4/2024 18:02	74.025	9.604
3/4/2024 18:03	73.8	9.576
3/4/2024 18:04	73.35	9.534
3/4/2024 18:05	75.225	9.506
3/4/2024 18:06	74.4375	9.499
3/4/2024 18:07	73.95	9.506
3/4/2024 18:08	74.2875	9.4955
3/4/2024 18:09	73.725	9.492
3/4/2024 18:10	74.8875	9.45
3/4/2024 18:11	73.3875	9.457
3/4/2024 18:12	75.6375	9.4955
3/4/2024 18:13	74.175	9.5585
3/4/2024 18:14	75.1125	9.6145
3/4/2024 18:15	73.0875	9.667
3/4/2024 18:16	74.7375	9.716
3/4/2024 18:17	73.425	9.744
3/4/2024 18:18	74.5875	9.7615
3/4/2024 18:19	74.0625	9.793
3/4/2024 18:20	71.25	9.821
3/4/2024 18:21	75.075	9.856
3/4/2024 18:22	74.6625	9.884
3/4/2024 18:23	73.8	9.912
3/4/2024 18:24	74.625	9.947
3/4/2024 18:25	75.4875	9.947

timestamp	PEN_001_FT_140_VAL0	PEN_001_AT_150_VAL0
3/4/2024 18:26	75.9375	9.968
3/4/2024 18:27	72.3	9.975
3/4/2024 18:28	74.775	9.9855
3/4/2024 18:29	74.1375	9.982
3/4/2024 18:30	73.725	9.996
3/4/2024 18:31	74.5125	10.017
3/4/2024 18:32	72.4875	10.003
3/4/2024 18:33	74.0625	10.003
3/4/2024 18:34	76.0875	10.0065
3/4/2024 18:35	74.4	10.01
3/4/2024 18:36	74.2875	10.003
3/4/2024 18:37	74.8875	10.01
3/4/2024 18:38	75.225	10.003
3/4/2024 18:39	74.4	10.0065
3/4/2024 18:40	74.4	10.01
3/4/2024 18:41	74.6625	9.996
3/4/2024 18:42	75.6	9.989
3/4/2024 18:43	74.5125	9.968
3/4/2024 18:44	74.625	9.933
3/4/2024 18:45	74.25	9.933
3/4/2024 18:46	72.75	9.9015
3/4/2024 18:47	74.475	9.863
3/4/2024 18:48	73.5375	9.814
3/4/2024 18:49	75.1125	9.758
3/4/2024 18:50	73.5375	9.73
3/4/2024 18:51	72.375	9.688
3/4/2024 18:52	73.95	9.625
3/4/2024 18:53	71.925	9.604
3/4/2024 18:54	74.175	9.5375
3/4/2024 18:55	73.875	9.5305
3/4/2024 18:56	74.325	9.4815
3/4/2024 18:57	74.925	9.443
3/4/2024 18:58	74.6625	9.4255
3/4/2024 18:59	74.175	9.394
3/4/2024 19:00	73.575	9.3415
3/4/2024 19:01	74.4	9.338
3/4/2024 19:02	72.7875	9.331
3/4/2024 19:03	75.075	9.31
3/4/2024 19:04	71.6625	9.296
3/4/2024 19:05	74.775	9.261
3/4/2024 19:06	74.7375	9.247
3/4/2024 19:07	73.6125	9.254
3/4/2024 19:08	75.225	9.226
3/4/2024 19:09	74.4375	9.219

timestamp	PEN_001_FT_140_VAL0	PEN_001_AT_150_VAL0
3/4/2024 19:10	74.85	9.1665
3/4/2024 19:11	73.65	9.163
3/4/2024 19:12	74.775	9.1595
3/4/2024 19:13	75.4875	9.268
3/4/2024 19:14	75.1875	9.38
3/4/2024 19:15	72.1125	9.457
3/4/2024 19:16	76.425	9.5235

	Recirc Rate (GPM)	Water pH
Run1	74	10
Run2	74	10
Run3	74	10

	Start	End
Run1	16:16	17:16
Run2	17:16	18:16
Run3	18:16	19:16

Test completed 3/4/24

timestamp	PEI_001_FT_140_VAL0	PEI_001_AT_150_VAL0
2/29/2024 14:05	88	8.54
2/29/2024 14:06	90.625	8.54
2/29/2024 14:07	90.5	8.54
2/29/2024 14:08	93.125	8.54
2/29/2024 14:09	90.625	8.54
2/29/2024 14:10	90.5	8.54
2/29/2024 14:11	90.5	8.54
2/29/2024 14:12	90.625	8.5295
2/29/2024 14:13	90.625	8.54
2/29/2024 14:14	90.625	8.533
2/29/2024 14:15	93.125	8.533
2/29/2024 14:16	90.5	8.533
2/29/2024 14:17	90.625	8.533
2/29/2024 14:18	90.5	8.533
2/29/2024 14:19	90.625	8.533
2/29/2024 14:20	90.75	8.533
2/29/2024 14:21	90.5	8.533
2/29/2024 14:22	90.625	8.533
2/29/2024 14:23	90.625	8.5295
2/29/2024 14:24	90.625	8.533
2/29/2024 14:25	90.5	8.5295
2/29/2024 14:26	90.625	8.5295
2/29/2024 14:27	92.875	8.533
2/29/2024 14:28	90.5	8.533
2/29/2024 14:29	90.5	8.54
2/29/2024 14:30	90.625	8.54
2/29/2024 14:31	90.625	8.526
2/29/2024 14:32	90.5	8.533
2/29/2024 14:33	90.5	8.533
2/29/2024 14:34	90.625	8.533
2/29/2024 14:35	90.5	8.5295
2/29/2024 14:36	90.5	8.526
2/29/2024 14:37	93.25	8.54
2/29/2024 14:38	90.5	8.533
2/29/2024 14:39	90.5	8.526
2/29/2024 14:40	90.75	8.526
2/29/2024 14:41	90.5	8.5295
2/29/2024 14:42	88.125	8.533
2/29/2024 14:43	90.75	8.533
2/29/2024 14:44	90.75	8.5295
2/29/2024 14:45	90.625	8.526
2/29/2024 14:46	93.125	8.5295
2/29/2024 14:47	93.125	8.533
2/29/2024 14:48	90.5	8.526

timestamp	PEI_001_FT_140_VAL0	PEI_001_AT_150_VAL0
2/29/2024 14:49	90.5	8.533
2/29/2024 14:50	90.5	8.533
2/29/2024 14:51	93	8.533
2/29/2024 14:52	90.5	8.5295
2/29/2024 14:53	93.25	8.533
2/29/2024 14:54	90.625	8.5295
2/29/2024 14:55	90.5	8.533
2/29/2024 14:56	90.625	8.533
2/29/2024 14:57	90.625	8.54
2/29/2024 14:58	90.625	8.533
2/29/2024 14:59	92	8.533
2/29/2024 15:00	90.5	8.54
2/29/2024 15:01	93.25	8.533
2/29/2024 15:02	90.5	8.54
2/29/2024 15:03	90.625	8.54
2/29/2024 15:04	93.125	8.533
2/29/2024 15:05	90.5	8.54
2/29/2024 15:06	93	8.54
2/29/2024 15:07	90.875	8.54
2/29/2024 15:08	90.625	8.54
2/29/2024 15:09	93	8.54
2/29/2024 15:10	93.125	8.5435
2/29/2024 15:11	90.625	8.5435
2/29/2024 15:12	90.75	8.54
2/29/2024 15:13	90.625	8.5435
2/29/2024 15:14	93	8.54
2/29/2024 15:15	93	8.54
2/29/2024 15:16	88.75	8.54
2/29/2024 15:17	90.5	8.54
2/29/2024 15:18	90.625	8.54
2/29/2024 15:19	90.625	8.54
2/29/2024 15:20	88.125	8.5435
2/29/2024 15:21	90.5	8.54
2/29/2024 15:22	93.125	8.54
2/29/2024 15:23	88.125	8.5435
2/29/2024 15:24	90.625	8.54
2/29/2024 15:25	90.75	8.54
2/29/2024 15:26	93	8.54
2/29/2024 15:27	90.5	8.54
2/29/2024 15:28	90.5	8.54
2/29/2024 15:29	93.25	8.5435
2/29/2024 15:30	93.125	8.5435
2/29/2024 15:31	93.25	8.54

timestamp	PEI_001_FT_140_VAL0	PEI_001_AT_150_VAL0
2/29/2024 15:32	90.625	8.54
2/29/2024 15:33	90.625	8.547
2/29/2024 15:34	91	8.5435
2/29/2024 15:35	93.25	8.54
2/29/2024 15:36	90.625	8.54
2/29/2024 15:37	93.25	8.5435
2/29/2024 15:38	90.625	8.54
2/29/2024 15:39	93.25	8.5435
2/29/2024 15:40	90.5	8.5435
2/29/2024 15:41	90.5	8.54
2/29/2024 15:42	90.625	8.54
2/29/2024 15:43	90.625	8.54
2/29/2024 15:44	90.5	8.54
2/29/2024 15:45	93	8.54
2/29/2024 15:46	90.625	8.54
2/29/2024 15:47	90.5	8.54
2/29/2024 15:48	90.625	8.533
2/29/2024 15:49	90.5	8.533
2/29/2024 15:50	90.625	8.54
2/29/2024 15:51	90.875	8.54
2/29/2024 15:52	90.625	8.54
2/29/2024 15:53	90.625	8.54
2/29/2024 15:54	90.5	8.533
2/29/2024 15:55	90.625	8.5435
2/29/2024 15:56	93.125	8.5435
2/29/2024 15:57	90.625	8.547
2/29/2024 15:58	90.625	8.54
2/29/2024 15:59	93	8.54
2/29/2024 16:00	90.625	8.5435
2/29/2024 16:01	90.5	8.54
2/29/2024 16:02	90.5	8.54
2/29/2024 16:03	90.625	8.5435
2/29/2024 16:04	90.625	8.54
2/29/2024 16:05	93.125	8.54
2/29/2024 16:06	90.625	8.533
2/29/2024 16:07	90.5	8.54
2/29/2024 16:08	93.125	8.54
2/29/2024 16:09	90.625	8.54
2/29/2024 16:10	90.625	8.54
2/29/2024 16:11	90.625	8.533
2/29/2024 16:12	90.5	8.54
2/29/2024 16:13	90.625	8.54
2/29/2024 16:14	90.5	8.54

timestamp	PEI_001_FT_140_VAL0	PEI_001_AT_150_VAL0
2/29/2024 16:15	90.5	8.533
2/29/2024 16:16	90.625	8.54
2/29/2024 16:17	90.625	8.54
2/29/2024 16:18	90.5	8.533
2/29/2024 16:19	91.375	8.54
2/29/2024 16:20	92.125	8.54
2/29/2024 16:21	90.625	8.5295
2/29/2024 16:22	90.5	8.54
2/29/2024 16:23	90.625	8.54
2/29/2024 16:24	88.125	8.533
2/29/2024 16:25	90.5	8.54
2/29/2024 16:26	90.75	8.54
2/29/2024 16:27	90.625	8.5295
2/29/2024 16:28	90.5	8.5295
2/29/2024 16:29	90.5	8.54
2/29/2024 16:30	90.25	8.54
2/29/2024 16:31	93.125	8.54
2/29/2024 16:32	91	8.5295
2/29/2024 16:33	90.5	8.533
2/29/2024 16:34	90.5	8.533
2/29/2024 16:35	93	8.54
2/29/2024 16:36	90.625	8.533
2/29/2024 16:37	90.5	8.5295
2/29/2024 16:38	90.5	8.5295
2/29/2024 16:39	90.5	8.533
2/29/2024 16:40	93	8.5295
2/29/2024 16:41	90.5	8.533
2/29/2024 16:42	90.625	8.5295
2/29/2024 16:43	90.5	8.533
2/29/2024 16:44	90.625	8.5295
2/29/2024 16:45	93	8.54
2/29/2024 16:46	90.625	8.533
2/29/2024 16:47	90.5	8.5295
2/29/2024 16:48	92.875	8.533
2/29/2024 16:49	90.625	8.526
2/29/2024 16:50	93.125	8.5295
2/29/2024 16:51	90.625	8.526
2/29/2024 16:52	90.625	8.5295
2/29/2024 16:53	90.5	8.5295
2/29/2024 16:54	90.625	8.526
2/29/2024 16:55	90.625	8.5295
2/29/2024 16:56	90.5	8.533
2/29/2024 16:57	93.125	8.533
2/29/2024 16:58	90.5	8.533

timestamp	PEI_001_FT_140_VAL0	PEI_001_AT_150_VAL0
2/29/2024 16:59	90.625	8.5295
2/29/2024 17:00	90.5	8.533
2/29/2024 17:01	90.625	8.533
2/29/2024 17:02	90.5	8.54
2/29/2024 17:03	90.5	8.533
2/29/2024 17:04	90.5	8.533
2/29/2024 17:05	93	8.5295
2/29/2024 17:06	90.625	8.533
2/29/2024 17:07	93.125	8.54
2/29/2024 17:08	90.5	8.54
2/29/2024 17:09	90.5	8.5295
2/29/2024 17:10	90.5	8.533
2/29/2024 17:11	90.5	8.5295

	Recirc Rate (GPM)	Water pH
Run1	91	8.53
Run2	91	8.54
Run3	91	8.53

	Start	End
Run1	14:05	15:07
Run2	15:07	16:09
Run3	16:09	17:11

Test completed 2/29/24

Appendix G

Calibration Documentation

Airgas Specialty Gases
Airgas USA LLC
6141 Easton Road
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X04NI99C15A00V5	Reference Number:	160-402710106-1
Cylinder Number:	CC105191	Cylinder Volume:	144.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Apr 28, 2023	Valve Outlet:	350
Lot Number:	160-402710106-1		

Expiration Date: Apr 28, 2031

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Req Conc	Actual Concentration (Mole %)	Analytical Uncertainty
ETHYLENE	10.00 PPM	9.718 PPM	+/-5%
METHANE	20.00 PPM	20.56 PPM	+/-5%
R22 CHLORODIFLUOROMETHANE	20.00 PPM	20.24 PPM	+/-5%
NITROGEN	Balance		

Signature on file

Approved for Release


HCL GMACS Calibration Standard
Customer: Spectrum Environmental Solutions
Part No: E02NI99T15EC055
Certified Concentrations
Component CAS # Conc Accuracy
Hydrogen Chloride 74-90-8 12.47 PPM 2.55 %
Sulfur Hexafluoride 2551-62-4 4.01 PPM 1.28 %
Nitrogen 7727-37-9 Balance
Dew Point: N/A
9/18/2023
Expiration Date: 9/18/2025
Lot Number: 160-402766297-1
Notes:
1. This GMACS was certified according to the EPA-approved

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA LLC
6141 Easton Road
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number:	X03NI99C15A0383	Reference Number:	SG02-IC000028456-1
Cylinder Number:	CC501483	Cylinder Volume:	141.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2000 PSIG
Analysis Date:	Dec 11, 2023	Valve Outlet:	330
Lot Number:	SG02-IC000028456-1		

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Req Conc	Actual Concentration (Mole %)	Analytical Uncertainty
SULFUR HEXAFLUORIDE	4.000 PPM	4.400 PPM	+/- 5%
HYDROGEN FLUORIDE	12.00 PPM	12.90 PPM	+/- 5%
NITROGEN	Balance		

Permanent Notes:-NA-

Notes: Analysis Date: 12/4/2023
Expiration Date: 12/4/2024
Blend +/- 20% Analytical +/- 5%
Shelf Life 1 Year

Approved for Release

Appendix H
FTIR QAQC Data

CTS Raw Data

PEI-001 Pre

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)
2/29/2024 9:56	2/29/2024	9:56:52 AM	1.71E+09	0.001939	-0.0197037	0.010294	150.786	0.994861
2/29/2024 9:57	2/29/2024	9:57:54 AM	1.71E+09	0.007495	0.0784366	0.011669	150.726	0.995291
2/29/2024 9:58	2/29/2024	9:58:52 AM	1.71E+09	-0.00046	-0.0584485	-0.00357	151.013	0.995721
2/29/2024 9:59	2/29/2024	9:59:55 AM	1.71E+09	-0.00562	-0.0032429	-0.0063	150.995	0.995721
2/29/2024 10:00	2/29/2024	10:00:52 AM	1.71E+09	-0.00323	-0.0634658	0.009047	151.234	0.995506
2/29/2024 10:01	2/29/2024	10:01:52 AM	1.71E+09	-0.00151	0.120242	0.547721	151.144	0.977876
2/29/2024 10:02	2/29/2024	10:02:52 AM	1.71E+09	0.002007	0.0213603	1.79989	151.013	0.982606
2/29/2024 10:03	2/29/2024	10:03:52 AM	1.71E+09	-0.0309	0.0245298	1.96917	151.052	0.982606
2/29/2024 10:04	2/29/2024	10:04:53 AM	1.71E+09	-0.02172	0.0220646	2.02443	151.058	0.982391
2/29/2024 10:05	2/29/2024	10:05:52 AM	1.71E+09	-0.02263	0.120837	2.01878	151.07	0.982606
2/29/2024 10:06	2/29/2024	10:06:52 AM	1.71E+09	-0.02288	0.0688036	2.00589	151.21	0.982606
2/29/2024 10:07	2/29/2024	10:07:53 AM	1.71E+09	-0.02071	0.0480127	2.01851	151.233	0.982606
2/29/2024 10:08	2/29/2024	10:08:52 AM	1.71E+09	-0.02393	0.112156	1.9884	151.13	0.982606
2/29/2024 10:09	2/29/2024	10:09:55 AM	1.71E+09	-0.01851	0.079883	2.01113	151.076	0.982606
2/29/2024 10:10	2/29/2024	10:10:52 AM	1.71E+09	-0.01406	0.0598123	2.02227	151.203	0.982391
2/29/2024 10:11	2/29/2024	10:11:54 AM	1.71E+09	4.54559	2.78593	6.85433	151.057	0.982606
2/29/2024 10:12	2/29/2024	10:12:52 AM	1.71E+09	19.0542	9.39816	19.6594	151.168	0.982606
2/29/2024 10:13	2/29/2024	10:13:52 AM	1.71E+09	19.082	9.40343	19.7535	151.014	0.982606
2/29/2024 10:14	2/29/2024	10:14:52 AM	1.71E+09	19.0888	9.39911	19.774	151.05	0.982606
2/29/2024 10:15	2/29/2024	10:15:53 AM	1.71E+09	18.9622	9.3465	19.5733	151.051	0.982606
2/29/2024 10:16	2/29/2024	10:16:52 AM	1.71E+09	3.3173	1.91182	5.29558	151.107	0.982391
2/29/2024 10:17	2/29/2024	10:17:52 AM	1.71E+09	0.008509	0.0138299	1.81283	151.042	0.982606
2/29/2024 10:18	2/29/2024	10:18:52 AM	1.71E+09	-0.00462	0.0636095	2.02821	151.013	0.982176

9.40

PES-003 Pre

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)
3/1/2024 10:59	3/1/2024	10:59:01 AM	1.71E+09	19.4324	9.9084	20.2852	151.14	1.01701
3/1/2024 11:00	3/1/2024	11:00:07 AM	1.71E+09	19.727	10.074	20.7023	151.02	1.00927
3/1/2024 11:01	3/1/2024	11:01:01 AM	1.71E+09	19.4327	9.73553	20.3036	150.96	0.992496
3/1/2024 11:02	3/1/2024	11:02:01 AM	1.71E+09	18.924	9.30379	19.6163	150.99	0.983036
3/1/2024 11:03	3/1/2024	11:03:01 AM	1.71E+09	19.0775	9.39189	19.7632	151.233	0.982821

9.90597667

PES-001 Pre-CTS

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)	
3/2/2024 10:00	3/2/2024	10:00:23 AM	1.71E+09	-0.00451	0.0346728	1.78998	151.158	0.976873	
3/2/2024 10:00	3/2/2024	10:00:52 AM	1.71E+09	-0.02876	0.0078287	1.78311	151.23	0.977446	
3/2/2024 10:01	3/2/2024	10:01:21 AM	1.71E+09	-0.01708	0.00420832	1.81317	151.268	0.978091	
3/2/2024 10:01	3/2/2024	10:01:53 AM	1.71E+09	0.570554	0.377727	2.5122	151.305	0.979166	
3/2/2024 10:02	3/2/2024	10:02:19 AM	1.71E+09	14.2949	7.37949	15.823	151.271	0.980241	
3/2/2024 10:02	3/2/2024	10:02:48 AM	1.71E+09	18.7429	9.36326	19.4835	151.188	0.980242	0:00:55
3/2/2024 10:03	3/2/2024	10:03:17 AM	1.71E+09	18.87	9.30311	19.4693	151.112	0.980242	
3/2/2024 10:03	3/2/2024	10:03:46 AM	1.71E+09	18.8759	9.34314	19.4708	151.095	0.979596	
3/2/2024 10:04	3/2/2024	10:04:15 AM	1.71E+09	18.8958	9.32221	19.4628	151.173	0.978736	
3/2/2024 10:04	3/2/2024	10:04:44 AM	1.71E+09	18.8941	9.36563	19.5373	151.347	0.978951	
3/2/2024 10:05	3/2/2024	10:05:13 AM	1.71E+09	18.8595	9.26258	19.5274	151.466	0.979596	
3/2/2024 10:05	3/2/2024	10:05:42 AM	1.71E+09	18.3852	9.1357	19.0608	151.496	0.978521	
3/2/2024 10:06	3/2/2024	10:06:11 AM	1.71E+09	5.13543	2.63817	6.61099	151.43	0.977876	
3/2/2024 10:06	3/2/2024	10:06:40 AM	1.71E+09	0.251067	0.185838	2.13418	151.288	0.978091	
3/2/2024 10:07	3/2/2024	10:07:10 AM	1.71E+09	0.027264	0.0906838	1.9324	151.104	0.978521	

9.34366

PEC-001 Post-CTS

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)
3/4/2024 8:41	3/4/2024	8:41:16 AM	1.71E+09	-0.00073	0.0107255	-0.01169	153.863	1.01851
3/4/2024 8:42	3/4/2024	8:42:19 AM	1.71E+09	-0.00641	0.0103792	0.009421	153.556	1.01808
3/4/2024 8:43	3/4/2024	8:43:16 AM	1.71E+09	-0.00462	-0.0332557	-0.0045	153.72	1.01894
3/4/2024 8:44	3/4/2024	8:44:19 AM	1.71E+09	-0.00276	-0.0196695	0.010619	153.79	1.01873
3/4/2024 8:45	3/4/2024	8:45:16 AM	1.71E+09	0.012693	-0.0345593	0.000534	153.543	1.01873
3/4/2024 8:46	3/4/2024	8:46:16 AM	1.71E+09	-0.00645	-0.01964	0.034982	153.096	1.00067
3/4/2024 8:47	3/4/2024	8:47:16 AM	1.71E+09	16.8213	8.58305	17.835	153.297	1.00927
3/4/2024 8:48	3/4/2024	8:48:17 AM	1.71E+09	19.0735	9.32798	19.8995	153.388	1.00905
3/4/2024 8:49	3/4/2024	8:49:16 AM	1.71E+09	19.098	9.39864	19.9077	153.349	1.00884
3/4/2024 8:50	3/4/2024	8:50:16 AM	1.71E+09	19.109	9.53347	19.9217	152.979	1.00884
3/4/2024 8:51	3/4/2024	8:51:16 AM	1.71E+09	19.1017	9.43187	19.8476	152.919	1.00862
3/4/2024 8:52	3/4/2024	8:52:16 AM	1.71E+09	19.0692	9.42236	19.9131	152.85	1.00884
3/4/2024 8:53	3/4/2024	8:53:16 AM	1.71E+09	19.1051	9.44481	19.9137	152.391	0.997226
3/4/2024 8:54	3/4/2024	8:54:18 AM	1.71E+09	19.0106	9.44032	19.8602	152.031	0.995291
3/4/2024 8:55	3/4/2024	8:55:18 AM	1.71E+09	19.0296	9.31304	19.8723	152.582	0.995076

CTS Raw Data

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)
3/4/2024 8:56	3/4/2024	8:56:16 AM	1.71E+09	19.0385	9.39015	19.8199	152.458	0.994646
3/4/2024 8:57	3/4/2024	8:57:16 AM	1.71E+09	19.0164	9.26233	19.8064	152.378	0.995506
3/4/2024 8:58	3/4/2024	8:58:18 AM	1.71E+09	18.9848	9.39133	19.8006	152.16	0.995291
3/4/2024 8:59	3/4/2024	8:59:16 AM	1.71E+09	9.67427	5.53371	11.9599	152.398	0.987336
3/4/2024 9:00	3/4/2024	9:00:16 AM	1.71E+09	0.009472	0.0745089	1.93028	152.149	0.984326
3/4/2024 9:01	3/4/2024	9:01:16 AM	1.71E+09	0.010153	0.118655	1.85589	151.896	0.984541
3/4/2024 9:02	3/4/2024	9:02:17 AM	1.71E+09	0.004946	0.102519	1.87268	151.754	0.983896
3/4/2024 9:03	3/4/2024	9:03:16 AM	1.71E+09	-0.02599	0.0891181	1.85692	151.684	0.983466
3/4/2024 9:04	3/4/2024	9:04:21 AM	1.71E+09	-0.00684	0.138556	1.90373	151.541	0.984541
3/4/2024 9:05	3/4/2024	9:05:16 AM	1.71E+09	-0.00219	0.102456	1.85479	151.491	0.984326
3/4/2024 9:06	3/4/2024	9:06:21 AM	1.71E+09	0.001609	0.0779875	1.89658	151.491	0.984326

9.43301333

PEA-001 Pre-CTS

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Signal	Temp(C)
3/5/2024 14:43	3/5/2024	2:43:32 PM	1.71E+09	18.7032	9.41079	19.3014	7.3452	150.277
3/5/2024 14:44	3/5/2024	2:44:32 PM	1.71E+09	18.756	9.43927	19.2491	7.34637	150.552
3/5/2024 14:45	3/5/2024	2:45:32 PM	1.71E+09	18.762	9.43022	19.1973	7.33631	150.466
3/5/2024 14:46	3/5/2024	2:46:35 PM	1.71E+09	18.8158	9.43827	19.3115	7.32807	150.492
3/5/2024 14:47	3/5/2024	2:47:37 PM	1.71E+09	18.8126	9.4503	19.2008	7.28774	150.704
3/5/2024 14:48	3/5/2024	2:48:34 PM	1.71E+09	18.8115	9.45121	19.3188	7.28417	150.832
3/5/2024 14:49	3/5/2024	2:49:32 PM	1.71E+09	18.7466	9.42775	19.201	7.32597	150.757
3/5/2024 14:50	3/5/2024	2:50:32 PM	1.71E+09	18.8595	9.45625	19.2398	7.33993	150.414
3/5/2024 14:51	3/5/2024	2:51:32 PM	1.71E+09	1.96593	1.04668	3.73597	6.51409	150.961
3/5/2024 14:52	3/5/2024	2:52:32 PM	1.71E+09	0.009458	0.0331384	1.61533	6.34676	150.935
3/5/2024 14:53	3/5/2024	2:53:34 PM	1.71E+09	-0.01187	0.0248482	1.75801	6.30487	150.628
3/5/2024 14:54	3/5/2024	2:54:32 PM	1.71E+09	-0.04105	0.0446541	1.92159	6.26544	150.54
3/5/2024 14:55	3/5/2024	2:55:32 PM	1.71E+09	-0.0432	0.0225925	2.03861	6.2711	150.841
3/5/2024 14:56	3/5/2024	2:56:32 PM	1.71E+09	-0.02802	0.0189202	1.84994	6.31879	150.925
3/5/2024 14:57	3/5/2024	2:57:32 PM	1.71E+09	-0.02574	0.0335996	1.75094	6.25849	150.982
3/5/2024 14:58	3/5/2024	2:58:38 PM	1.71E+09	-0.01681	0.0288321	1.68968	6.2636	150.833
3/5/2024 14:59	3/5/2024	2:59:32 PM	1.71E+09	-0.01276	0.0220868	1.83599	6.25371	151.101
3/5/2024 15:00	3/5/2024	3:00:32 PM	1.71E+09	-0.01481	0.0335343	1.83381	6.26951	151.239

9.44659333

PEC-006 Post-CTS

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)
3/6/2024 9:48	3/6/2024	9:48:24 AM	1.71E+09	-0.00671	0.00792059	-7.50E-05	152.782	1.01701
3/6/2024 9:49	3/6/2024	9:49:24 AM	1.71E+09	-0.00568	0.00051509	-0.00239	152.643	1.01701
3/6/2024 9:50	3/6/2024	9:50:24 AM	1.71E+09	0.004243	0.0147894	0.004371	152.475	1.01701
3/6/2024 9:51	3/6/2024	9:51:24 AM	1.71E+09	0.002857	-0.0016191	-0.00567	152.382	1.01701
3/6/2024 9:52	3/6/2024	9:52:25 AM	1.71E+09	-0.00066	-0.0083429	-0.01298	152.227	1.01701
3/6/2024 9:53	3/6/2024	9:53:24 AM	1.71E+09	-0.00256	-0.0050517	0.008514	152.055	1.01679
3/6/2024 9:54	3/6/2024	9:54:26 AM	1.71E+09	0.075423	0.0424213	0.078162	152.064	1.00905
3/6/2024 9:55	3/6/2024	9:55:24 AM	1.71E+09	16.8598	8.59591	17.7466	152.562	1.02088
3/6/2024 9:56	3/6/2024	9:56:24 AM	1.71E+09	19.0405	9.57474	19.7341	152.536	1.0256
3/6/2024 9:57	3/6/2024	9:57:24 AM	1.71E+09	19.0004	9.53628	19.9257	152.646	1.0256
3/6/2024 9:58	3/6/2024	9:58:27 AM	1.71E+09	18.9695	9.53916	19.8941	152.329	1.0256
3/6/2024 9:59	3/6/2024	9:59:24 AM	1.71E+09	18.9971	9.47712	19.8625	151.797	1.0256
3/6/2024 10:00	3/6/2024	10:00:24 AM	1.71E+09	18.9676	9.51492	19.7681	151.521	1.0054
3/6/2024 10:01	3/6/2024	10:01:25 AM	1.71E+09	18.8919	9.49499	19.6521	151.716	1.00604
3/6/2024 10:02	3/6/2024	10:02:26 AM	1.71E+09	18.8057	9.44488	19.587	151.793	1.00282
3/6/2024 10:03	3/6/2024	10:03:27 AM	1.71E+09	0.286252	0.155234	2.18611	151.92	0.992926
3/6/2024 10:04	3/6/2024	10:04:24 AM	1.71E+09	-0.01886	0.00012607	1.92677	152.224	0.992926
3/6/2024 10:05	3/6/2024	10:05:24 AM	1.71E+09	-0.01012	-0.0103252	1.8814	151.985	0.993356
3/6/2024 10:06	3/6/2024	10:06:27 AM	1.71E+09	-0.02147	-0.0023307	1.88928	151.657	0.993356
3/6/2024 10:07	3/6/2024	10:07:24 AM	1.71E+09	-0.01092	0.0100646	1.92174	151.478	0.992711
3/6/2024 10:08	3/6/2024	10:08:25 AM	1.71E+09	-0.00298	-0.0311153	1.94322	151.697	0.992926
3/6/2024 10:09	3/6/2024	10:09:24 AM	1.71E+09	-0.00708	-0.015658	1.90559	151.68	0.992711
3/6/2024 10:10	3/6/2024	10:10:27 AM	1.71E+09	-0.00726	0.015889	1.81496	151.57	0.992926
3/6/2024 10:11	3/6/2024	10:11:25 AM	1.71E+09	-0.02412	-0.0212528	1.90394	151.491	0.992926

9.51752

PES-002 (4-1) End of test

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	WaterError	Signal
3/6/2024 21:45	3/6/2024	9:45:49 PM	1.71E+09	18.4229	9.36131	19.1637	115.756	7.20451
3/6/2024 21:46	3/6/2024	9:46:49 PM	1.71E+09	18.9632	9.57507	19.7662	150.917	7.27593
3/6/2024 21:47	3/6/2024	9:47:51 PM	1.71E+09	18.9252	9.53472	19.7501	145.098	7.26396
3/6/2024 21:48	3/6/2024	9:48:49 PM	1.71E+09	18.9073	9.5839	19.6559	125.352	7.28296
3/6/2024 21:49	3/6/2024	9:49:49 PM	1.71E+09	18.9175	9.54673	19.6461	112.965	7.29453
3/6/2024 21:50	3/6/2024	9:50:49 PM	1.71E+09	18.8447	9.54489	19.5989	107.101	7.37305
3/6/2024 21:51	3/6/2024	9:51:50 PM	1.71E+09	18.7953	9.50447	19.5396	107.793	7.39113

CTS Raw Data

Timestamp	Date	Time	Epoch Time	difluorome	Ethylene	Methane	Temp(C)	Press(atm)
3/6/2024 21:52	3/6/2024	9:52:49 PM	1.71E+09	16.3231	8.50675	17.5728	108.411	7.26932
3/6/2024 21:53	3/6/2024	9:53:52 PM	1.71E+09	-0.02101	0.0510868	1.74116	79.4379	6.36657
3/6/2024 21:54	3/6/2024	9:54:49 PM	1.71E+09	-0.04649	0.0836407	1.91134	52.1596	6.35642

9.55850667

Spike Gas Direct Inject

NuWave - concentrations file
Pathlength:
Method:
Client / Site / Pathway:

Timestamp	Hydrochloric acid	Sulfur hexafluoride	Temp(C)	Press(atm)	QAQC	Number Scans
2/29/2024 12:09	0.704637	0.295118	151.226	0.962612	0	20
2/29/2024 12:09	1.65335	0.755126	150.959	0.67882	0	20
2/29/2024 12:10	8.6159	3.87712	151.048	0.34214	0	20
2/29/2024 12:10	9.67391	4.2919	151.347	0.337625	0	16
2/29/2024 12:11	8.27017	3.63918	151.615	0.441037	0	24
2/29/2024 12:11	5.5888	2.53552	151.794	0.767398	0	16
2/29/2024 12:12	5.78607	2.68366	151.764	0.990776	0	20
2/29/2024 12:12	7.06574	3.27882	151.585	0.990131	0	20
2/29/2024 12:13	7.898	3.66206	151.436	0.989486	0	20
2/29/2024 12:13	8.50726	3.89576	151.317	0.989271	0	20
2/29/2024 12:14	8.78021	3.98529	151.197	0.989056	0	20
2/29/2024 12:14	9.17012	4.13821	151.231	0.989701	0	20
2/29/2024 12:15	9.32866	4.18901	151.254	0.990346	0	20
2/29/2024 12:15	9.48822	4.22644	151.415	0.989056	0	16
2/29/2024 12:16	9.54799	4.24671	151.409	0.988411	0	20
2/29/2024 12:16	9.6373	4.25864	151.469	0.987981	0	20
2/29/2024 12:17	9.59374	4.2276	151.499	0.987121	0	16
2/29/2024 12:17	9.72973	4.2706	151.42	0.986906	0	20
2/29/2024 12:18	9.79919	4.27524	151.48	0.987336	0	20
2/29/2024 12:18	9.85078	4.28243	151.474	0.987766	0	20
2/29/2024 12:19	9.81084	4.23872	151.381	0.987121	0	20
2/29/2024 12:19	9.92038	4.28551	151.352	0.987336	0	20
2/29/2024 12:20	9.95186	4.27792	151.376	0.987551	0	16
2/29/2024 12:20	9.98847	4.28067	151.257	0.987336	0	20
2/29/2024 12:21	10.0107	4.27552	151.167	0.988196	0	16
2/29/2024 12:21	10.0232	4.28824	151.197	0.988411	0	20
2/29/2024 12:22	10.0907	4.28366	151.287	0.987981	0	20
2/29/2024 12:22	10.121	4.28213	151.347	0.987981	0	20
2/29/2024 12:23	10.1771	4.27988	151.376	0.987336	0	20
2/29/2024 12:23	10.2203	4.29178	151.466	0.985616	0	20
2/29/2024 12:24	10.2321	4.2839	151.455	0.984111	0	20
2/29/2024 12:24	10.2991	4.29981	151.389	0.983896	0	20
2/29/2024 12:25	10.2259	4.24011	151.376	0.983466	0	20
2/29/2024 12:25	10.3455	4.29028	151.376	0.984111	0	20
2/29/2024 12:26	10.3458	4.28266	151.466	0.984541	0	20
2/29/2024 12:26	10.4186	4.28683	151.496	0.984326	0	20
2/29/2024 12:27	10.4504	4.29262	151.526	0.984541	0	20
2/29/2024 12:27	10.4954	4.29263	151.556	0.983896	0	20
2/29/2024 12:28	10.5593	4.28624	151.496	0.984326	0	24
2/29/2024 12:28	10.5922	4.28656	151.52	0.984111	0	16
2/29/2024 12:29	10.6507	4.293	151.628	0.984326	0	20
2/29/2024 12:29	10.6421	4.30142	151.622	0.984541	0	20
2/29/2024 12:30	10.6265	4.30461	151.676	0.983896	0	16
2/29/2024 12:30	10.6264	4.30308	151.689	0.983036	0	20
2/29/2024 12:31	10.6184	4.29069	151.685	0.983466	0	20
2/29/2024 12:31	10.6435	4.29952	151.658	0.983251	0	20
2/29/2024 12:32	10.6248	4.29758	151.62	0.983681	0	20
2/29/2024 12:32	10.6144	4.28343	151.657	0.983251	0	20
2/29/2024 12:33	10.6289	4.28545	151.627	0.983251	0	20
2/29/2024 12:33	10.6275	4.28364	151.567	0.983466	0	16
2/29/2024 12:34	10.6067	4.27474	151.537	0.984111	0	20
2/29/2024 12:34	10.624	4.28848	151.507	0.983466	0	20
2/29/2024 12:35	10.6291	4.28548	151.597	0.983251	0	20
2/29/2024 12:35	10.6421	4.29027	151.716	0.983466	0	20
2/29/2024 12:36	10.691	4.29864	151.746	0.983466	0	16
2/29/2024 12:36	10.6775	4.29073	151.627	0.983681	0	20
2/29/2024 12:37	10.6554	4.29143	151.597	0.983251	0	20

Spike Gas Direct Inject

NuWave - concentrations file
Pathlength:
Method:
Client / Site / Pathway:

Timestamp	Hydrochloric acid	Sulfur hexafluoride	Temp(C)	Press(atm)	QAQC	Number Scans
2/29/2024 12:37	10.6628	4.28965	151.64	0.983251	0	20
2/29/2024 12:38	10.6683	4.28437	151.641	0.983681	0	20
2/29/2024 12:38	10.6635	4.28733	151.665	0.983896	0	20
2/29/2024 12:39	10.6938	4.28795	151.593	0.983251	0	20
2/29/2024 12:39	10.6903	4.29424	151.587	0.983251	0	20
2/29/2024 12:40	10.6515	4.24987	151.539	0.983251	0	20
2/29/2024 12:40	10.7731	4.29015	151.468	0.984111	0	20
2/29/2024 12:41	10.7752	4.2859	151.486	0.983681	0	20
2/29/2024 12:41	10.8169	4.29971	151.576	0.983251	0	24
2/29/2024 12:42	10.8518	4.30078	151.635	0.983896	0	16
2/29/2024 12:42	10.8958	4.28831	151.678	0.984326	0	20
2/29/2024 12:43	10.9438	4.30108	151.648	0.983681	0	20
2/29/2024 12:43	10.9534	4.29062	151.589	0.983466	0	16
2/29/2024 12:44	10.9511	4.29629	151.601	0.983681	0	20
2/29/2024 12:44	10.8632	4.24646	151.638	0.983681	0	20
2/29/2024 12:45	10.8456	4.23998	151.621	0.983466	0	20
2/29/2024 12:45	10.9129	4.28219	151.61	0.983466	0	20
2/29/2024 12:46	10.9	4.28992	151.569	0.983466	0	20
2/29/2024 12:46	10.8709	4.28875	151.557	0.984111	0	20
2/29/2024 12:47	10.8924	4.29349	151.479	0.983681	0	20
2/29/2024 12:47	10.9108	4.29351	151.347	0.983466	0	20
2/29/2024 12:48	10.9054	4.29276	151.429	0.983251	0	20
2/29/2024 12:48	10.8362	4.24085	151.476	0.983466	0	20
2/29/2024 12:49	10.9127	4.29187	151.387	0.983466	0	16

10.892 4.282

10.347

HF Direct Inject

NuWave - concentrations file
Pathlength:
Method:
Client / Site / Pathway:

Timestamp	Hydrofluoric Acid	Sulfur hexafluoride	Temp(C)	Press(atm)
3/6/2024 14:38	1.85467	3.27545	151.055	1.10116
3/6/2024 14:39	6.15853	4.583	151.412	1.11977
3/6/2024 14:39	7.53627	4.60519	151.575	1.12106
3/6/2024 14:40	8.21034	4.59758	151.311	1.12214
3/6/2024 14:40	8.57678	4.59102	151.015	1.12321
3/6/2024 14:41	8.84287	4.5661	150.744	1.12536
3/6/2024 14:41	8.14548	4.44536	150.55	1.08344
3/6/2024 14:42	6.74869	4.55317	150.476	1.00733
3/6/2024 14:42	6.55497	4.58282	150.57	0.999806
3/6/2024 14:43	6.62808	4.58007	150.627	0.999806
3/6/2024 14:43	6.80088	4.59409	150.64	0.999806
3/6/2024 14:44	6.933	4.59689	150.648	0.999806
3/6/2024 14:44	7.04338	4.58054	150.607	0.999806
3/6/2024 14:45	7.15675	4.58338	150.56	0.999806
3/6/2024 14:45	7.24949	4.58916	150.596	0.999806
3/6/2024 14:46	7.31418	4.57392	150.644	0.999806
3/6/2024 14:46	7.38877	4.58189	150.799	0.999806
3/6/2024 14:47	9.17198	4.73839	150.85	1.03764
3/6/2024 14:47	9.56101	4.59734	150.926	1.07957
3/6/2024 14:48	9.62308	4.58172	150.816	1.08494
3/6/2024 14:48	9.61738	4.59958	150.69	1.0858
3/6/2024 14:49	9.69015	4.59941	150.673	1.0858
3/6/2024 14:49	9.72154	4.60085	150.673	1.0858
3/6/2024 14:50	9.02695	4.45269	150.656	1.05011
3/6/2024 14:50	8.20327	4.60111	150.593	0.996796
3/6/2024 14:51	7.84623	4.58476	150.559	0.996366
3/6/2024 14:51	7.7202	4.59029	150.502	0.995936
3/6/2024 14:52	7.69235	4.58305	150.468	0.996581
3/6/2024 14:52	7.67275	4.58623	150.492	0.996366
3/6/2024 14:53	7.7525	4.63797	150.529	0.995721
3/6/2024 14:53	7.67767	4.58358	150.684	0.995721
3/6/2024 14:54	7.67542	4.58728	150.844	0.995936
3/6/2024 14:54	7.72056	4.58261	150.886	0.995506
3/6/2024 14:55	7.77456	4.57215	150.796	0.996366
3/6/2024 14:55	7.79278	4.58201	150.707	0.995936
3/6/2024 14:56	7.84832	4.59315	150.557	0.995721
3/6/2024 14:56	7.87305	4.57223	150.533	0.995721
3/6/2024 14:57	7.8852	4.59729	150.563	0.995721
3/6/2024 14:57	7.8735	4.57464	150.593	0.995506
3/6/2024 14:58	7.87538	4.58103	150.645	0.995506
3/6/2024 14:58	7.97877	4.59278	150.721	0.995506
3/6/2024 14:59	7.98702	4.58627	150.626	0.996366
3/6/2024 14:59	8.05642	4.595	150.577	0.995506
3/6/2024 15:00	8.03665	4.59142	150.61	0.995506
3/6/2024 15:00	8.10347	4.58781	150.678	0.995936
3/6/2024 15:01	8.12707	4.5932	150.741	0.995721
3/6/2024 15:01	8.10132	4.59612	150.769	0.995506
3/6/2024 15:02	8.11133	4.59389	150.775	0.995506
3/6/2024 15:02	8.16324	4.59493	150.784	0.995936
3/6/2024 15:03	8.19477	4.6011	150.761	0.995721
3/6/2024 15:03	8.18872	4.59547	150.701	0.995506
3/6/2024 15:04	8.26775	4.58882	150.695	0.995291
3/6/2024 15:04	8.27365	4.58857	150.725	0.995291
3/6/2024 15:05	8.24452	4.58052	150.857	0.995291
3/6/2024 15:05	8.27408	4.59921	150.965	0.995076
3/6/2024 15:06	8.29512	4.59147	151.001	0.995721
3/6/2024 15:06	8.3174	4.6007	151.085	0.995721

HF Direct Inject

NuWave - concentrations file
Pathlength:
Method:
Client / Site / Pathway:

Timestamp	Hydrofluoric Acid	Sulfur hexafluoride	Temp(C)	Press(atm)
3/6/2024 15:07	8.36441	4.59454	151.061	0.995506
3/6/2024 15:07	8.39414	4.59601	151.001	0.995506
3/6/2024 15:08	8.41192	4.58881	151.018	0.995506
3/6/2024 15:08	8.40156	4.58852	150.994	0.995506
3/6/2024 15:09	8.37052	4.59298	151.177	0.995076
3/6/2024 15:09	8.37753	4.59593	151.211	0.995076
3/6/2024 15:10	8.43927	4.60285	151.164	0.995291
3/6/2024 15:10	8.45773	4.5924	151.014	0.995721
3/6/2024 15:11	8.50601	4.59781	150.896	0.995721
3/6/2024 15:11	8.50226	4.59014	150.869	0.995076
3/6/2024 15:12	8.50215	4.59369	150.843	0.995291
3/6/2024 15:12	8.52148	4.58893	151.005	0.995076
3/6/2024 15:13	8.48135	4.5925	151.184	0.995506
3/6/2024 15:13	8.49246	4.59973	151.184	0.995076
3/6/2024 15:14	8.56666	4.60332	151.095	0.994646
3/6/2024 15:14	8.56986	4.59783	150.975	0.995506
3/6/2024 15:15	8.48185	4.57967	150.886	0.994001
3/6/2024 15:15	7.86433	4.58518	150.773	0.991206
	8.487178571			
	8.062819643			

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
2/29/2024 13:37	0.672446		0.361145	151.496	0.956807	spike
2/29/2024 13:38	0.667131		0.362259	151.645	0.956807	spike
2/29/2024 13:38	0.664559		0.361348	151.759	0.956592	spike
2/29/2024 13:39	0.673947		0.361035	151.742	0.956592	spike
2/29/2024 13:39	0.674782		0.362462	151.767	0.956592	spike
2/29/2024 13:40	0.649222		0.361599	151.877	0.956592	spike
2/29/2024 13:40	0.66827		0.364093	151.833	0.956592	spike
2/29/2024 13:41	0.685285		0.36602	151.793	0.956807	spike
2/29/2024 13:41	0.690087		0.363014	151.776	0.956592	spike
2/29/2024 13:42	0.680506		0.362688	151.806	0.956592	spike
2/29/2024 13:42	0.662013		0.363828	151.806	0.956807	spike
2/29/2024 13:43	0.69378		0.362024	151.806	0.956807	spike
2/29/2024 13:43	0.677823		0.36141	151.806	0.956807	spike
2/29/2024 13:44	0.64843		0.363566	151.776	0.956807	spike
2/29/2024 13:44	0.662952		0.363336	151.776	0.956807	spike
2/29/2024 13:45	0.669267		0.362611	151.736	0.956807	spike
2/29/2024 13:45	0.668114		0.359648	151.674	0.956807	spike
2/29/2024 13:46	0.684832		0.354065	151.606	0.958312	spike
2/29/2024 16:48	0.0127811		0.00240797	151.459	0.956807	Native
2/29/2024 16:49	0.0243035		0.00351014	151.483	0.956592	Native
2/29/2024 16:50	0.0269488		0.00416367	151.549	0.957237	Native
2/29/2024 16:51	0.028321		0.00326586	151.608	0.956807	Native
2/29/2024 16:52	0.0245383		0.00331628	151.584	0.956807	Native
2/29/2024 16:53	0.0111628		0.00355624	151.364	0.956807	Native
2/29/2024 16:54	0.0259248		0.00395553	151.459	0.956807	Native
2/29/2024 16:55	0.0161993		0.00371961	151.459	0.956807	Native
2/29/2024 16:56	0.0176317		0.00324429	151.34	0.956807	Native
2/29/2024 16:57	0.028547		0.00316908	151.603	0.957237	Native
2/29/2024 16:58	0.0331671		0.0038131	151.638	0.956807	Native
2/29/2024 16:59	0.0307029		0.00289311	151.711	0.957237	Native
2/29/2024 17:00	0.0147678		0.00350795	151.537	0.956807	Native
2/29/2024 17:01	0.0250951		0.00399018	151.627	0.957237	Native
2/29/2024 17:02	0.0159765		0.00334395	151.716	0.956807	Native
2/29/2024 17:03	0.0204379		0.0029472	151.728	0.957022	Native
2/29/2024 17:04	0.0286367		0.00348317	151.776	0.956807	Native
2/29/2024 17:05	0.0391221		0.00507263	151.34	0.957022	Native
2/29/2024 17:06	0.023148		0.00505444	151.364	0.956807	Native
2/29/2024 17:07	0.0243651		0.00307708	151.549	0.956807	Native
2/29/2024 17:08	0.018996		0.00273684	151.489	0.956807	Native
2/29/2024 17:09	0.0225992		0.00314288	151.662	0.956807	Native
2/29/2024 17:10	0.0309381		0.00196616	151.758	0.956807	Native
2/29/2024 17:11	0.00871636		0.00329872	151.819	0.957022	Native

Timestamp	Hydrochloric acid	Sulfur hexafluoride	Temp(C)	Press(atm)	
3/1/2024 12:33	0.0107249	0.0010991	150.909	0.974314	
3/1/2024 12:34	0.0158176	0.00243438	150.833	0.974222	
3/1/2024 12:35	0.00993301	0.00249779	150.802	0.974007	
3/1/2024 12:35	-0.00125865	0.00271699	150.8	0.974222	
3/1/2024 12:36	0.00812777	0.0028891	150.804	0.974222	
3/1/2024 12:36	0.00976438	0.00224616	150.971	0.974652	
3/1/2024 12:37	-0.00202418	0.00272255	151.18	0.971427	
3/1/2024 12:37	0.0172024	0.0259525	151.359	0.960247	
3/1/2024 12:38	0.0238409	0.0386753	151.448	0.956807	
3/1/2024 12:38	0.018976	0.0153781	151.305	0.956807	
3/1/2024 12:39	0.0193222	0.00576581	151.059	0.956807	
3/1/2024 12:39	0.020088	0.02841	150.79	0.956807	
3/1/2024 12:40	0.0378247	0.0564746	150.712	0.956807	
3/1/2024 12:40	0.0428208	0.00478942	150.861	0.956807	
3/1/2024 12:41	0.00856291	0.0108859	151.137	0.956807	
3/1/2024 12:41	0.0201757	0.0244646	151.37	0.956807	
3/1/2024 12:42	0.0196896	0.0519123	151.322	0.956807	
3/1/2024 12:42	0.0165847	0.0644716	151.202	0.956807	
3/1/2024 12:43	0.0189664	0.0523433	151.148	0.956807	
3/1/2024 12:43	0.00357919	0.0477928	150.98	0.956807	
3/1/2024 12:44	0.0315317	0.078953	150.842	0.956807	
3/1/2024 12:44	0.039918	0.011791	150.699	0.956807	
3/1/2024 12:45	0.037362	0.0034273	150.759	0.956807	Native
3/1/2024 12:45	0.0270325	0.0155035	150.949	0.956807	Native
3/1/2024 12:46	0.0302676	0.024815	151.013	0.956807	Native
3/1/2024 12:46	0.0272626	0.0362988	151.069	0.956807	Native

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
3/1/2024 12:47	0.0259215		0.0303653	151.012	0.956807	Native
3/1/2024 12:47	0.0435966		0.0124493	150.826	0.956807	Native
3/1/2024 12:48	0.0481578		0.00740832	150.77	0.957022	Native
3/1/2024 12:48	0.0403379		0.0585267	150.806	0.957022	Native
3/1/2024 12:49	0.0329445		0.0411832	150.776	0.956807	Native
3/1/2024 12:50	0.0305611		0.0288902	150.865	0.956807	Native
3/1/2024 12:50	0.0576735		0.0384459	151.074	0.956807	Native
3/1/2024 12:51	0.0401855		0.0439029	151.134	0.956807	
3/1/2024 12:51	0.0339348		0.0696435	151.104	0.956807	
3/1/2024 12:52	0.0303838		0.0636852	151.015	0.963257	
3/1/2024 12:52	0.0301208		0.0257296	150.865	0.975941	
3/1/2024 12:53	0.0200395		0.00242767	150.746	0.977876	
3/1/2024 12:53	0.0197835		0.00202441	150.668	0.977231	
3/1/2024 12:54	0.0138103		0.00259228	150.78	0.977446	
3/1/2024 12:54	0.0106126		0.00161935	151.131	0.978521	
3/1/2024 12:55	0.00285439		0.00207453	151.226	0.978306	
3/1/2024 12:55	0.0209925		0.00229595	151.118	0.978306	
3/1/2024 12:56	0.00365067		0.00239614	151.095	0.978091	
3/1/2024 12:56	0.00669933		0.00117851	150.976	0.978306	
3/1/2024 12:57	0.0151953		0.00290359	150.832	0.977876	
3/1/2024 12:57	0.0153696		0.0019194	150.808	0.977231	
3/1/2024 12:58	0.000241942		0.00247463	150.832	0.976586	
3/1/2024 12:58	0.0255282		0.0021339	150.974	0.976157	
3/1/2024 12:59	0.0147015		0.00140827	151.129	0.976372	
3/1/2024 12:59	0.000365185		0.00155098	151.2	0.976371	
3/1/2024 13:00	-0.00536392		0.00243709	151.122	0.974867	
3/1/2024 13:00	0.00922552		0.0018012	151.02	0.974867	
3/1/2024 13:01	0.0155432		0.00203536	150.936	0.976801	
3/1/2024 13:01	0.0120737		0.00159639	150.906	0.976371	
3/1/2024 13:02	0.0121208		0.0012591	150.792	0.976156	
3/1/2024 13:02	0.02021		0.00355551	150.762	0.976586	
3/1/2024 13:03	0.00662756		0.00186973	150.983	0.976586	
3/1/2024 13:04	0.0183716		0.00360102	151.13	0.977016	
3/1/2024 13:04	0.012557		0.246317	151.149	0.976586	
3/1/2024 13:05	0.00477286		0.767931	151.012	0.976586	
3/1/2024 13:05	0.0327559		0.573058	150.886	0.975941	
3/1/2024 13:06	0.033211		0.360413	150.766	0.976371	
3/1/2024 13:06	0.0333643		0.225623	150.724	0.976586	
3/1/2024 13:07	0.0371958		0.17237	150.758	0.976156	
3/1/2024 13:07	0.0257634		0.107334	150.793	0.976371	
3/1/2024 13:08	0.0302131		0.0824699	150.821	0.976156	
3/1/2024 13:08	0.0189075		0.0787358	150.83	0.976156	
3/1/2024 13:09	1.14443		1.45658	150.646	0.976586	
3/1/2024 13:09	2.31358		1.77823	150.417	0.976371	
3/1/2024 13:10	2.79267		1.70448	150.194	0.976801	
3/1/2024 13:10	2.94607		1.64027	150.129	0.976801	
3/1/2024 13:11	3.00702		1.58617	150.257	0.975941	
3/1/2024 13:11	2.97192		1.53294	150.459	0.975726	
3/1/2024 13:12	2.87839		1.45361	150.728	0.975941	
3/1/2024 13:12	2.83668		1.4038	150.724	0.976156	
3/1/2024 13:13	2.86639		1.40432	150.524	0.976586	
3/1/2024 13:13	2.77822		1.35071	150.362	0.977016	
3/1/2024 13:14	2.67537		1.28095	150.273	0.976801	
3/1/2024 13:14	2.53066		1.20894	150.254	0.976586	
3/1/2024 13:15	2.54414		1.1914	150.278	0.976371	
3/1/2024 13:15	3.64429		1.67732	150.484	0.975941	
3/1/2024 13:16	3.96374		1.81477	150.728	0.976586	
3/1/2024 13:16	4.04999		1.82524	150.786	0.976586	
3/1/2024 13:17	4.09113		1.82283	150.798	0.976586	
3/1/2024 13:17	4.08585		1.81352	150.755	0.977016	
3/1/2024 13:18	4.12831		1.818	150.508	0.976586	
3/1/2024 13:18	4.05026		1.79666	150.253	0.975941	
3/1/2024 13:19	4.13788		1.82521	150.22	0.976156	
3/1/2024 13:19	6.73462		2.911	150.278	0.976586	
3/1/2024 13:20	3.42014		1.28515	150.515	0.976586	
3/1/2024 13:21	0.411476		0.118366	150.983	0.976156	
3/1/2024 13:21	0.271114		0.105606	151.103	0.976156	
3/1/2024 13:22	2.16396		1.23393	150.984	0.976801	
3/1/2024 13:22	7.46002		3.31883	150.827	0.976156	
3/1/2024 13:23	8.19867		3.37169	150.654	0.976156	
3/1/2024 13:23	4.40132		1.74262	150.444	0.976371	
3/1/2024 13:24	2.26141		0.996627	150.541	0.976801	

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
3/1/2024 13:24	2.12734		0.965727	150.742	0.976586	
3/1/2024 13:25	1.51042		0.688456	151.007	0.971642	
3/1/2024 13:25	0.928095		0.437724	150.994	0.966697	
3/1/2024 13:26	0.936651		0.443057	150.612	0.966912	
3/1/2024 13:26	0.799593		0.385241	150.319	0.962827	
3/1/2024 13:27	0.696119		0.335653	150.079	0.958312	
3/1/2024 13:27	0.705253		0.337152	150.08	0.958742	
3/1/2024 13:28	0.685861		0.334127	150.184	0.958527	Spike
3/1/2024 13:28	0.690076		0.332508	150.302	0.959172	Spike
3/1/2024 13:29	0.684048		0.327493	150.283	0.959172	Spike
3/1/2024 13:29	0.677985		0.329006	150.304	0.959172	Spike
3/1/2024 13:30	0.712285		0.330078	150.223	0.958312	Spike
3/1/2024 13:30	0.700251		0.330888	150.136	0.958312	
3/1/2024 13:31	0.712522		0.329001	150.086	0.958742	
3/1/2024 13:31	0.700216		0.328125	149.865	0.958527	
3/1/2024 13:32	0.720027		0.327105	150.015	0.958527	
3/1/2024 13:32	0.287784		0.0942614	150.364	0.958957	
3/1/2024 13:33	0.0629982		0.00218459	150.518	0.959387	
3/1/2024 13:33	0.0582112		0.00241173	150.562	0.959387	
3/1/2024 13:34	0.0294475		0.00300557	150.49	0.958527	
3/1/2024 13:35	0.036099		0.00405941	150.338	0.958527	
3/1/2024 13:35	0.0455326		0.00428634	150.271	0.958957	
3/1/2024 13:35	0.0370312		0.00170368	150.104	0.959602	
3/1/2024 13:36	0.0413975		0.00248186	150.184	0.959172	
3/1/2024 13:37	0.03773		0.00186957	150.361	0.958742	
3/1/2024 13:37	0.0303039		0.00238662	150.65	0.958957	
3/1/2024 13:38	0.0132066		0.00203579	150.822	0.958527	
3/1/2024 13:38	0.0224464		0.00302608	150.809	0.959387	
3/1/2024 13:39	0.001848		0.00480529	150.815	0.959387	
3/1/2024 13:39	0.0189115		0.00209727	150.791	0.958957	
3/1/2024 13:40	0.0198547		0.00277398	150.733	0.958527	

Timestamp	Hydrochloric acid	Sulfur hexafluoride	Temp(C)	Press(atm)	
3/2/2024 19:28	0.285053	0.00954708	151.141	0.956807	
3/2/2024 19:29	0.285244	0.00937938	151.253	0.956807	
3/2/2024 19:29	0.281405	0.0101426	151.223	0.954657	
3/2/2024 19:30	0.424139	0.00971941	151.174	0.953582	
3/2/2024 19:30	0.40563	0.0102177	150.943	0.954012	
3/2/2024 19:31	0.370349	0.00876468	150.777	0.954012	
3/2/2024 19:31	0.333691	0.00909428	150.777	0.953367	
3/2/2024 19:32	0.303146	0.00875317	150.986	0.953367	
3/2/2024 19:32	0.280105	0.00857694	151.392	0.954442	
3/2/2024 19:33	4.91665	2.95941	151.536	0.955517	
3/2/2024 19:33	10.5348	4.24536	151.556	0.956162	
3/2/2024 19:34	11.0123	4.25257	151.415	0.956377	
3/2/2024 19:34	11.2199	4.24738	151.208	0.956377	
3/2/2024 19:35	4.43134	0.684893	151.107	0.954012	
3/2/2024 19:35	0.962439	0.0125764	151.126	0.953582	
3/2/2024 19:36	0.679776	0.0102301	151.364	0.954012	
3/2/2024 19:36	0.559309	0.0120921	151.418	0.953582	
3/2/2024 19:37	1.96616	0.762494	151.448	0.954227	
3/2/2024 19:37	4.74058	1.94978	151.443	0.954872	
3/2/2024 19:38	4.62232	1.77758	151.347	0.954442	
3/2/2024 19:38	1.77521	0.578222	151.138	0.954227	
3/2/2024 19:39	1.61917	0.555373	151.144	0.954442	
3/2/2024 19:39	1.41115	0.453884	151.234	0.948422	
3/2/2024 19:40	1.0985	0.345331	151.443	0.939822	Spike
3/2/2024 19:40	1.08149	0.350306	151.467	0.939822	Spike
3/2/2024 19:41	1.10026	0.35374	151.448	0.940037	Spike
3/2/2024 19:41	1.10768	0.351732	151.234	0.939822	Spike
3/2/2024 19:42	1.08657	0.353132	151.084	0.939607	Spike
3/2/2024 19:42	1.03895	0.349655	150.894	0.939393	Spike
3/2/2024 19:43	1.08371	0.351344	150.834	0.939822	Spike
3/2/2024 19:43	1.1187	0.347769	151.019	0.939822	Spike
3/2/2024 19:44	1.13049	0.351943	151.234	0.939822	Spike
3/2/2024 19:44	1.11904	0.353427	151.204	0.939822	Spike
3/2/2024 19:45	1.1268	0.352798	151.049	0.940037	Spike
3/2/2024 19:45	1.16896	0.356519	150.959	0.940037	Spike
3/2/2024 19:46	1.15614	0.354369	150.959	0.939822	Spike
3/2/2024 19:46	1.16619	0.354666	151.038	0.939607	Spike
3/2/2024 19:47	1.15209	0.355599	151.306	0.940037	Spike

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
3/2/2024 19:47	1.15021		0.358936	151.491	0.940037	Spike
3/2/2024 19:48	1.10159		0.359775	151.461	0.940037	Spike
3/2/2024 19:48	1.02906		0.360803	151.437	0.940252	Spike
3/2/2024 19:49	1.00181		0.361349	151.371	0.939822	Spike
3/2/2024 19:49	0.980986		0.362915	151.342	0.939607	Spike
3/2/2024 19:50	0.997368		0.362735	151.2	0.939822	Spike
3/2/2024 19:50	0.981734		0.36335	151.218	0.940252	Spike
3/2/2024 19:51	0.978287		0.362725	151.302	0.939822	
3/2/2024 19:51	0.971624		0.362598	151.399	0.940252	
3/2/2024 19:52	1.052		0.36288	151.324	0.940037	
3/2/2024 19:52	1.12801		0.366852	151.295	0.940037	
3/2/2024 19:53	1.12914		0.359612	151.153	0.939822	
3/2/2024 19:53	1.12203		0.364536	151.142	0.939607	
3/2/2024 19:54	1.11816		0.361345	151.162	0.939822	
3/2/2024 19:54	1.10272		0.360857	151.235	0.939822	
3/2/2024 19:55	1.09789		0.36294	151.318	0.939822	
3/2/2024 19:55	1.10347		0.361572	151.259	0.940037	
3/2/2024 19:56	1.098		0.358924	151.182	0.940252	
3/2/2024 19:56	0.748383		0.175256	151.176	0.939822	
3/2/2024 19:57	0.374185		0.0130983	151.134	0.939607	
3/2/2024 19:57	0.339901		0.0129642	150.973	0.940037	
3/2/2024 19:58	0.329489		0.012888	150.979	0.940037	Native
3/2/2024 19:58	0.299281		0.0133225	151.117	0.939822	Native
3/2/2024 19:59	0.327838		0.013491	151.208	0.940037	Native
3/2/2024 19:59	0.307584		0.012471	151.209	0.940252	Native
3/2/2024 20:00	0.294414		0.0178799	151.168	0.940037	Native
3/2/2024 20:00	0.333984		0.0132881	151.12	0.939607	Native
3/2/2024 20:01	0.357374		0.0124187	151.125	0.939607	
3/2/2024 20:01	0.362914		0.0140118	151.036	0.939822	
3/2/2024 20:02	0.360101		0.0141381	150.996	0.940252	
3/2/2024 20:02	0.368958		0.019707	151.062	0.940037	
3/2/2024 20:03	0.367756		0.0180161	151.211	0.940037	
3/2/2024 20:03	0.222303		0.0112576	151.282	0.946702	
3/2/2024 20:04	0.0502988		0.00463267	151.185	0.956807	
3/2/2024 20:04	0.0337417		0.00622734	151.066	0.956807	
3/2/2024 20:05	0.0371305		0.00617865	151.049	0.957022	
3/2/2024 20:05	0.0420734		0.00555854	151.06	0.957022	
3/2/2024 20:06	0.0413301		0.00620668	151.144	0.957022	
3/2/2024 20:06	0.0229284		0.00481182	151.228	0.957022	

Timestamp	Hydrochloric acid	Sulfur hexafluoride	Temp(C)	Press(atm)
3/4/2024 20:28	-0.0407084	0.00764214	151.763	0.982606
3/4/2024 20:28	-0.00466625	0.00872433	151.806	0.973577
3/4/2024 20:29	-0.0310847	0.0105004	151.8	0.960677
3/4/2024 20:29	-0.0193662	0.00790668	151.766	0.956807
3/4/2024 20:30	-0.00192094	0.00479144	151.732	0.950787
3/4/2024 20:30	-0.0192768	0.0143666	151.646	0.939607
3/4/2024 20:31	-0.00463722	0.0030889	151.696	0.933158
3/4/2024 20:31	0.005708	0.00651672	151.845	0.931008
3/4/2024 20:32	-0.0102415	0.00100211	151.828	0.931008
3/4/2024 20:32	-0.021701	0.00332457	151.701	0.931008
3/4/2024 20:33	-0.0216326	0.00846895	151.633	0.931008
3/4/2024 20:33	-0.00732446	0.00829474	151.556	0.931008
3/4/2024 20:34	-0.0160255	0.0104405	151.485	0.931008
3/4/2024 20:34	-0.00259702	0.00836975	151.469	0.931008
3/4/2024 20:35	-0.00731886	0.00622263	151.436	0.930793
3/4/2024 20:35	-0.0120276	0.00876631	151.338	0.930363
3/4/2024 20:36	-0.00840044	0.0064541	151.357	0.930363
3/4/2024 20:36	-0.0271104	0.00691707	151.417	0.930793
3/4/2024 20:37	-0.0115021	0.00607303	151.387	0.931008
3/4/2024 20:37	-0.0176194	0.00307468	151.387	0.930578
3/4/2024 20:38	-0.00631719	0.00677973	151.37	0.930578
3/4/2024 20:38	0.00412611	0.00738172	151.347	0.930793
3/4/2024 20:39	-0.0156594	0.0069733	151.276	0.930578
3/4/2024 20:39	-0.0015145	0.00625545	151.121	0.931008
3/4/2024 20:40	-0.0330731	0.00510498	151.091	0.931008
3/4/2024 20:40	-0.0135562	0.00813524	151.151	0.931008
3/4/2024 20:41	-0.00819551	0.0106803	151.151	0.946272
3/4/2024 20:41	0.00129489	0.00695677	151.122	0.977446
3/4/2024 20:42	-0.0147503	0.00681718	151.233	0.982821
3/4/2024 20:42	-0.00776317	0.00658312	151.474	0.983036

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
3/4/2024 20:43	-0.0145805		0.00648563	151.553	0.983036	
3/4/2024 20:43	0.000836595		0.00926015	151.465	0.975727	
3/4/2024 20:44	-0.0264501		0.0159542	151.399	0.965407	
3/4/2024 20:44	-0.0162594		0.0157432	151.429	0.965407	
3/4/2024 20:45	-0.0220956		0.0162934	151.399	0.965407	
3/4/2024 20:45	-0.032171		0.0154575	151.328	0.965407	Native
3/4/2024 20:46	-0.00553443		0.0154855	151.168	0.965407	Native
3/4/2024 20:46	0.000375757		0.014432	151.24	0.965407	Native
3/4/2024 20:47	-0.0239953		0.015789	151.679	0.965192	Native
3/4/2024 20:47	-0.0260801		0.0144722	152.159	0.964547	Native
3/4/2024 20:48	-0.0367318		0.0156231	152.573	0.963687	Native
3/4/2024 20:48	-0.0208561		0.0139031	152.713	0.962827	Native
3/4/2024 20:49	-0.0102208		0.0140938	152.759	0.963257	
3/4/2024 20:49	-0.005016		0.0154604	152.785	0.963902	
3/4/2024 20:50	-8.04E-05		0.0155607	152.877	0.963902	
3/4/2024 20:50	-0.00363016		0.0141122	152.889	0.963472	
3/4/2024 20:51	0.0211383		0.0146722	152.753	0.962827	
3/4/2024 20:51	-0.0163683		0.0176893	152.732	0.963042	
3/4/2024 20:52	-0.015256		0.0181541	152.861	0.961537	
3/4/2024 20:52	-0.00446716		0.0156423	152.914	0.961107	
3/4/2024 20:53	0.56842		2.1011	152.982	0.964762	
3/4/2024 20:53	2.44483		2.13038	152.951	0.964977	
3/4/2024 20:54	3.43043		2.09278	153.004	0.964762	
3/4/2024 20:54	3.84193		2.05176	152.972	0.964332	
3/4/2024 20:55	4.03522		2.02483	152.876	0.964117	
3/4/2024 20:55	4.13929		1.99794	152.802	0.964762	
3/4/2024 20:56	4.20769		1.97533	152.749	0.964977	
3/4/2024 20:56	4.31137		1.9576	152.714	0.964547	
3/4/2024 20:57	4.38628		1.94503	152.747	0.964762	
3/4/2024 20:57	4.37522		1.92352	152.797	0.965192	
3/4/2024 20:58	4.3319		1.88906	152.856	0.964977	
3/4/2024 20:58	4.3117		1.86216	152.783	0.964117	
3/4/2024 20:59	2.167		0.555153	152.771	0.963687	
3/4/2024 20:59	0.554551		0.017259	152.778	0.964117	
3/4/2024 21:00	0.516485		0.165043	152.837	0.964332	
3/4/2024 21:00	4.12835		2.02585	152.871	0.964117	
3/4/2024 21:01	3.82244		1.67982	152.757	0.964762	
3/4/2024 21:01	1.88949		0.682984	152.671	0.965407	
3/4/2024 21:02	1.70498		0.718971	152.551	0.964977	
3/4/2024 21:02	1.36073		0.524074	152.465	0.956592	
3/4/2024 21:03	1.00029		0.386448	152.616	0.948422	
3/4/2024 21:03	0.969933		0.384811	152.644	0.949067	Spike
3/4/2024 21:04	0.958219		0.382749	152.506	0.949067	Spike
3/4/2024 21:04	0.940801		0.380015	152.353	0.949282	Spike
3/4/2024 21:05	0.93356		0.381102	152.096	0.949497	Spike
3/4/2024 21:05	0.965134		0.377643	151.974	0.949712	Spike
3/4/2024 21:06	0.928312		0.377534	151.872	0.949927	Spike
3/4/2024 21:06	0.929034		0.374884	151.792	0.949712	Spike
3/4/2024 21:07	0.924671		0.375563	151.763	0.949282	Spike
3/4/2024 21:07	0.904115		0.375268	151.742	0.949712	
3/4/2024 21:08	0.905215		0.374498	151.651	0.949712	
3/4/2024 21:08	0.611832		0.180245	151.558	0.949282	
3/4/2024 21:09	0.212254		0.0138697	151.552	0.949067	
3/4/2024 21:09	0.161952		0.0115017	151.552	0.949712	
3/4/2024 21:10	0.126482		0.0128345	151.522	0.949497	
3/4/2024 21:10	0.108196		0.0148988	151.463	0.948852	
3/4/2024 21:11	0.113112		0.0133034	151.284	0.948852	
3/4/2024 21:11	0.119149		0.016338	151.104	0.955087	
3/4/2024 21:12	0.114545		0.0169889	150.955	0.963042	
3/4/2024 21:12	0.13002		0.014792	151.015	0.962397	
3/4/2024 21:13	0.108301		0.0156464	151.134	0.958097	
3/4/2024 21:13	0.0838494		0.0160588	151.224	0.956807	
3/4/2024 21:14	0.0881867		0.0161373	151.224	0.956807	
3/4/2024 21:14	0.059935		0.0140889	151.224	0.956807	
3/4/2024 21:15	0.0716337		0.0146787	151.254	0.956807	
3/4/2024 21:15	0.103249		0.017941	151.224	0.956807	
3/4/2024 21:16	0.0698961		0.0212996	151.224	0.956807	
3/4/2024 21:16	0.0770973		0.0206199	151.313	0.956807	
3/4/2024 21:17	0.0749554		0.0216056	151.313	0.956807	
3/4/2024 21:17	0.0567094		0.0197639	151.015	0.956807	
3/4/2024 21:18	0.0634288		0.0187173	150.687	0.956807	
3/4/2024 21:18	0.0683077		0.0183603	150.508	0.956807	

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)
3/4/2024 21:19	0.0504301		0.0193079	150.404	0.956807
3/4/2024 21:19	0.0560031		0.0177233	150.495	0.956807
3/4/2024 21:20	0.025636		0.0188944	150.463	0.956807
3/4/2024 21:20	0.0455332		0.0190856	150.318	0.956807
3/4/2024 21:21	0.0673682		0.0171188	150.189	0.956807
3/4/2024 21:21	0.0521914		0.017281	150.047	0.956807
3/4/2024 21:22	0.0372555		0.0214382	149.964	0.956807
3/4/2024 21:22	0.0608597		0.0196531	149.94	0.956807
3/4/2024 21:23	0.0854029		0.0161284	149.895	0.956592
3/4/2024 21:23	0.057526		0.0168712	150.015	0.956592
3/4/2024 21:24	0.0618631		0.0193295	150.072	0.956807
3/4/2024 21:24	0.0471357		0.0183779	150.099	0.956807
3/4/2024 21:25	0.0538543		0.0174481	150.226	0.956807
3/4/2024 21:25	0.0440033		0.0179254	150.413	0.956807
3/4/2024 21:26	0.0603586		0.0152626	150.574	0.960247
3/4/2024 21:26	0.0235544		0.00745362	150.621	0.970352
3/4/2024 21:27	0.0322437		0.00612462	150.743	0.973792
3/4/2024 21:27	0.0135461		0.00635644	150.938	0.974007
3/4/2024 21:28	0.0236129		0.00616804	150.943	0.974007
3/4/2024 21:28	0.0204721		0.041231	150.905	0.974007
3/4/2024 21:29	0.0289816		0.00695501	150.743	0.974007
3/4/2024 21:29	0.00833135		0.00697204	150.592	0.974007
3/4/2024 21:30	0.0109708		0.00709657	150.647	0.974007
3/4/2024 21:30	-0.00146061		0.00783496	150.624	0.974007
3/4/2024 21:31	0.0161334		0.00862261	150.481	0.974007
3/4/2024 21:31	0.0139857		0.0055006	150.274	0.974007
3/4/2024 21:32	0.0145121		0.00668413	150.206	0.974007
3/4/2024 21:32	-0.00478741		0.00764956	150.249	0.973792
3/4/2024 21:33	-0.000115573		0.00786357	150.247	0.973577
3/4/2024 21:33	0.0222982		0.00650337	150.204	0.973792

Timestamp	Hydrofluoric Acid	Sulfur hexafluoride	Temp(C)	Press(atm)
3/6/2024 15:29	1.4485	0.00479375	151.199	0.977948
3/6/2024 15:30	1.31546	0.0054081	151.208	0.977876
3/6/2024 15:30	1.22698	0.00584998	151.208	0.978091
3/6/2024 15:31	1.13065	0.0063976	151.243	0.977661
3/6/2024 15:31	1.07153	0.00591477	151.303	0.977446
3/6/2024 15:32	1.01307	0.00560915	151.243	0.978306
3/6/2024 15:32	0.976832	0.00742385	151.238	0.978091
3/6/2024 15:33	0.851402	0.00698538	151.16	0.972287
3/6/2024 15:33	0.441619	0.00770416	151.13	0.954227
3/6/2024 15:34	0.442104	0.00936143	151.201	0.948207
3/6/2024 15:34	0.417482	0.00648556	151.276	0.948207
3/6/2024 15:35	0.386972	0.00607261	151.296	0.948207
3/6/2024 15:35	0.349629	0.0071337	151.293	0.948207
3/6/2024 15:36	0.338939	0.00992825	151.219	0.948207
3/6/2024 15:36	0.325304	0.00522358	151.207	0.948207
3/6/2024 15:37	0.302459	0.00812699	151.087	0.948207
3/6/2024 15:37	0.275587	0.00820588	151.141	0.948207
3/6/2024 15:38	0.310405	0.00632686	151.315	0.948207
3/6/2024 15:38	0.231454	0.00178998	151.386	0.951002
3/6/2024 15:39	0.162796	0.00434063	151.416	0.957452
3/6/2024 15:39	0.181783	0.00176807	151.356	0.958957
3/6/2024 15:40	0.184011	0.00622262	151.266	0.958957
3/6/2024 15:40	0.16529	0.00548515	151.236	0.958527
3/6/2024 15:41	0.175006	0.00641959	151.296	0.958312
3/6/2024 15:41	0.144647	0.00426279	151.475	0.958312
3/6/2024 15:42	0.129711	0.00411363	151.565	0.958527
3/6/2024 15:42	0.161898	0.00534335	151.624	0.958742
3/6/2024 15:43	0.134451	0.00548285	151.654	0.958957
3/6/2024 15:43	0.143788	0.00398596	151.565	0.958957
3/6/2024 15:44	0.0746618	0.00651212	151.475	0.958957
3/6/2024 15:44	0.129279	0.0035504	151.326	0.958742
3/6/2024 15:45	0.192957	0.00392084	151.177	0.978091
3/6/2024 15:45	0.237024	0.0029617	151.111	0.991206
3/6/2024 15:46	0.22375	0.00533716	151.177	0.991421
3/6/2024 15:46	0.278983	0.00485481	151.207	0.991421
3/6/2024 15:47	0.244069	0.00419338	151.236	0.987766
3/6/2024 15:47	0.389421	0.00545135	151.261	0.981532
3/6/2024 15:48	0.345178	0.00616855	151.266	0.980457
3/6/2024 15:48	0.352119	0.00639067	151.278	0.980027

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
3/6/2024 15:49		0.46454	0.006264	151.426	0.980026	
3/6/2024 15:49		0.389953	0.00663755	151.512	0.980242	
3/6/2024 15:50		0.358727	0.00617765	151.467	0.980672	Native
3/6/2024 15:50		0.379023	0.00595135	151.374	0.980672	Native
3/6/2024 15:51		0.403084	0.00627261	151.369	0.980457	Native
3/6/2024 15:51		0.355421	0.00644572	151.345	0.980457	Native
3/6/2024 15:52		0.370099	0.00711374	151.225	0.980457	Native
3/6/2024 15:52		0.373575	0.00633476	151.195	0.980457	Native
3/6/2024 15:53		0.350253	0.133318	151.345	0.981532	
3/6/2024 15:53		0.56614	4.30509	151.404	0.983251	
3/6/2024 15:54		2.64486	4.59104	151.374	0.983896	
3/6/2024 15:54		4.34364	4.58073	151.434	0.983681	
3/6/2024 15:55		5.49098	4.59006	151.477	0.983896	
3/6/2024 15:55		6.17475	4.59248	151.455	0.983466	
3/6/2024 15:56		6.6635	4.58807	151.482	0.983466	
3/6/2024 15:56		7.02045	4.59815	151.707	0.983466	
3/6/2024 15:57		7.31317	4.59673	152.042	0.983681	
3/6/2024 15:57		7.54754	4.59424	152.139	0.983251	
3/6/2024 15:58		7.79142	4.60281	151.991	0.983466	
3/6/2024 15:58		7.91282	4.60355	151.885	0.983251	
3/6/2024 15:59		8.03938	4.61275	151.755	0.982821	
3/6/2024 15:59		12.2283	3.53773	151.67	0.981961	
3/6/2024 16:00		9.62537	3.19942	151.714	0.980671	
3/6/2024 16:00		8.29135	3.24421	151.896	0.981102	
3/6/2024 16:01		8.09052	2.25314	151.868	0.980887	
3/6/2024 16:01		5.17608	0.380797	151.846	0.980887	
3/6/2024 16:02		3.76313	0.36924	151.799	0.981316	
3/6/2024 16:02		3.10272	0.368235	151.681	0.980887	
3/6/2024 16:03		2.70513	0.369159	151.563	0.980457	
3/6/2024 16:03		2.47711	0.36407	151.498	0.980672	
3/6/2024 16:04		2.23996	0.364207	151.562	0.980672	
3/6/2024 16:04		2.01609	0.365652	151.62	0.980887	
3/6/2024 16:05		1.90145	0.365988	151.632	0.981102	
3/6/2024 16:05		1.81503	0.365033	151.566	0.981317	
3/6/2024 16:06		1.76056	0.363991	151.488	0.980887	
3/6/2024 16:06		1.70383	0.363519	151.393	0.981102	
3/6/2024 16:07		1.69787	0.364104	151.387	0.981102	
3/6/2024 16:07		1.61483	0.364218	151.357	0.981532	
3/6/2024 16:08		1.55273	0.364647	151.454	0.980887	
3/6/2024 16:08		1.48604	0.365398	151.575	0.980887	
3/6/2024 16:09		1.46194	0.364756	151.551	0.980672	
3/6/2024 16:09		1.4024	0.366473	151.533	0.981317	
3/6/2024 16:10		1.39631	0.365877	151.435	0.981102	
3/6/2024 16:10		1.38279	0.363923	151.425	0.981317	
3/6/2024 16:11		1.35418	0.367024	151.479	0.981317	
3/6/2024 16:11		1.35691	0.36542	151.576	0.980672	
3/6/2024 16:12		1.27267	0.366077	151.599	0.980887	
3/6/2024 16:12		1.23907	0.366061	151.497	0.981102	
3/6/2024 16:13		1.23304	0.367183	151.491	0.980672	
3/6/2024 16:13		1.22496	0.365575	151.461	0.980457	
3/6/2024 16:14		1.10223	0.260787	151.401	0.973577	
3/6/2024 16:14		0.923933	0.206542	151.48	0.966482	
3/6/2024 16:15		0.856867	0.206106	151.461	0.966267	
3/6/2024 16:15		0.799919	0.20769	151.48	0.966052	
3/6/2024 16:16		0.796273	0.206685	151.474	0.966052	
3/6/2024 16:16		0.758248	0.203525	151.45	0.966267	Spike
3/6/2024 16:17		0.741212	0.205349	151.349	0.966482	Spike
3/6/2024 16:17		0.745552	0.203253	151.212	0.965837	Spike
3/6/2024 16:18		0.71266	0.206161	151.117	0.965837	Spike
3/6/2024 16:18		0.706904	0.206002	151.104	0.966482	Spike
3/6/2024 16:19		0.701682	0.207709	151.308	0.966267	
3/6/2024 16:19		0.696297	0.207354	151.409	0.966482	
3/6/2024 16:20		0.667522	0.208829	151.396	0.966482	
3/6/2024 16:20		0.676282	0.206559	151.306	0.966697	
3/6/2024 16:21		0.65329	0.209671	151.306	0.965622	
3/6/2024 16:21		0.603567	0.0804522	151.271	0.966482	
3/6/2024 16:22		0.488726	0.00615211	151.36	0.966482	
3/6/2024 16:22		0.463669	0.00697289	151.431	0.966052	
3/6/2024 16:23		0.409824	0.00580028	151.461	0.965622	
3/6/2024 16:23		0.376357	0.00762042	151.431	0.965837	
3/6/2024 16:24		0.322555	0.00614904	151.342	0.965837	
3/6/2024 16:24		0.332757	0.00601964	151.276	0.966267	

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)
3/6/2024 16:25		0.331656	0.00538547	151.306	0.965622
3/6/2024 16:25		0.302516	0.00505916	151.252	0.966267
3/6/2024 16:26		0.337941	0.00596872	151.222	0.966482
3/6/2024 16:26		0.311938	0.00695862	151.312	0.966482
3/6/2024 16:27		0.264501	0.00605377	151.431	0.966697
3/6/2024 16:27		0.295699	0.00593649	151.372	0.966052
3/6/2024 16:28		0.309151	0.00695719	151.258	0.965837
3/6/2024 16:28		0.247349	0.00467349	151.15	0.966267
3/6/2024 16:29		0.256058	0.00687873	151.053	0.966267
3/6/2024 16:29		0.214186	0.00495236	151.19	0.972072
3/6/2024 16:30		0.0923948	0.00571784	151.41	0.970782
3/6/2024 16:30		0.118794	0.00412936	151.462	0.964332
3/6/2024 16:31		0.0951091	0.00333619	151.46	0.963902
3/6/2024 16:31		0.107033	0.00582337	151.369	0.963902
3/6/2024 16:32		0.0969391	0.00405736	151.357	0.964332
3/6/2024 16:32		0.0922562	0.00202618	151.329	0.964762

Timestamp	Hydrochloric acid	Sulfur hexafluoride	Temp(C)	Press(atm)	
3/6/2024 21:56	0.00830379	0.0011512	151.799	0.984756	
3/6/2024 21:57	0.0825598	0.000107882	151.705	0.978306	
3/6/2024 21:57	0.0682929	0.000468262	151.675	0.967987	
3/6/2024 21:58	0.00972007	0.000390347	151.638	0.963472	
3/6/2024 21:58	0.0159989	0.000273532	151.609	0.963687	
3/6/2024 21:59	0.0240619	0.00128196	151.638	0.963902	
3/6/2024 21:59	0.0122479	0.000286871	151.602	0.964117	Native
3/6/2024 22:00	0.0135561	0.000348465	151.572	0.964332	Native
3/6/2024 22:00	0.0161149	-0.00100791	151.632	0.964547	Native
3/6/2024 22:01	0.014122	-6.30E-05	151.625	0.964977	
3/6/2024 22:01	0.0313382	0.329839	151.612	0.965622	
3/6/2024 22:02	0.0203912	0.000783512	151.706	0.964547	
3/6/2024 22:02	0.00112133	-0.000184065	151.783	0.965192	
3/6/2024 22:03	6.29448	3.84125	151.813	0.968417	
3/6/2024 22:03	9.69994	4.21726	151.694	0.969922	
3/6/2024 22:04	4.90395	1.31121	151.634	0.967127	
3/6/2024 22:04	0.469598	0.00369813	151.694	0.964762	
3/6/2024 22:05	0.424866	0.191429	151.7	0.964332	
3/6/2024 22:05	0.584208	0.30657	151.759	0.964762	
3/6/2024 22:06	0.580516	0.304415	151.789	0.964547	
3/6/2024 22:06	0.595814	0.303364	151.789	0.964762	
3/6/2024 22:07	0.565976	0.302938	151.789	0.965192	
3/6/2024 22:08	0.592926	0.298683	151.729	0.964762	
3/6/2024 22:08	0.590804	0.29915	151.789	0.964977	
3/6/2024 22:08	0.595085	0.29987	151.843	0.964977	
3/6/2024 22:09	0.594083	0.296131	151.873	0.965192	
3/6/2024 22:09	0.605989	0.297616	151.843	0.965192	
3/6/2024 22:10	0.60703	0.293566	151.843	0.965407	
3/6/2024 22:11	0.612056	0.29421	151.813	0.965192	
3/6/2024 22:11	0.629772	0.293141	151.783	0.964762	
3/6/2024 22:11	0.631841	0.293236	151.843	0.964332	
3/6/2024 22:12	0.593943	0.292159	151.843	0.964547	
3/6/2024 22:12	0.611282	0.293399	151.783	0.964977	
3/6/2024 22:13	0.631598	0.293057	151.64	0.965192	
3/6/2024 22:13	0.616343	0.290492	151.55	0.964762	
3/6/2024 22:14	0.627168	0.288917	151.55	0.964547	
3/6/2024 22:14	0.612616	0.288381	151.579	0.964977	
3/6/2024 22:15	0.636145	0.287251	151.585	0.964332	
3/6/2024 22:15	0.625392	0.286727	151.585	0.964547	
3/6/2024 22:16	0.63746	0.286238	151.585	0.964977	
3/6/2024 22:16	0.628477	0.288177	151.567	0.964332	
3/6/2024 22:17	0.627843	0.28841	151.632	0.964547	
3/6/2024 22:18	0.619504	0.28715	151.662	0.964977	
3/6/2024 22:18	0.617015	0.287919	151.632	0.964977	
3/6/2024 22:18	0.633504	0.285256	151.722	0.964977	
3/6/2024 22:19	0.643493	0.284254	151.692	0.965192	
3/6/2024 22:19	0.650434	0.28536	151.692	0.964977	
3/6/2024 22:20	0.645607	0.284517	151.722	0.964977	
3/6/2024 22:20	0.632141	0.284592	151.662	0.964762	
3/6/2024 22:21	0.634336	0.285168	151.602	0.964547	Spike
3/6/2024 22:21	0.639987	0.283622	151.596	0.964762	Spike
3/6/2024 22:22	0.645519	0.284874	151.626	0.964762	Spike
3/6/2024 22:22	0.646741	0.283077	151.751	0.964117	Spike

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)
3/6/2024 22:23	0.636603		0.284172	151.716	0.964547
3/6/2024 22:23	0.624124		0.274279	151.776	0.965192
3/6/2024 22:24	0.648077		0.25106	151.722	0.965622
3/6/2024 22:24	0.171593		1.98E-05	151.722	0.964762
3/6/2024 22:25	0.119983		0.000971219	151.692	0.964547
3/6/2024 22:26	0.084873		0.000874696	151.632	0.964547
3/6/2024 22:26	0.0831653		-0.000646206	151.632	0.964762

Timestamp	Hydrofluoric Acid	Sulfur hexafluoride	Temp(C)	Press(atm)	
3/6/2024 22:28	-0.250636	-0.002	151.893	0.950664	
3/6/2024 22:28	-0.266636	0.001	151.925	0.942187	
3/6/2024 22:29	-0.266941	0.003	151.96	0.940037	
3/6/2024 22:29	-0.228967	0.000	151.811	0.950357	
3/6/2024 22:30	-0.24016	0.000	151.692	0.965192	
3/6/2024 22:30	-0.231753	0.001	151.602	0.965192	
3/6/2024 22:31	-0.244664	0.001	151.607	0.964977	
3/6/2024 22:31	-0.259092	0.001	151.683	0.964762	
3/6/2024 22:32	-0.211929	0.001	151.706	0.964547	
3/6/2024 22:32	-0.220266	-0.001	151.658	0.964117	
3/6/2024 22:33	-0.0783113	0.873	151.693	0.970567	
3/6/2024 22:33	3.29133	4.606	151.716	0.981746	
3/6/2024 22:34	5.65665	4.581	151.685	0.983036	
3/6/2024 22:34	6.78177	4.590	151.656	0.983036	
3/6/2024 22:35	9.22817	2.506	151.596	0.974437	
3/6/2024 22:35	3.66863	0.860	151.566	0.965192	
3/6/2024 22:36	2.49451	0.869	151.572	0.965192	
3/6/2024 22:36	1.71177	0.630	151.626	0.957667	
3/6/2024 22:37	1.23993	0.535	151.757	0.948207	
3/6/2024 22:37	0.994752	0.452	151.738	0.938103	
3/6/2024 22:38	0.821215	0.406	151.774	0.922623	
3/6/2024 22:38	0.765404	0.406	151.785	0.922408	
3/6/2024 22:39	0.74823	0.405	151.713	0.922408	
3/6/2024 22:39	0.739088	0.406	151.564	0.922408	
3/6/2024 22:40	0.718198	0.408	151.534	0.922408	
3/6/2024 22:40	0.686809	0.406	151.534	0.922408	
3/6/2024 22:41	0.686498	0.410	151.534	0.922408	
3/6/2024 22:41	0.722239	0.409	151.534	0.922408	
3/6/2024 22:42	0.730556	0.408	151.534	0.922408	
3/6/2024 22:42	0.705379	0.406	151.534	0.922623	
3/6/2024 22:43	0.700357	0.407	151.594	0.922408	
3/6/2024 22:43	0.716513	0.408	151.624	0.922408	
3/6/2024 22:44	0.685828	0.409	151.594	0.922408	
3/6/2024 22:44	0.720133	0.409	151.564	0.922408	
3/6/2024 22:45	0.245948	0.097	151.594	0.922408	
3/6/2024 22:45	-0.00161133	0.006	151.653	0.933373	
3/6/2024 22:46	0.118968	0.019	151.683	0.960462	
3/6/2024 22:46	0.0630866	0.027	151.713	0.967342	
3/6/2024 22:47	0.0747163	0.027	151.743	0.967127	
3/6/2024 22:47	0.112921	0.218	151.833	0.966697	
3/6/2024 22:48	0.35132	0.443	151.833	0.967127	
3/6/2024 22:48	0.491138	0.436	151.833	0.964977	
3/6/2024 22:49	0.37971	0.306	151.922	0.958742	Spike
3/6/2024 22:49	0.412115	0.307	152.012	0.956807	Spike
3/6/2024 22:50	0.418014	0.308	151.952	0.956807	Spike
3/6/2024 22:50	0.382433	0.305	151.892	0.956807	
3/6/2024 22:51	0.403289	0.303	151.862	0.956807	
3/6/2024 22:51	0.436779	0.303	151.833	0.956807	
3/6/2024 22:52	0.404048	0.304	151.773	0.956807	
3/6/2024 22:52	0.403855	0.303	151.743	0.956807	
3/6/2024 22:53	0.433984	0.302	151.743	0.956807	
3/6/2024 22:53	0.418886	0.302	151.683	0.956807	
3/6/2024 22:54	0.4241	0.302	151.594	0.956807	
3/6/2024 22:54	0.436048	0.302	151.564	0.956807	
3/6/2024 22:55	0.381602	0.302	151.594	0.956807	
3/6/2024 22:55	0.443602	0.302	151.534	0.956807	
3/6/2024 22:56	0.409491	0.303	151.564	0.956807	
3/6/2024 22:56	0.489971	0.351	151.594	0.956807	
3/6/2024 22:57	0.206301	0.053	151.594	0.956807	
3/6/2024 22:57	0.0215394	0.001	151.594	0.956807	

FTIR Spike Raw Data

Spectrum	HCl	HF 150C	SF6 150C	Temp (C)	Pressure (Atm)	
3/6/2024 22:58		-0.0600134	0.001	151.683	0.956807	
3/6/2024 22:58		-0.0909543	0.000	151.683	0.956807	
3/6/2024 22:59		-0.104526	0.001	151.773	0.956807	
3/6/2024 22:59		-0.096212	0.000	151.803	0.956807	
3/6/2024 23:00		-0.153444	0.001	151.833	0.956807	Native
3/6/2024 23:00		-0.128503	0.002	151.773	0.956807	Native
3/6/2024 23:01		-0.149882	0.001	151.713	0.956807	Native
3/6/2024 23:01		-0.150837	0.000	151.803	0.956807	
3/6/2024 23:02		-0.15689	0.001	151.862	0.956807	
3/6/2024 23:02		-0.198387	-0.001	151.833	0.956807	
3/6/2024 23:03		-0.160951	0.000	151.803	0.956807	
3/6/2024 23:03		-0.123389	0.000	151.862	0.956807	
3/6/2024 23:04		-0.121837	0.001	151.892	0.966482	
3/6/2024 23:04		-0.144757	0.001	151.833	0.976371	
3/6/2024 23:05		-0.0995259	0.001	151.803	0.976371	
3/6/2024 23:05		-0.100483	0.001	151.827	0.976371	
3/6/2024 23:06		-0.124053	0.000	151.905	0.976586	
3/6/2024 23:06		-0.128545	0.001	151.959	0.977661	
3/6/2024 23:07		-0.10375	0.000	151.936	0.978951	
3/6/2024 23:07		-0.100017	0.000	151.865	0.979811	