Air Emissions Compliance Test Report

Completed for:

Gainesville Renewable Energy Center Woody Biomass Power Plant Biomass-fueled BFB Boiler (EU-002)

Test Report Number: 20-11542-02-001

Test Completed: March 22 - 24, 2017

1183 East Overdrive Circle • Hernando, FL 34442 • (352) 489-4337 • Fax: (352) 489-4801

Air Emissions Compliance
Test Report

Gainesville Renewable Energy Center
Woody Biomass Power Plant
Woody Biomass-fueled BFB Boiler (EU-002)
Gainesville, Florida

C.E.M. Solutions Project No.: 11542

Testing Completed: March 22 - 24, 2017

C.E.M. Solutions, Inc. Report Number: 20-11542-01-001

C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, Florida 34442
Phone: 352-489-4337

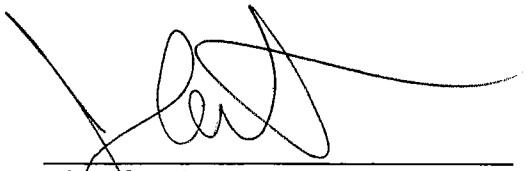
Declaration of Conformance to ASTM D 7036-04: Standard Practice for Competence of Air Emission Testing Bodies

C.E.M. Solutions operates in conformance with the requirements of ASTM D 7036-04: Standard Practice for Competence of Air Emission Testing Bodies through the use of a quality system which incorporates a quality manual, internal audit system, systematic training of personnel and rigorous review of test methods and operating procedures. C.E.M. Solutions Inc. collects performance data related to the quality system and this data is available upon request.

Joe Conti
Quality Assurance Manager
C.E.M. Solutions

Statement of Validity

I hereby certify the information and data provided in this emissions test report for tests performed at the Gainesville Renewable Energy Center's Woody Biomass Power Plant conducted on March 22 through 24, 2017 are complete and accurate to the best of my knowledge.



Joe Conti
Quality Assurance Manager,
C.E.M. Solutions, Inc.

Project Background

Name of Source Owner:	Gainesville Renewable Energy Center
Address of Owner:	11201 NW Hwy 441 Gainesville, FL 32653
Source Identification:	Facility ID: 0010131 Woody Biomass-fueled BFB Boiler Emissions Unit: 002
Location of Source:	Alachua County, Florida
Type of Operation:	SIC Code 4911
Tests Performed:	Method 1 – Traverse Points Method 2 – Stack Gas Volumetric Flow and Velocity Method 3A – Determination of O_2 and CO_2 Method 3B – Determination of O_2 and CO_2 Method 4 – Stack Gas Moisture Content Method 5 – Particulate Matter Conditional Test Method 013– Sulfuric Acid Mist Method 9 – Determination of Opacity of Emissions Method 19 – Determination of Emission Rates Method 25A - Determination of VOC Method 26A - Determination of HCl and HF Conditional Test Method 027 –Ammonia Slip Determination Method 30B – Determination of Mercury Method 201A – Determination of Particulate Matter 2.5
Test Supervisor (QSTI):	Charles Horton
Test Technicians:	Matthew Brock Thomas Cawiezell Alexander Lagunas
Date(s) Tests Conducted:	March 22 through 24, 2017:
Site Test Coordinator:	Ali Leaphart, Plant Engineer
County Regulatory Observers:	Bill Barnard and Justin Knoll of AMEC on behalf of Alachua County Environmental Protection Department (ACEPD)

Table of Contents

1.0 Introduction 1
1.1 Test Deviations or Anomalies 1
2.0 Facility Description 3
2.1 Process Equipment 3
2.2 Regulatory Requirements 3
3.0 Test Program/Operating Conditions 4
4.0 Test Methods 5
4.1 Sample and Velocity Traverse Points 5
4.1.1 Gaseous Traverse Points and Run Durations 6
4.1.2 Wet Chemistry Traverse Points and Run Durations 6
4.2 Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tubes) 6
4.2.1 Method 2 Quality Assurance/Quality Control Procedures 6
4.3 Moisture Content Determination 7
4.3.1 Method 4 Quality Assurance/Quality Control Procedures 7
4.4 Particulate Matter Determination 7
4.4.1 Sample Recovery and Analysis 8
4.4.2 Quality Assurance/Quality Control Procedures 8
4.5 Sulfuric Acid Mist (CTM-013) 8
4.5.1 Sample Recovery and Analysis 9
4.5.2 Quality Assurance/Quality Control Procedures 9
4.6 Hydrogen chloride (HCl) and Hydrogen Fluoride (HF) 9
4.6.1 Quality Assurance/Quality Control Procedures 10
4.7 Ammonia Slip Test 10
4.7.1 Quality Assurance/Quality Control Procedures 11
4.8 Mercury Determination 11
4.8.1 Sample Recovery and Analysis 12
4.8.2 Sample Recovery and Analysis 12
4.8.2 Sample Recovery and Analysis 12
4.9 Determination of PCDD’s and PCDF’s 13
4.9.1 Method 23 Quality Assurance/Quality Control Procedures 13
4.10 VOC Determination 14
4.11 Visible Emission Determination 15
5.0 Test Results 16

List of Tables

Table 1: Summary of Test Results....2
Table 2: Emissions Limitations and Standards....3
Table 3: Test Dates and Unit Load....4
Table 4: Summary of EPA Reference Methods....5
Table 5: Compliance Test Summary....16

Appendices

Appendix A: Facility Operating Data
Appendix B: Mathematical Equations
Appendix C: Sample Location Diagram/Traverse Points
Appendix D: Reference Method QA/QC
Appendix D-1: Instrumental Method QA/QC
Appendix D-2: Wet Chemistry Method QA/QC
Appendix E: Reference Method Data
- Appendix E-1: Instrumental Methods Test Data
- Appendix E-2: Particulate Matter Test Data
- Appendix E-3: Sulfuric Acid Mist Test Data
- Appendix E-4: Ammonia Slip Test Data
- Appendix E-5: HCl and HF Test Data
- Appendix E-7: Mercury Test Data
- Appendix E-8: Dioxins and Furans Test Data
- Appendix E-9 Method 9

Appendix F: Laboratory Reports
Appendix G: Accreditations and Certifications

1.0 Introduction

Gainesville Renewable Energy Center (GREC) retained C.E.M. Solutions, Inc. to conduct air emissions tests at the Gainesville Renewable Energy Center's Woody Biomass-fueled BFB Boiler (EU-002) located in Gainesville, Florida.

The test program was used to determine the compliance status of Woody Biomass-fueled BFB Boiler in regards to its emissions limitations and standards outlined in Air Construction Permit 0010131-006-AV and IB MACT standards, 40CFR63, Subpart DDDDD.

The test program and results are presented and discussed in this report. Table 1 summarizes the target pollutants, test methods used and the permit and/or performance criteria for each pollutant. Test results are detailed and discussed in Section 5.0 of this report.

Ali Leaphart of GREC coordinated plant operations throughout the test program. Bill Barnard and Justin Knoll of the Alachua County Environmental Protection Department was present during portions of the test program. All testing was conducted in accordance with test methods promulgated by the USEPA and approved by the Florida DEP.

A Stationary Source Audit Sample (SSAS) was ordered from the ERA laboratory and included with the samples delivered to Enthalpy Analytical for analysis. Results of the audit were within the SSAS criteria and the audit sample report is included in Appendix E with the HCl/HF laboratory analysis results report.

1.1 Test Deviations or Anomalies

Due to the low level of analytes encountered during the test program, a universal protocol was developed for reporting laboratory analysis values. If the laboratory reported a value to be under the minimum detection level (MDL) or as a "non detect", the value was reported at the MDL for calculations of emissions. When a value is reported to be above the MDL but below the Limit of Quantification (LOQ, which means the presence of the compound is detected but it could not be accurately determined) the LOQ or reporting limit of the analytical method was used for calculation of emissions. Reported emissions impacted by this reporting protocol include the HCl and HF (Method 26A) and SAM (CTM-013). Analytical reports provided by the laboratories detail which analytes were not detected and those below the LOQ.

Table 1: Summary of Test Results
Woody Biomass Power Plant Energy Complex
Woody Biomass-fueled BFB Boiler

Parameter	3 Run Average Emission	Permitted Emissions Rate
Sulfuric acid mist	0.1 lb/hr	1.4 lb/hr
HCl	0.11 lb/hr 0.00009 lb/mmBtu	2.22 lb/hr 0.002 lb/mmBtu
HF	0.05 lb/hr	2.22 lb/hr
Total Filterable Particulate Matter	0.0010 lb/mmBtu	0.0098 lb/mmBtu
< 2.5 micrometer Particulate Matter	0.0020 lb/mmBtu	No set limit.
Visible Emissions	0.0 %	10% Opacity
Total Hydrocarbons (VOC)	0.000 lb/mmBtu	0.009 lb/mmBtu
Ammonia slip	0.3 ppmvd @ 7% O_2	10 ppmvd @ 7% O_2
Mercury	3.89 x10^{-7} lb/mmBtu	8.0 X 10^{-7} lb/mmBtu (40CFR63, Subpart DDDDD for Hg)
Dioxins & Furans	0.02 ng TEQ/dscm @ 7% O_2	0.15 ng TEQ/dscm @ 7% O_2

2.0 Facility Description

The Biomass-fueled Bubbling Fluidized Bed Boiler (EU-002) consists of a 100 MW steam turbine electric power generator. The Woody Biomass-fueled BFB Boiler burns clean wood and is rated for a maximum heat input of 1,358 mmbtu/hr.

2.1 Process Equipment

Emission controls consist of the following:

- Nitrogen oxides (NO_X) emissions are controlled by a selective catalytic reduction (SCR) system (via injection of ammonia solution into combustion flue gas).
- Sulfur dioxide (SO_2), acid gases (HCl and HF) and organic compound emissions from the Woody Biomass-fueled BFB Boiler are controlled by an in-duct sorbent injection system.
- PM, NO_X, CO and VOC emissions are controlled by efficient combustion
- Particulate matter (PM) emissions are controlled by a fabric filter (baghouse).

2.2 Regulatory Requirements

The facility was required to conduct emissions testing to determine compliance with Florida Air Permit No. 0010131-006-AV and 40CFR63, Subpart DDDDD. The source of each parameter's emissions limitations and standards are summarized in Table 2.

Table 2: Emissions Limitations and Standards
Woody Biomass Power Plant Energy Complex
Woody Biomass-fueled BFB Boiler

Parameter	Performance/Emissions Limit	Performance or Permit condition
VOC	0.009 lb/MMBtu	Subsection B, PC 9
HCl & HF	2.22 lb/hr 2.2 X 10^{-2} lb/MMBtu	Subsection B, PC 9 40CFR63, Subpart DDDDD
PM (total filterable)	0.015 lb/MMBtu 0.0098 lb/MMBtu	Subsection B, PC 9 40CFR63, Subpart DDDDD
PM ($\leq$ 2.5μm)	Informational purposes only	Consent decree
SAM/flow CTM-013/M2	1.4 lb/hr	Subsection B, PC 9
VE (Boiler)	Boiler: 10%/20% once/hr	Subsection B, PC 9
NH_3 Slip	10 ppmvd @ 7% O_2	Subsection B, PC 9
Mercury	8.0 X 10^{-7} lb/MMBtu	40CFR63, Subpart DDDDD
Dioxins and Furans	0.15ng TEQ/dscm @ 7% O2	Consent decree

3.0 Test Program/Operating Conditions

Air emissions testing to determine the compliance status of the Woody Biomass-fueled BFB Boiler was conducted on March 22 through March 24, 2017.

Table 3 summarizes the dates on which portions of the compliance test were conducted and the average heat input at which the unit was operating during each day.

Table 3: Test Dates and Unit Load
Gainesville Renewable Energy Center
Woody Biomass-fueled BFB Boiler

Date	Test Conducted	Unit Steam Flow (lb/hr)
March 22, 2017	Methods 5, 23, 26A, 30B	882,090 lb/hr
March 23, 2017	Methods 5, 23, 25A, 26A, 201A	855,100 lb/hr
March 24, 2017	Methods 30B, CTM-013, CTM-027	853,220 lb/hr

During the compliance test program, the Woody Biomass-fueled BFB Boiler steam flow averaged 863470 lb/hr while operating on 100 percent solid fuel, which correlates to 93 percent of the maximum steam flow (930,000 lb/hr).

4.0 Test Methods

All testing was performed in accordance with methods approved by the USEPA and FDEP. The following discusses the methods, as well as quality assurance and sample handling procedures.

Table 4 summarizes the EPA test methods utilized to complete the test program.

Table 4: Summary of EPA Reference Methods
Woody Biomass Power Plant Energy Complex
Woody Biomass-fueled BFB Boiler

EPA Method	Description
1	Sample and Velocity Traverses for Stationary Sources
2	Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot)
3A	Determination of O_2 and CO_2
3B	Determination of O_2 and CO_2
4	Moisture Content in Stack Gases
5	Particulate Emissions from Stationary Sources
9	Opacity (Visible Emissions)
CTM-013	Determination of Sulfuric Acid Mist
23	Determination of Dioxins and Furans
25A	Determination of VOC
26A	Determination of HCl and HF
CTM-027	Determination of Ammonia Slip
30B	Determination of Mercury
201A	Determination of Particulate Matter 2.5

4.1 Sample and Velocity Traverse Points

Sample and velocity traverse points were determined utilizing EPA Method 1. The circular boiler exhaust stack has an inner diameter of 143.5 inches at the sample location. The Sample location is approximately 110.5 feet (1326 inches) downstream from the nearest flow disturbance and 68.5 feet (822 inches) upstream from the stack exhaust muffler. The sample location is approximately 9.24 diameters downstream from the nearest disturbance and approximately 5.73 diameters upstream from the exhaust muffler.

The stack contains four (4) 6 inch diameter test ports, located at 20°, 110°, 200° and 290°. An additional single test port is located at 315°. A diagram of the sample location can be viewed in Appendix C.

4.1.1 Gaseous Traverse Points and Run Durations

VOC samples were extracted from a single point at the centroid of the stack. VOC test runs were 60 minutes in duration. The test port located at 315° was utilized for gas sampling. A total of three test runs were completed.

4.1.2 Wet Chemistry Traverse Points and Run Durations

Isokinetic, wet chemistry method traverse points were determined in accordance with EPA Method 1. A total of 12 traverse points (3 points per port, 4 ports were used) were used to complete each test run. Points were located at 6.31, 20.95 and 42.48 inches from the inner wall of the stack. Each method varied in sample run duration.

CTM-013 was sampled at a constant rate and were located at a single point greater than 1 meter from the inner stack wall.

4.2 Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tubes)

Method 2 was used to determine the volumetric flow rate of the stack effluent gas and was used on each isokinetic test method train.

Differential pressure and stack temperature readings were taken with an S type pitot tube and Type K temperature sensor at each sample traverse point.

4.2.1 Method 2 Quality Assurance/Quality Control Procedures

The S type pitot tube was inspected visually and measured to meet the design specifications of EPA Method 2, for a pitot coefficient of 0.84.

The incline manometer and each leg of the pitot tube was leak checked before and immediately after each test run. The incline manometer was leveled and zeroed before each test run.

Thermocouple sensors were calibrated prior to the test program and a post test check was performed after testing completion.

Appendix D contains the completed QA/QC forms.

4.3 Moisture Content Determination

Moisture content of the stack gas was determined by Method 4 with each wet chemistry method.

Stack gas was sampled at each traverse point, passed through pre-weighed impingers and then through a calibrated dry gas meter. Moisture is removed from the sample gas in the pre-weighed impingers, which are submerged in an ice bath, and later analyzed for moisture weight gain. Moisture is determined based upon the amount of moisture weight gain and sample gas collected.

Field moisture data sheets are also located in Appendix E.

4.3.1 Method 4 Quality Assurance/Quality Control Procedures

The moisture sampling train was leak checked prior to each test run at approximately 15" Hg and immediately after each run at a vacuum higher than the highest vacuum recorded during the respective test run. Results are recorded on the moisture field data sheets.

Weighing to determine moisture content was conducted with a balance having an accuracy of 0.1 grams. The scale used to weigh the moisture impingers was checked daily with a 500g class II calibration weight to verify an accuracy of ± 0.5 g.

Gas temperature at the exit of the impingers was maintained at less than 68 degrees Fahrenheit.

4.4 Particulate Matter Determination

USEPA Method 5 was used to determine filterable particulate emissions. Stack gas was extracted isokinetically from the gas stream; particulate emissions are measured gravimetrically by determining the amount of particulate matter collected on the glass nozzle and quartz fiber filter. The probe liner and filter holder were maintained at 320^{o}F ± 20^{o}F during each run.

Sample volume was measured by passing the gas through a set of weighed impingers used for moisture content, then passed through a calibrated dry gas meter. An S type pitot tube is attached to the probe to measure stack gas velocity and to maintain sampling conditions between 90% and 110% isokinetics. A type K temperature sensor is also attached to the probe to measure the stack gas temperature.

Isokinetic conditions were maintained throughout each test run of the test program as demonstrated in Table 5. A minimum of 120 dscf of sample was taken each test run over a sampling period of approximately 240 minutes. Method 5 field data sheets are located in Appendix E.

4.4.1 Sample Recovery and Analysis

After each sample run, the nozzle and filter holder ahead of the filter were brushed and rinsed with acetone. Contents were stored in a leak free container for transport to the laboratory. The impingers were weighed for increase, to the nearest 0.1 gram, to determine moisture gain.

Particulate matter was determined by drying each filter to a constant weight and recorded to the nearest 0.1 mg. Sample from the probe nozzle and filter holder were evaporated in a tared beaker at ambient temperature and dried further in a desiccator then weighed to a constant weight, and recorded to the nearest 0.1 mg.

Appendix E contains the analytical results for each run.

4.4.2 Quality Assurance/Quality Control Procedures

The probe nozzles were inspected and measured across three different diameters to determine the appropriate nozzle diameter.

Before and after each test run, the manometer was leveled and zeroed. Leak checks of the sampling train were conducted before and immediately after each test run.

The dry gas meter was fully calibrated within six months prior to the test program using a set of EPA critical orifices. Post test program dry meter checks were completed to verify the accuracy of the meter's Y_i. Reagent and sample train blanks were collected and analyzed. Completed Method 5/202 QA/QC forms are located in Appendix D.

4.5 Sulfuric Acid Mist (CTM-013)

CTM-013 was used to determine the volume of sulfuric acid mist (SAM) present in the flue gas. Each gas stream was sampled for one hour at a constant sample rate of approximately 10 lpm[1].

[1]CTM-013 testing cannot be performed isokinetically since the sample flow rates are too high. This will not allow for enough time for the thermal drop in the sample gas through the condenser.

The CTM-013 sample train consisting of a quartz glass probe, heated to 600°F ± 25 °F, a heated quartz filter (600°F ± 25 °F) used to filter particulate, a condenser (set to a temperature of 150°F ± 10°F) used to condense and capture H_2SO_4, and a quartz fiber filter used to capture H_2SO_4. An impinger train, composed of the following impingers, following the condenser. The first two impingers contained 100 ml of deionized water, the third impinger was empty and the final impinger contained a pre-weighed amount of indicating silica gel.

4.5.1 Sample Recovery and Analysis

A 15 minute post-run purge with clean dry ambient air was conducted at the average sampling rate used during the sample run. After the purge, the H_2SO_4 condenser was rinsed multiple times with deionized water. The condenser wash was collected in a laboratory prepared polyethylene sample bottle. The probe and the quartz filter holder were rinsed with DI water and the rinse was discarded.

Appendix E contains the analytical results for each run. The analysis was conducted by Enthalpy Analytical of Durham, North Carolina.

4.5.2 Quality Assurance/Quality Control Procedures

Before and after each test run, the manometer was leveled and zeroed.
Leak checks of the sampling train were conducted before and immediately after each test run.

The dry gas meter was fully calibrated within six months prior to the test program using a set of EPA critical orifices. Post test program dry meter checks were completed to verify the accuracy of the meter's Y_i. Reagent and sample train blanks were collected and analyzed. Completed QA/QC forms are located in Appendix D.

4.6 Hydrogen chloride (HCl) and Hydrogen Fluoride (HF)

Hydrogen chloride (HCl) and Hydrogen Fluoride (HF) was determined utilizing a USEPA Modified Method 26 sample train.

Gaseous samples were withdrawn at a constant rate from the duct and collected in absorbing solutions. The particulate matter collected on the filter is recovered to determine the amount of particulate collected during the test run. Acidic absorbing solutions collect the gaseous hydrogen halides (HCl and HF). The hydrogen halides are solubilized in the acidic solution and form chloride. The halide solutions are measured by ion chromatography.

The optional cyclone was not utilized during the test program because liquid droplets in the flue gas stream are not expected.

The sample train consisted of 4 impingers. Impinger 1 and 2 contained 100ml of 0.1N sulfuric acid (H_2SO_4) solution, impingers 3 was empty and impinger 4 contained a pre-weighed amount of silica gel.

The entire sampling train was glass. Temperature requirements of Method 26 were met. Sample analysis was performed by Enthalpy Analytical of Durham, North Carolina. Laboratory results are located in Appendix F.

4.6.1 Quality Assurance/Quality Control Procedures

The probe nozzles were inspected and measured across three different diameters to determine the appropriate nozzle diameter.

Before and after each test run, the manometer was leveled and zeroed. Leak checks of the sampling train were conducted before and immediately after each test run.

The dry gas meter was fully calibrated within six months prior to the test program using a set of EPA critical orifices. Post test program dry meter checks were completed to verify the accuracy of the meter's Y_i. Reagent and sample train blanks were collected and analyzed. Completed QA/QC forms are located in Appendix D.

4.7 Ammonia Slip Test

Ammonia concentrations were determined using EPA Conditional Test Method 27 (CTM-027).

Stack gas-samples were extracted isokinetically, for a period of 60 minutes. Gas samples were pulled from the stack through a glass nozzle and glass lined probe into a heated filter box containing a quartz filter. The gas was then transported, via an unheated Teflon line, to an impinger train. The impinger train consisted of two Greenburg-Smith (G-S) impingers (impingers 1 and 2) and two modified G-S impingers with the tips removed (impingers 3 and 4) all connected in series in an ice bath. Impingers 1 and 2 were charged with 100ml of 0.1N sulfuric acid (H_2SO_4) solution. The third was left empty and the fourth impinger was loaded with a pre-weighed amount of silica gel.

The volume of the liquid (catch) in each of the first three impingers was recorded for future use. Each impinger catch was transferred into individual, clean 500-ml HDPE containers. Each container was then labeled and stored on ice for

shipment to the laboratory, where the samples were analyzed within 2 weeks after their collection.

An ion chromatograph equipped with a conductivity detector was used for ammonium ion separation and quantitation to analyze the samples. At a minimum, the first two impingers were analyzed for ammonia breakthrough. The analysis was conducted by Enthalpy Analytical of Durham, North Carolina.

Pre- and post-impinger weights, field data collection, and lab analysis results are presented in Appendix D.

4.7.1 Quality Assurance/Quality Control Procedures

The sample train was leak checked prior to and following each test run at or above the highest vacuum recorded during the test run in accordance with the test method.

Prior to conducting each test run, the impinger train was chilled in ice for at least 10 minutes as specified in the test method.

All sample train glassware was cleaned prior to each test run with deionized (DI) water.

Following each test run, the back half of the filter housing was rinsed with DI water and stored in the same storage container as the catch from impinger 1. Impingers 1 and 2 were rinsed with DI water after recovery and stored with the impinger catch from its respective impinger as well. Reagent and sample train blanks were collected and analyzed. QA/QC forms can be viewed in Appendix D.

4.8 Mercury Determination

Mercury reference method (RM) data was determined using Method 30B. Data collected by the reference method is compared to the CEMS data when available. Mathematical equations used to determine calculated emissions standards and RATA accuracy are located in Appendix A.

30B sorbent traps were analyzed using a Ohio Lumex Model RA-915+ cold vapor analyzer. All reference method analyzers used meet or exceed applicable performance specifications detailed in the appropriate method.

Mercury emissions were tested using two sample trains simultaneously using a common, dual train sample probe. Gas samples were continuously extracted from the stack though a dry gas meter at a constant rate.

Method 30B field data sheets are located in Appendix D. Approximately 100 liters of sample was collected each test run over a sampling period of approximately 60 minutes.

4.8.1 Sample Recovery and Analysis

After each sample run, the sorbent traps are removed from the probe and transported to a mobile laboratory located at the base of the stack for analysis. The sorbent trap is opened and the contents are analyzed for Mercury concentration. Sorbent traps were analyzed using an Ohio Lumex Mercury RA 915+ analyzer.

The RA-915+ mercury analyzer employs differential atomic absorption spectrometry technique. A glow discharge mercury lamp is placed in a permanent magnetic field, whereby the 254-nm mercury resonance line is split into three polarized components. After passing through a polarization modulator, radiation passes through a multi-path cell equipped with narrow-band high reflectivity mirrors that isolates the 254-nm resonance line. A logarithm of the intensity, which is proportional to the mercury atom concentration in the cell, is determined upon detecting the radiation by a photodetector and subsequent analog-digital conversion of its electric signal by a built-in microprocessor. Outputs are transmitted to a computer for further processing or data storage. Appendix E contains the analytical results for each run.

4.8.2 Sample Recovery and Analysis

All sampling, analytical, and Quality Assurance/Quality Control (QA/QC) procedures outlined in EPA method 30B were followed. The analyzer specific Minimum Detection Limit (MDL) was determined from replicate low level measurements. Mercury (Hg^o) bias tests were conducted at two distinct sorbent trap loads prior to running sample analysis. The minimum sample mass, minimum calibration concentration and target sample volume was determined prior to testing as well. Mercury Analyzer QA/QC sheets are located in Appendix E.

All field test equipment was calibrated before or during use in the field. Leak checks of the sampling train were conducted before and immediately after each test run.

The dry gas meter was fully calibrated within six months prior to the test program using critical orifices. Post test program dry meter checks were completed to verify the accuracy of the meter's Y_i.

Completed QA/QC forms are located in Appendix D.

4.9 Determination of PCDD's and PCDF's

Method 23 was used to determine PCDD/PCDF emissions. Stack gas was extracted isokinetically from the gas stream and collected in the glass nozzle, glass probe liner, glass fiber filter, and on a packed column of absorbent material. The PCDD's and PCDF's are extracted from the sample, separated by high resolution gas chromatography, and measured by high resolution mass spectrometry.

The probe liner and filter heater box temperatures were maintained at 248 ± 25 degrees Fahrenheit throughout each test run. The XAD absorbent module and upstream condenser coil was cooled to below 20ºC (68ºF) to ensure efficient capture of the PCDD's and PCDF's during each test run by a water recirculating pump.

Sample volume was measured by passing the gas through a set of pre-weighed impingers used for moisture content, then passed through a calibrated dry gas meter. An S type pitot tube is attached to the probe to measure stack gas velocity and to maintain sampling conditions between 90% and 110% isokinetic. A type K temperature sensor is also attached to the probe to measure the stack gas temperature. Isokinetic conditions were maintained throughout each test run of the test program. Appendix D contains completed Method 23 field data sheets.

A minimum of 90.0 dscf of sample was taken each test run over a sampling period of 180 minutes.

After each sample run, the nozzle, probe liner, filter holder, and condenser ahead of the XAD absorbent trap were rinsed and brushed three times with pesticide grade acetone, and toluene. Contents were stored in pre-treated amber leak free containers and environmentally controlled for transport to the laboratory. The impingers were weighed for increase, to the nearest 0.5 gram, to determine moisture gain.

Laboratory analysis was conducted by SGS Analytical of Wilmington, North Carolina.

Appendix F contains the analytical results for each run.

4.9.1 Method 23 Quality Assurance/Quality Control Procedures

All sample glassware in the sampling train upstream and including the XAD resin trap were soaked for several hours in a heated Alconox cleaning solution, rinsed

three times with DI water, Soaked in a heated Chem-Solv cleaning solution, rinsed with tap water, rinsed three times with type-II de-ionized water, rinsed three times with pesticide grade acetone and sealed with Teflon tape and high density aluminum foil treated with pesticide grade hexane. Before initial use in the field, all sample train components upstream of the XAD module were rinsed three times with pesticide grade acetone.

The probe nozzles were inspected and measured across three different diameters to determine the appropriate nozzle diameter.

Before and after each test run, the manometer was leveled and zeroed.

Leak checks of the sampling train were conducted before and immediately after each test run.

The dry gas meter was fully calibrated, within six months prior to the test program, using a set of EPA critical orifices. Post test program dry meter checks were completed to verify the accuracy of the meter's Y_i.

Completed QA/QC forms are located in Appendix C.

4.10 VOC Determination

VOC reference method (RM) data was determined using instrument analyzer procedures. Mathematical equations used to determine calculated emissions standards are located in Appendix B. Table 4 summarizes the EPA methods and instrumentation:

All reference method analyzers used meet or exceed applicable performance specifications detailed in the appropriate method.

VOC and diluent (O_2) gas samples were continuously extracted from the stack by a full extractive gas sample probe (dry basis). Samples were then transported to a gas sample conditioner via a heated sample line operating at 250ºF or above. The gas sample conditioner lowers the dew point of the sample gas to approximately 5ºC through minimum interference heat exchangers. The dry, cool sample is then sent to the gas analyzers, located in the environmentally controlled test trailer for analysis by the reference method analyzers.

Instrument outputs were recorded continuously with a Windows compatible personal computer, compiled into 15 second averages, and stored in a database for future reference.

Instrument ranges and calibration gases were chosen in accordance with each pollutant's applicable EPA method. Calibration gas Certificates of Analysis can be found in Appendix B.

4.11 Visible Emission Determination

USEPA Method 9 was utilized to determine visible emissions.

Visible emissions observations were performed by a FDEP certified visible emissions reader. Readings were taken at 15 second intervals and reduced into six minute averages as required by the applicable EPA standard. One-sixty minute visible emissions test run was performed while the unit was operating at maximum capacity.

Method 9 data summary, field data and VE reader's certification are located in Appendix E.

5.0 Test Results

The following presents the results of the test program. Supporting calculations and field data summaries are presented in Appendix B and E, respectively. Table 5 summarizes the results of the test program.

Table 5: Compliance Test Summary
Woody Biomass Power Plant Energy Complex
Woody Biomass-fueled BFB Boiler

Parameter	Run 1	Run 2	Run 3	Average	Permitted Emissions Rate
FPM	0.0009	0.0009	0.0011	0.0010	0.0098 lb/mmbtu
$PM_{2.5}$	0.0014	0.0020	0.0028	0.0020	-
VE	0.0	-	-	0.0	10% Opacity
Hg	4.39×10^{-7}	3.54×10^{-7}	3.75×10^{-7}	3.89×10^{-7}	8.0×10^{-7} lb/mmbtu
SAM	0.1 J	0.1 J	0.1	0.1	1.4 lb/hr
HCl	0.10 J 0.00008 J	0.13 J 0.00011 J	0.11 J 0.00009 J	0.11 0.00009	2.22 lb/hr 0.022 lb/mmbtu
HF	0.05 ND	0.04 ND	0.05 ND	0.05	2.22 lb/hr
VOC	0.000	0.001	0.000	0.000	0.009 lb/mmbtu
NH_3	0.3	0.3	0.3	0.3	10 ppmvd @ 7% O_2
D&F	0.02	0.03	0.02	0.02	0.15ng TEQ/dscm @ 7% O_2

Appendix A: Facility Operating Data

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/22/2017 12:35	9,240	3.49	18,744,000.00	884.32
3/22/2017 12:36	9,240	3.47	18,696,000.00	884.11
3/22/2017 12:37	9,240	3.28	18,468,000.00	883.23
3/22/2017 12:38	9,240	3.44	18,576,000.00	884.96
3/22/2017 12:39	9,240	3.4	18,582,000.00	884.96
3/22/2017 12:40	9,240	3.23	18,354,000.00	885.15
3/22/2017 12:41	9,240	3.15	18,714,000.00	883.64
3/22/2017 12:42	9,240	3.24	18,738,000.00	882.42
3/22/2017 12:43	9,240	3.3	18,744,000.00	882.32
3/22/2017 12:44	9,240	3.17	18,372,000.00	882.4
3/22/2017 12:45	9,240	3.37	18,456,000.00	882.26
3/22/2017 12:46	9,240	3.48	18,588,000.00	882.95
3/22/2017 12:47	9,240	3.5	18,324,000.00	884.41
3/22/2017 12:48	9,240	3.43	18,378,000.00	885.4
3/22/2017 12:49	9,240	3.3	18,282,000.00	885.2
3/22/2017 12:50	9,240	3.26	18,528,000.00	883.67
3/22/2017 12:51	9,240	3.08	18,690,000.00	883.32
3/22/2017 12:52	9,240	3.13	18,942,000.00	882.72
3/22/2017 12:53	9,240	3.36	18,822,000.00	882.02
3/22/2017 12:54	9,240	3.56	19,008,000.00	882.81
3/22/2017 12:55	9,240	3.58	18,972,000.00	883.55
3/22/2017 12:56	9,240	3.52	18,540,000.00	884.27
3/22/2017 12:57	9,240	3.63	18,912,000.00	884.77
3/22/2017 12:58	9,240	3.5	18,852,000.00	884.08
3/22/2017 12:59	9,240	3.61	18,786,000.00	883.34
3/22/2017 13:00	9,240	3.7	18,636,000.00	883.9
3/22/2017 13:01	9,240	3.78	18,858,000.00	884.86
3/22/2017 13:02	9,240	3.74	18,102,000.00	885.26
3/22/2017 13:03	9,240	3.68	18,804,000.00	885.5
3/22/2017 13:04	9,240	3.45	18,576,000.00	885.67
3/22/2017 13:05	9,240	3.4	18,834,000.00	885.11
3/22/2017 13:06	9,240	3.2	19,008,000.00	884.04
3/22/2017 13:07	9,240	3.38	18,666,000.00	881.36
3/22/2017 13:08	9,240	3.52	18,744,000.00	882.46
3/22/2017 13:09	9,240	3.6	18,984,000.00	882.33
3/22/2017 13:10	9,240	3.58	18,480,000.00	881.93
3/22/2017 13:11	9,240	3.68	18,828,000.00	882.95
3/22/2017 13:12	9,240	3.8	19,002,000.00	882.92
3/22/2017 13:13	9,240	3.68	18,720,000.00	882.9
3/22/2017 13:14	9,240	3.51	18,408,000.00	884.21
3/22/2017 13:15	9,240	3.33	18,498,000.00	884.39
3/22/2017 13:16	9,240	3.42	18,258,000.00	884.26
3/22/2017 13:17	9,240	3.45	18,192,000.00	883.8
3/22/2017 13:18	9,240	3.56	18,120,000.00	884.59
3/22/2017 13:19	9,240	3.23	18,294,000.00	884.75
3/22/2017 13:20	9,240	3.15	18,612,000.00	884.48
3/22/2017 13:21	9,240	3.23	18,720,000.00	884.39
3/22/2017 13:22	9,240	3.36	18,258,000.00	883.77
3/22/2017 13:23	9,240	3.42	18,630,000.00	884.4
3/22/2017 13:24	9,240	3.44	19,086,000.00	883.85
3/22/2017 13:25	9,240	3.52	18,510,000.00	883.87
3/22/2017 13:26	9,240	3.52	18,978,000.00	884.21
3/22/2017 13:27	9,240	3.68	18,462,000.00	884.77
3/22/2017 13:28	9,240	3.46	18,474,000.00	884.19
3/22/2017 13:29	9,240	3.43	18,264,000.00	883.26
3/22/2017 13:30	9,240	3.54	18,768,000.00	882.77
3/22/2017 13:31	9,240	3.53	18,330,000.00	883.09
3/22/2017 13:32	9,240	3.6	18,420,000.00	882.94
3/22/2017 13:33	9,240	3.42	18,144,000.00	883.29
3/22/2017 13:34	9,240	3.4	18,198,000.00	882.92
3/22/2017 13:35	9,240	3.32	18,378,000.00	882.33
3/22/2017 13:36	9,240	3.3	17,964,000.00	882.51
3/22/2017 13:37	9,240	3.39	17,988,000.00	881.84
3/22/2017 13:38	9,240	3.3	17,922,000.00	882.27
3/22/2017 13:39	9,240	3.28	17,706,000.00	882.92
3/22/2017 13:40	9,240	3.32	17,700,000.00	883.23
3/22/2017 13:41	9,240	3.19	18,012,000.00	884.33
3/22/2017 13:42	9,240	3.25	18,144,000.00	884.66

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/22/2017 13:43	9,240	3.19	17,736,000.00	884.72
3/22/2017 13:44	9,240	3.44	18,366,000.00	884.86
3/22/2017 13:45	9,240	3.29	18,516,000.00	884.54
3/22/2017 13:46	9,240	3.28	18,408,000.00	884.85
3/22/2017 13:47	9,240	3.48	18,444,000.00	884.51
3/22/2017 13:48	9,240	3.47	18,582,000.00	884.53
3/22/2017 13:49	9,240	3.8	18,720,000.00	883.28
3/22/2017 13:50	9,240	3.88	18,660,000.00	883.59
3/22/2017 13:51	9,240	3.58	18,552,000.00	884.35
3/22/2017 13:52	9,240	3.54	18,870,000.00	884.38
3/22/2017 13:53	9,240	3.47	18,708,000.00	883.51
3/22/2017 13:54	9,240	3.56	18,480,000.00	883.18
3/22/2017 13:55	9,240	3.39	18,054,000.00	882.4
3/22/2017 13:56	9,240	3.44	18,240,000.00	881.96
3/22/2017 13:57	9,240	3.46	18,018,000.00	883
3/22/2017 13:58	9,240	3.47	17,694,000.00	883.61
3/22/2017 13:59	9,240	3.47	17,706,000.00	883.58
3/22/2017 14:00	9,240	3.42	17,994,000.00	884.86
3/22/2017 14:01	9,240	3.29	17,868,000.00	885.65
3/22/2017 14:02	9,240	3.28	17,904,000.00	886.53
3/22/2017 14:03	9,240	3.07	17,676,000.00	887.06
3/22/2017 14:04	9,240	2.93	17,748,000.00	885.69
3/22/2017 14:05	9,240	3.16	17,826,000.00	884.51
3/22/2017 14:06	9,240	3.01	18,390,000.00	885.33
3/22/2017 14:07	9,240	3.12	18,450,000.00	883.54
3/22/2017 14:08	9,240	3.13	18,624,000.00	882.36
3/22/2017 14:09	9,240	3.4	18,300,000.00	882.65
3/22/2017 14:10	9,240	3.59	18,240,000.00	882.92
3/22/2017 14:11	9,240	3.78	18,318,000.00	883.25
3/22/2017 14:12	9,240	3.49	18,048,000.00	883.27
3/22/2017 14:13	9,240	3.43	17,706,000.00	884.05
3/22/2017 14:14	9,240	3.49	17,886,000.00	884.02
3/22/2017 14:15	9,240	3.37	17,904,000.00	883.47
3/22/2017 14:16	9,240	3.26	17,634,000.00	883.05
3/22/2017 14:17	9,240	3.36	17,682,000.00	884.46
3/22/2017 14:18	9,240	3.3	17,898,000.00	883.86
3/22/2017 14:19	9,240	3.14	18,036,000.00	883.81
3/22/2017 14:20	9,240	3.27	17,988,000.00	884.21
3/22/2017 14:21	9,240	3.41	18,078,000.00	885.14
3/22/2017 14:22	9,240	3.51	17,634,000.00	885.07
3/22/2017 14:23	9,240	3.25	17,940,000.00	884.93
3/22/2017 14:24	9,240	3.32	18,000,000.00	885.01
3/22/2017 14:25	9,240	3.44	17,916,000.00	884.17
3/22/2017 14:26	9,240	3.49	18,042,000.00	883.42
3/22/2017 14:27	9,240	3.76	18,462,000.00	883.42
3/22/2017 14:28	9,240	3.73	18,408,000.00	883.07
3/22/2017 14:29	9,240	3.73	18,396,000.00	883.5
3/22/2017 14:30	9,240	3.54	18,564,000.00	883.58
3/22/2017 14:31	9,240	3.54	18,492,000.00	883
3/22/2017 14:32	9,240	3.54	18,132,000.00	883.38
3/22/2017 14:33	9,240	3.56	18,366,000.00	882.59
3/22/2017 14:34	9,240	3.52	18,198,000.00	882.39
3/22/2017 14:35	9,240	3.32	18,096,000.00	882.49
3/22/2017 14:36	9,240	3.44	17,628,000.00	882.81
3/22/2017 14:37	9,240	3.4	17,964,000.00	882.7
3/22/2017 14:38	9,240	3.19	17,754,000.00	883.71
3/22/2017 14:39	9,240	3.21	17,250,000.00	884.14
3/22/2017 14:40	9,240	3.15	17,850,000.00	884.17
3/22/2017 14:41	9,240	3.26	17,790,000.00	884.79
3/22/2017 14:42	9,240	3.22	18,198,000.00	884.6
3/22/2017 14:43	9,240	3.16	18,066,000.00	884.51
3/22/2017 14:44	9,240	3.24	18,096,000.00	884.31
3/22/2017 14:45	9,240	3.16	18,492,000.00	883.42
3/22/2017 14:46	9,240	3.4	18,018,000.00	882.7
3/22/2017 14:47	9,240	3.36	18,504,000.00	882.29
3/22/2017 14:48	9,240	3.52	18,258,000.00	881.21
3/22/2017 14:49	9,240	3.7	18,132,000.00	881.43
3/22/2017 14:50	9,240	3.66	18,090,000.00	881.77

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/22/2017 14:51	9,240	3.51	18,114,000.00	882.54
3/22/2017 14:52	9,240	3.29	18,258,000.00	882.59
3/22/2017 14:53	9,240	3.3	17,808,000.00	882.04
3/22/2017 14:54	9,240	3.44	17,364,000.00	882.3
3/22/2017 14:55	9,240	3.26	17,652,000.00	883.87
3/22/2017 14:56	9,240	3.11	17,736,000.00	884.11
3/22/2017 14:57	9,240	2.99	17,592,000.00	884.15
3/22/2017 14:58	9,240	3.05	17,268,000.00	884.74
3/22/2017 14:59	9,240	3.11	17,856,000.00	885.86
3/22/2017 15:00	9,240	3.17	17,826,000.00	884.14
3/22/2017 15:01	9,240	3.14	17,766,000.00	883.27
3/22/2017 15:02	9,240	3.19	18,414,000.00	883.16
3/22/2017 15:03	9,240	3.21	18,186,000.00	883.49
3/22/2017 15:04	9,240	3.36	18,546,000.00	882.43
3/22/2017 15:05	9,240	3.44	18,390,000.00	881.52
3/22/2017 15:06	9,240	3.43	18,600,000.00	881.86
3/22/2017 15:07	9,240	3.4	18,546,000.00	881.01
3/22/2017 15:08	9,240	3.64	17,982,000.00	881.32
3/22/2017 15:09	9,240	3.66	18,024,000.00	881.86
3/22/2017 15:10	9,240	3.51	17,706,000.00	881.64
3/22/2017 15:11	9,240	3.38	17,586,000.00	882.2
3/22/2017 15:12	9,240	3.38	17,754,000.00	883.2
3/22/2017 15:13	9,240	3.22	17,910,000.00	882.55
3/22/2017 15:14	9,240	3.13	17,916,000.00	883.28
3/22/2017 15:15	9,240	3.24	18,138,000.00	882.87
3/22/2017 15:16	9,240	3.02	18,330,000.00	882.16
3/22/2017 15:17	9,240	3.08	18,294,000.00	881.39
3/22/2017 15:18	9,240	3.38	18,276,000.00	881.73
3/22/2017 15:19	9,240	3.37	18,726,000.00	881.72
3/22/2017 15:20	9,240	3.39	18,588,000.00	880.95
3/22/2017 15:21	9,240	3.56	18,384,000.00	880.61
3/22/2017 15:22	9,240	3.64	18,138,000.00	881.2
3/22/2017 15:23	9,240	3.55	17,988,000.00	880.54
3/22/2017 15:24	9,240	3.38	17,664,000.00	880.78
3/22/2017 15:25	9,240	3.52	18,102,000.00	882.1
3/22/2017 15:26	9,240	3.26	17,886,000.00	881.38
3/22/2017 15:27	9,240	3.06	18,054,000.00	880.64
3/22/2017 15:28	9,240	3.09	17,868,000.00	880.69
3/22/2017 15:29	9,240	3.18	18,030,000.00	880.61
3/22/2017 15:30	9,240	3.3	18,210,000.00	880.86
3/22/2017 15:31	9,240	3.26	17,610,000.00	880.75
3/22/2017 15:32	9,240	3.22	17,814,000.00	882.13
3/22/2017 15:33	9,240	3.18	17,592,000.00	882.57
3/22/2017 15:34	9,240	3.3	17,994,000.00	882.95
3/22/2017 15:35	9,240	3.24	17,844,000.00	883.14
3/22/2017 15:36	9,240	3.27	17,910,000.00	882.7
3/22/2017 15:37	9,240	3.33	17,988,000.00	882.31
3/22/2017 15:38	9,240	3.5	17,766,000.00	880.55
3/22/2017 15:39	9,240	3.56	17,982,000.00	881.96
3/22/2017 15:40	9,240	3.58	18,468,000.00	882.81
3/22/2017 15:41	9,240	3.72	18,492,000.00	882.46
3/22/2017 15:42	9,240	3.66	18,678,000.00	881.69
3/22/2017 15:43	9,240	3.74	18,540,000.00	881.68
3/22/2017 15:44	9,240	3.63	18,600,000.00	881.92
3/22/2017 15:45	9,240	3.31	18,912,000.00	881.16
3/22/2017 15:46	9,240	3.46	18,474,000.00	879.27
3/22/2017 15:47	9,240	3.71	18,594,000.00	878.75
3/22/2017 15:48	9,240	3.65	18,474,000.00	880.08
3/22/2017 15:49	9,240	3.56	17,940,000.00	879.46
3/22/2017 15:50	9,240	3.39	17,466,000.00	880.05
3/22/2017 15:51	9,240	3.51	17,436,000.00	882.03
3/22/2017 15:52	9,240	3.26	17,328,000.00	882.39
3/22/2017 15:53	9,240	3.1	17,526,000.00	882.74
3/22/2017 15:54	9,240	2.92	17,412,000.00	882.74
3/22/2017 15:55	9,240	2.97	17,754,000.00	882.97
3/22/2017 15:56	9,240	3.17	17,922,000.00	881.64
3/22/2017 15:57	9,240	3.26	17,826,000.00	881.88
3/22/2017 15:58	9,240	3.3	17,892,000.00	882.98

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/22/2017 15:59	9,240	3.33	18,048,000.00	882.59
3/22/2017 16:00	9,240	3.51	17,994,000.00	882.91
3/22/2017 16:01	9,240	3.51	18,126,000.00	882.64
3/22/2017 16:02	9,240	3.48	18,300,000.00	881.95
3/22/2017 16:03	9,240	3.58	18,816,000.00	881.95
3/22/2017 16:04	9,240	3.5	18,234,000.00	881.36
3/22/2017 16:05	9,240	3.48	18,864,000.00	881.17
3/22/2017 16:06	9,240	3.58	18,396,000.00	880.6
3/22/2017 16:07	9,240	3.72	18,312,000.00	879.77
3/22/2017 16:08	9,240	3.7	18,204,000.00	880.39
3/22/2017 16:09	9,240	3.61	18,258,000.00	880.52
3/22/2017 16:10	9,240	3.51	18,210,000.00	881.13
3/22/2017 16:11	9,240	3.5	17,904,000.00	880.5
3/22/2017 16:12	9,240	3.31	18,180,000.00	880.33
3/22/2017 16:13	9,240	3.36	17,736,000.00	880.55
3/22/2017 16:14	9,240	3.39	17,688,000.00	880.85
3/22/2017 16:15	9,240	3.25	17,634,000.00	881.31
3/22/2017 16:16	9,240	3.34	17,646,000.00	882.78
3/22/2017 16:17	9,240	3.41	17,472,000.00	883.99
3/22/2017 16:18	9,240	3.19	17,424,000.00	884.84
3/22/2017 16:19	9,240	3.08	17,484,000.00	884.11
3/22/2017 16:20	9,240	3.09	17,646,000.00	883.64
3/22/2017 16:21	9,240	3.2	18,078,000.00	884.03
3/22/2017 16:22	9,240	3.31	18,258,000.00	881.79
3/22/2017 16:23	9,240	3.3	18,216,000.00	881.49
3/22/2017 16:24	9,240	3.38	18,378,000.00	883.36
3/22/2017 16:25	9,240	3.45	18,084,000.00	882.89
3/22/2017 16:26	9,240	3.52	18,552,000.00	881.99
3/22/2017 16:27	9,240	3.66	18,564,000.00	882.38
3/22/2017 16:28	9,240	3.57	18,180,000.00	883.81
3/22/2017 16:29	9,240	3.57	18,252,000.00	883.17
3/22/2017 16:30	9,240	3.6	18,294,000.00	882.46
3/22/2017 16:31	9,240	3.44	17,880,000.00	882.71
3/22/2017 16:32	9,240	3.52	18,306,000.00	883.53
3/22/2017 16:33	9,240	3.4	18,120,000.00	883.34
3/22/2017 16:34	9,240	3.18	18,072,000.00	882.23
3/22/2017 16:35	9,240	3.41	17,952,000.00	882.18
3/22/2017 16:36	9,240	3.55	17,844,000.00	883.68
3/22/2017 16:37	9,240	3.6	17,832,000.00	883.61
3/22/2017 16:38	9,240	3.36	17,748,000.00	882.58
3/22/2017 16:39	9,240	3.19	17,976,000.00	883.63
3/22/2017 16:40	9,240	3.38	17,952,000.00	883.91
3/22/2017 16:41	9,240	3.19	18,072,000.00	883.15
3/22/2017 16:42	9,240	3.1	18,258,000.00	882.33
3/22/2017 16:43	9,240	3.21	18,228,000.00	882.22
3/22/2017 16:44	9,240	3.45	17,988,000.00	881.68
3/22/2017 16:45	9,240	3.44	18,282,000.00	881.98
3/22/2017 16:46	9,240	3.46	17,952,000.00	881.65
3/22/2017 16:47	9,240	3.62	18,228,000.00	882.95
3/22/2017 16:48	9,240	3.51	17,874,000.00	883.95
3/22/2017 16:49	9,240	3.48	17,970,000.00	883.27
3/22/2017 16:50	9,240	3.36	17,982,000.00	882.74
3/22/2017 16:51	9,240	3.32	18,312,000.00	882.6
3/22/2017 16:52	9,240	3.41	18,108,000.00	881.93
3/22/2017 16:53	9,240	3.32	18,036,000.00	881.97
3/22/2017 16:54	9,240	3.47	18,132,000.00	882.08
3/22/2017 16:55	9,240	3.51	18,036,000.00	881.7
3/22/2017 16:56	9,240	3.34	18,300,000.00	882.58
3/22/2017 16:57	9,240	3.23	18,414,000.00	882.08
3/22/2017 16:58	9,240	3.19	17,922,000.00	882.04
3/22/2017 16:59	9,240	3.22	17,838,000.00	881.37
3/22/2017 17:00	9,240	3.47	17,538,000.00	881.54
3/22/2017 17:01	9,240	3.48	17,772,000.00	882.11
3/22/2017 17:02	9,240	3.51	17,934,000.00	883.06
3/22/2017 17:03	9,240	3.42	17,664,000.00	883.57
3/22/2017 17:04	9,240	3.27	17,838,000.00	883.38
3/22/2017 17:05	9,240	3.29	18,234,000.00	882.68
3/22/2017 17:06	9,240	3.13	18,138,000.00	882.35

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/22/2017 17:07	9,240	3.15	18,186,000.00	881.95
3/22/2017 17:08	9,240	3.17	18,192,000.00	881.14
3/22/2017 17:09	9,240	3.18	18,090,000.00	880.22
3/22/2017 17:10	9,240	3.32	18,168,000.00	879.76
3/22/2017 17:11	9,240	3.59	18,084,000.00	879.98
3/22/2017 17:12	9,240	3.72	18,030,000.00	880.93
3/22/2017 17:13	9,240	3.77	18,096,000.00	880.74
3/22/2017 17:14	9,240	3.6	17,880,000.00	881.39
3/22/2017 17:15	9,240	3.45	17,970,000.00	882.85
3/22/2017 17:16	9,240	3.45	17,886,000.00	882.83
3/22/2017 17:17	9,240	3.26	17,910,000.00	882.56
3/22/2017 17:18	9,240	3.12	17,694,000.00	881.27
3/22/2017 17:19	9,240	3.11	18,258,000.00	881.73
3/22/2017 17:20	9,240	3.15	17,526,000.00	880.43
3/22/2017 17:21	9,240	3.18	18,066,000.00	880.2
3/22/2017 17:22	9,240	3.17	18,060,000.00	879.68
3/22/2017 17:23	9,240	3.5	17,796,000.00	880.08
3/22/2017 17:24	9,240	3.67	17,868,000.00	881.6
3/22/2017 17:25	9,240	3.56	18,348,000.00	881.68
3/22/2017 17:26	9,240	3.49	17,994,000.00	881.73
3/22/2017 17:27	9,240	3.46	18,168,000.00	882.25
3/22/2017 17:28	9,240	3.44	17,562,000.00	882.09
3/22/2017 17:29	9,240	3.4	18,120,000.00	881.94
3/22/2017 17:30	9,240	3.38	18,126,000.00	882.18
3/22/2017 17:31	9,240	3.3	18,024,000.00	880.97
3/22/2017 17:32	9,240	3.43	18,510,000.00	881.09
3/22/2017 17:33	9,240	3.32	18,240,000.00	880.66
3/22/2017 17:34	9,240	3.36	18,084,000.00	880.69
3/22/2017 17:35	9,240	3.22	18,240,000.00	880.89
3/22/2017 17:36	9,240	3.31	18,288,000.00	879.54
3/22/2017 17:37	9,240	3.35	17,946,000.00	880.06
3/22/2017 17:38	9,240	3.39	18,120,000.00	880.3
3/22/2017 17:39	9,240	3.34	18,048,000.00	880.44
3/22/2017 17:40	9,240	3.32	18,336,000.00	879.98
3/22/2017 17:41	9,240	3.33	17,880,000.00	879.02
3/22/2017 17:42	9,240	3.32	17,844,000.00	879.92
3/22/2017 17:43	9,240	3.4	18,216,000.00	879.89
3/22/2017 17:44	9,240	3.34	17,808,000.00	879.41
3/22/2017 17:45	9,240	3.2	17,952,000.00	880.29
3/22/2017 17:46	9,240	3.09	18,036,000.00	880.25
3/22/2017 17:47	9,240	3.07	17,976,000.00	879.14
3/22/2017 17:48	9,240	3.03	18,246,000.00	878.18
3/22/2017 17:49	9,240	3.12	18,132,000.00	879.2
3/22/2017 17:50	9,240	3.28	18,312,000.00	879
3/22/2017 17:51	9,240	3.2	18,306,000.00	878.47
3/22/2017 17:52	9,240	3.31	18,210,000.00	878.9
3/22/2017 17:53	9,240	3.51	18,360,000.00	879.73
3/22/2017 17:54	9,240	3.37	18,258,000.00	880.17
3/22/2017 17:55	9,240	3.3	18,312,000.00	878.56
3/22/2017 17:56	9,240	3.49	18,132,000.00	878.38
3/22/2017 17:57	9,240	3.52	17,964,000.00	879.67
3/22/2017 17:58	9,240	3.37	18,054,000.00	879.22
3/22/2017 17:59	9,240	3.46	18,024,000.00	878.98
3/22/2017 18:00	9,240	3.58	18,216,000.00	880.08
3/22/2017 18:01	9,240	3.34	17,940,000.00	880.36
3/22/2017 18:02	9,240	3.32	18,354,000.00	879.93
3/22/2017 18:03	9,240	3.37	18,444,000.00	879.64
3/22/2017 18:04	9,240	3.22	18,342,000.00	880.15
3/22/2017 18:05	9,240	3.17	18,396,000.00	879.46
3/22/2017 18:06	9,240	3.13	18,270,000.00	878.99
3/22/2017 18:07	9,240	3.18	18,066,000.00	878.98
3/22/2017 18:08	9,240	3.27	18,234,000.00	879.73
3/22/2017 18:09	9,240	3.37	18,582,000.00	879.9
3/22/2017 18:10	9,240	3.38	18,144,000.00	879.29
3/22/2017 18:11	9,240	3.2	18,564,000.00	879.64
3/22/2017 18:12	9,240	3.23	18,504,000.00	880.07
3/22/2017 18:13	9,240	3.18	18,204,000.00	879.98
3/22/2017 18:14	9,240	3.36	18,348,000.00	879.16

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/22/2017 18:15	9,240	3.43	18,504,000.00	880.07
3/22/2017 18:16	9,240	3.39	18,192,000.00	880.57
3/22/2017 18:17	9,240	3.25	18,366,000.00	880.92
3/22/2017 18:18	9,240	3.4	18,432,000.00	881.95
3/22/2017 18:19	9,240	3.13	18,072,000.00	881.36
3/22/2017 18:20	9,240	3.1	18,462,000.00	880.81
3/22/2017 18:21	9,240	3.36	18,504,000.00	880.32
3/22/2017 18:22	9,240	3.42	18,474,000.00	881.27
3/22/2017 18:23	9,240	3.45	18,888,000.00	880.53
3/22/2017 18:24	9,240	3.41	18,510,000.00	880.2
3/22/2017 18:25	9,240	3.46	18,888,000.00	880.65
3/22/2017 18:26	9,240	3.4	18,528,000.00	881.39
3/22/2017 18:27	9,240	3.41	18,672,000.00	880.46
3/22/2017 18:28	9,240	3.54	19,032,000.00	879.23
3/22/2017 18:29	9,240	3.56	18,846,000.00	880.33
3/22/2017 18:30	9,240	3.7	19,278,000.00	880.8
3/22/2017 18:31	9,240	3.54	18,750,000.00	880.66
3/22/2017 18:32	9,240	3.43	18,744,000.00	879.83
3/22/2017 18:33	9,240	3.38	18,456,000.00	879.52
3/22/2017 18:34	9,240	3.38	18,546,000.00	878.2
3/22/2017 18:35	9,240	3.49	18,516,000.00	877.86
3/22/2017 18:36	9,240	3.38	18,054,000.00	879.32
3/22/2017 18:37	9,240	3.29	18,372,000.00	880.02
3/22/2017 18:38	9,240	3.21	17,934,000.00	879.49
3/22/2017 18:39	9,240	3.14	18,432,000.00	879.64
3/22/2017 18:40	9,240	3.25	17,826,000.00	880.91
3/22/2017 18:41	9,240	3.22	18,366,000.00	880.92
3/22/2017 18:42	9,240	3.29	17,988,000.00	880.76
3/22/2017 18:43	9,240	3.21	18,582,000.00	880.93
3/22/2017 18:44	9,240	3.34	18,234,000.00	881.78
3/22/2017 18:45	9,240	3.37	18,708,000.00	881.89
3/22/2017 18:46	9,240	3.33	18,990,000.00	880.5
3/22/2017 18:47	9,240	3.36	18,810,000.00	880.11
3/22/2017 18:48	9,240	3.37	18,774,000.00	880.05
3/22/2017 18:49	9,240	3.62	18,654,000.00	879.67
3/22/2017 18:50	9,240	3.7	19,284,000.00	879.77
3/22/2017 18:51	9,240	3.64	18,570,000.00	880.51
3/22/2017 18:52	9,240	3.64	18,528,000.00	880.63
3/22/2017 18:53	9,240	3.58	18,624,000.00	880.75
3/22/2017 18:54	9,240	3.57	18,654,000.00	880.78
3/22/2017 18:55	9,240	3.47	18,198,000.00	880.51
3/22/2017 18:56	9,240	3.34	18,594,000.00	880.41
3/22/2017 18:57	9,240	3.35	18,516,000.00	880.29
3/22/2017 18:58	9,240	3.45	18,690,000.00	880.78
3/22/2017 18:59	9,240	3.43	18,552,000.00	880.55
3/22/2017 19:00	9,240	3.56	18,372,000.00	880.55
3/22/2017 19:01	9,240	3.54	18,552,000.00	882.03
3/22/2017 19:02	9,240	3.43	18,426,000.00	882.44
3/22/2017 19:03	9,240	3.22	18,576,000.00	882
3/22/2017 19:04	9,240	3.17	18,306,000.00	880.3
3/22/2017 19:05	9,240	3.34	18,864,000.00	879.89
3/22/2017 19:06	9,240	3.32	18,486,000.00	879.64
3/22/2017 19:07	9,240	3.57	18,696,000.00	879.98
3/22/2017 19:08	9,240	3.52	18,984,000.00	879.33
3/22/2017 19:09	9,240	3.43	18,756,000.00	879.53
3/22/2017 19:10	9,240	3.59	18,906,000.00	880.21
3/22/2017 19:11	9,240	3.41	18,558,000.00	879.98
3/22/2017 19:12	9,240	3.48	18,192,000.00	879.54
3/22/2017 19:13	9,240	3.48	18,624,000.00	879.58
3/22/2017 19:14	9,240	3.39	18,486,000.00	879.37
3/22/2017 19:15	9,240	3.44	18,066,000.00	879.71
3/22/2017 19:16	9,240	3.45	18,366,000.00	879.15
3/22/2017 19:17	9,240	3.42	18,234,000.00	879.44
3/22/2017 19:18	9,240	3.35	18,216,000.00	880.26
				882.09
3/23/2017 7:23	9,240	3.52	18,204,000.00	859.79

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 7:24	9,240	3.36	18,036,000.00	859.03
3/23/2017 7:25	9,240	3.36	17,970,000.00	857.53
3/23/2017 7:26	9,240	3.52	18,024,000.00	856.81
3/23/2017 7:27	9,240	3.79	18,474,000.00	857.23
3/23/2017 7:28	9,240	3.72	18,228,000.00	856.91
3/23/2017 7:29	9,240	3.84	18,018,000.00	857.54
3/23/2017 7:30	9,240	3.72	17,832,000.00	858.59
3/23/2017 7:31	9,240	3.48	18,060,000.00	858.12
3/23/2017 7:32	9,240	3.33	17,772,000.00	857.34
3/23/2017 7:33	9,240	3.25	17,532,000.00	857.08
3/23/2017 7:34	9,240	3.47	17,784,000.00	856.24
3/23/2017 7:35	9,240	3.45	17,724,000.00	856.37
3/23/2017 7:36	9,240	3.46	17,544,000.00	856.66
3/23/2017 7:37	9,240	3.43	17,622,000.00	856.76
3/23/2017 7:38	9,240	3.36	17,550,000.00	857.76
3/23/2017 7:39	9,240	3.04	17,706,000.00	857.4
3/23/2017 7:40	9,240	3.12	17,586,000.00	856.68
3/23/2017 7:41	9,240	3.29	17,322,000.00	856.14
3/23/2017 7:42	9,240	3.57	17,478,000.00	856.22
3/23/2017 7:43	9,240	3.42	17,544,000.00	856.39
3/23/2017 7:44	9,240	3.37	17,862,000.00	857.2
3/23/2017 7:45	9,240	3.25	17,694,000.00	857.35
3/23/2017 7:46	9,240	3.17	17,652,000.00	855.75
3/23/2017 7:47	9,240	3.4	17,496,000.00	855.02
3/23/2017 7:48	9,240	3.49	18,294,000.00	855.29
3/23/2017 7:49	9,240	3.43	18,042,000.00	854.55
3/23/2017 7:50	9,240	3.32	17,742,000.00	853.9
3/23/2017 7:51	9,240	3.44	17,574,000.00	853.69
3/23/2017 7:52	9,240	3.63	17,760,000.00	853.9
3/23/2017 7:53	9,240	3.57	18,060,000.00	853.71
3/23/2017 7:54	9,240	3.52	18,162,000.00	853.13
3/23/2017 7:55	9,240	3.38	17,922,000.00	852.55
3/23/2017 7:56	9,240	3.54	17,760,000.00	851.61
3/23/2017 7:57	9,240	3.5	17,526,000.00	852.42
3/23/2017 7:58	9,240	3.42	17,556,000.00	853.39
3/23/2017 7:59	9,240	3.13	17,274,000.00	853.07
3/23/2017 8:00	9,240	3.25	17,010,000.00	853.33
3/23/2017 8:01	9,240	3.3	17,298,000.00	853.95
3/23/2017 8:02	9,240	3.23	17,448,000.00	854.12
3/23/2017 8:03	9,240	3.35	16,998,000.00	853.84
3/23/2017 8:04	9,240	3.24	17,112,000.00	853.76
3/23/2017 8:05	9,240	3.38	17,814,000.00	853.44
3/23/2017 8:06	9,240	3.46	17,922,000.00	854.47
3/23/2017 8:07	9,240	3.36	17,832,000.00	854.66
3/23/2017 8:08	9,240	3.25	17,814,000.00	853.54
3/23/2017 8:09	9,240	3.64	17,850,000.00	852.4
3/23/2017 8:10	9,240	3.62	17,808,000.00	852.53
3/23/2017 8:11	9,240	3.83	17,886,000.00	853.04
3/23/2017 8:12	9,240	3.85	17,994,000.00	853.85
3/23/2017 8:13	9,240	3.68	18,114,000.00	853.89
3/23/2017 8:14	9,240	3.54	17,592,000.00	853.4
3/23/2017 8:15	9,240	3.39	17,694,000.00	852.91
3/23/2017 8:16	9,240	3.52	17,724,000.00	853.01
3/23/2017 8:17	9,240	3.62	17,382,000.00	853.69
3/23/2017 8:18	9,240	3.51	17,910,000.00	853.25
3/23/2017 8:19	9,240	3.19	17,742,000.00	853.07
3/23/2017 8:20	9,240	3.19	17,256,000.00	853.47
3/23/2017 8:21	9,240	3.2	17,148,000.00	851.56
3/23/2017 8:22	9,240	3.38	17,118,000.00	850.87
3/23/2017 8:23	9,240	3.54	17,706,000.00	853.01
3/23/2017 8:24	9,240	3.3	17,436,000.00	856.32
3/23/2017 8:25	9,240	3.25	17,718,000.00	856.01
3/23/2017 8:26	9,240	3	17,574,000.00	855.32
3/23/2017 8:27	9,240	3.04	17,574,000.00	855.59
3/23/2017 8:28	9,240	3.13	17,484,000.00	855.61
3/23/2017 8:29	9,240	3.29	17,610,000.00	854.13
3/23/2017 8:30	9,240	3.48	18,420,000.00	854.3
3/23/2017 8:31	9,240	3.42	17,940,000.00	854.47

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 8:32	9,240	3.68	17,826,000.00	855.35
3/23/2017 8:33	9,240	3.53	18,156,000.00	854.19
3/23/2017 8:34	9,240	3.42	18,204,000.00	854.41
3/23/2017 8:35	9,240	3.59	18,204,000.00	854.81
3/23/2017 8:36	9,240	3.64	17,748,000.00	853.35
3/23/2017 8:37	9,240	3.46	18,144,000.00	851.55
3/23/2017 8:38	9,240	3.54	17,970,000.00	852.38
3/23/2017 8:39	9,240	3.38	17,760,000.00	853.58
3/23/2017 8:40	9,240	3.3	17,628,000.00	853.08
3/23/2017 8:41	9,240	3.37	17,676,000.00	852.52
3/23/2017 8:42	9,240	3.38	17,796,000.00	852.82
3/23/2017 8:43	9,240	3.31	17,250,000.00	854.41
3/23/2017 8:44	9,240	3.12	16,872,000.00	854.45
3/23/2017 8:45	9,240	3.18	16,878,000.00	854.39
3/23/2017 8:46	9,240	3.12	17,268,000.00	855.05
3/23/2017 8:47	9,240	3.19	17,526,000.00	855.67
3/23/2017 8:48	9,240	3.06	17,292,000.00	855.57
3/23/2017 8:49	9,240	2.94	17,382,000.00	854.4
3/23/2017 8:50	9,240	3	17,460,000.00	854.19
3/23/2017 8:51	9,240	3.38	17,532,000.00	854.03
3/23/2017 8:52	9,240	3.51	17,754,000.00	854.07
3/23/2017 8:53	9,240	3.46	17,568,000.00	854.56
3/23/2017 8:54	9,240	3.53	17,742,000.00	855.7
3/23/2017 8:55	9,240	3.38	17,748,000.00	855.5
3/23/2017 8:56	9,240	3.35	17,922,000.00	854.52
3/23/2017 8:57	9,240	3.23	17,988,000.00	853.87
3/23/2017 8:58	9,240	3.58	17,640,000.00	853.36
3/23/2017 8:59	9,240	3.69	18,078,000.00	852.74
3/23/2017 9:00	9,240	3.72	17,760,000.00	853.25
3/23/2017 9:01	9,240	3.56	18,042,000.00	854.45
3/23/2017 9:02	9,240	3.28	18,114,000.00	854.02
3/23/2017 9:03	9,240	3.22	18,204,000.00	852.03
3/23/2017 9:04	9,240	3.45	18,222,000.00	852.41
3/23/2017 9:05	9,240	3.2	17,976,000.00	852.36
3/23/2017 9:06	9,240	3.38	17,694,000.00	852.22
3/23/2017 9:07	9,240	3.65	17,208,000.00	851.82
3/23/2017 9:08	9,240	3.6	17,472,000.00	853.21
3/23/2017 9:09	9,240	3.41	17,106,000.00	854.7
3/23/2017 9:10	9,240	3.38	17,124,000.00	855.14
3/23/2017 9:11	9,240	3.24	17,526,000.00	855.89
3/23/2017 9:12	9,240	2.92	17,622,000.00	856.36
3/23/2017 9:13	9,240	2.92	17,532,000.00	856.92
3/23/2017 9:14	9,240	2.9	17,382,000.00	854.33
3/23/2017 9:15	9,240	3.08	17,322,000.00	853.88
3/23/2017 9:16	9,240	3.13	17,880,000.00	855.25
3/23/2017 9:17	9,240	3.23	18,318,000.00	854.43
3/23/2017 9:18	9,240	3.32	18,156,000.00	854.04
3/23/2017 9:19	9,240	3.56	17,916,000.00	854.74
3/23/2017 9:20	9,240	3.54	17,742,000.00	855.41
3/23/2017 9:21	9,240	3.4	18,138,000.00	855
3/23/2017 9:22	9,240	3.27	17,922,000.00	854.85
3/23/2017 9:23	9,240	3.31	18,054,000.00	853.53
3/23/2017 9:24	9,240	3.26	18,036,000.00	853.24
3/23/2017 9:25	9,240	3.42	17,874,000.00	853.6
3/23/2017 9:26	9,240	3.25	17,676,000.00	853.78
3/23/2017 9:27	9,240	3.16	17,760,000.00	853.34
3/23/2017 9:28	9,240	3.25	17,382,000.00	853.45
3/23/2017 9:29	9,240	3.29	17,352,000.00	855.06
3/23/2017 9:30	9,240	3.18	17,556,000.00	854.24
3/23/2017 9:31	9,240	2.98	17,340,000.00	854.16
3/23/2017 9:32	9,240	3.1	17,568,000.00	854.74
3/23/2017 9:33	9,240	3.41	17,802,000.00	854.89
3/23/2017 9:34	9,240	3.12	17,508,000.00	855.32
3/23/2017 9:35	9,240	3.28	17,082,000.00	855.99
3/23/2017 9:36	9,240	3.22	17,832,000.00	855.43
3/23/2017 9:37	9,240	3.31	18,000,000.00	856.54
3/23/2017 9:38	9,240	3.38	18,378,000.00	856.54
3/23/2017 9:39	9,240	3.42	18,108,000.00	855.57

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 9:40	9,240	3.58	18,444,000.00	855.29
3/23/2017 9:41	9,240	3.53	18,390,000.00	855.41
3/23/2017 9:42	9,240	3.73	18,120,000.00	854.83
3/23/2017 9:43	9,240	3.71	18,384,000.00	854.18
3/23/2017 9:44	9,240	3.72	18,444,000.00	854.28
3/23/2017 9:45	9,240	3.61	18,354,000.00	854.53
3/23/2017 9:46	9,240	3.58	18,276,000.00	855.29
3/23/2017 9:47	9,240	3.45	17,778,000.00	854.62
3/23/2017 9:48	9,240	3.36	18,156,000.00	853.96
3/23/2017 9:49	9,240	3.36	18,054,000.00	854.54
3/23/2017 9:50	9,240	3.38	17,808,000.00	854.51
3/23/2017 9:51	9,240	3.34	17,838,000.00	855.13
3/23/2017 9:52	9,240	3.33	17,568,000.00	856.18
3/23/2017 9:53	9,240	3.14	17,664,000.00	856.48
3/23/2017 9:54	9,240	3.07	17,808,000.00	856.03
3/23/2017 9:55	9,240	3.26	17,472,000.00	856.24
3/23/2017 9:56	9,240	3.15	17,976,000.00	855.58
3/23/2017 9:57	9,240	3.06	17,874,000.00	855.08
3/23/2017 9:58	9,240	3.37	17,802,000.00	855.15
3/23/2017 9:59	9,240	3.54	17,694,000.00	856.61
3/23/2017 10:00	9,240	3.54	18,024,000.00	855.95
3/23/2017 10:01	9,240	3.46	17,748,000.00	856.33
3/23/2017 10:02	9,240	3.14	17,736,000.00	855.71
3/23/2017 10:03	9,240	3.28	17,796,000.00	854.51
3/23/2017 10:04	9,240	3.57	17,832,000.00	854.49
3/23/2017 10:05	9,240	3.54	17,808,000.00	854.34
3/23/2017 10:06	9,240	3.38	17,820,000.00	855.05
3/23/2017 10:07	9,240	3.38	18,072,000.00	855.59
3/23/2017 10:08	9,240	3.38	18,072,000.00	855.12
3/23/2017 10:09	9,240	3.34	17,976,000.00	854.5
3/23/2017 10:10	9,240	3.46	18,126,000.00	854.13
3/23/2017 10:11	9,240	3.54	18,192,000.00	854.62
3/23/2017 10:12	9,240	3.5	18,234,000.00	854.1
3/23/2017 10:13	9,240	3.45	18,066,000.00	854.34
3/23/2017 10:14	9,240	3.58	18,336,000.00	854.42
3/23/2017 10:15	9,240	3.66	17,808,000.00	855.3
3/23/2017 10:16	9,240	3.68	18,108,000.00	856.06
3/23/2017 10:17	9,240	3.66	17,820,000.00	855.66
3/23/2017 10:18	9,240	3.57	18,162,000.00	856.01
3/23/2017 10:19	9,240	3.6	17,994,000.00	856.24
3/23/2017 10:20	9,240	3.43	18,168,000.00	856.23
3/23/2017 10:21	9,240	3.36	18,012,000.00	855.55
3/23/2017 10:22	9,240	3.42	18,066,000.00	855.72
3/23/2017 10:23	9,240	3.45	18,162,000.00	855.2
3/23/2017 10:24	9,240	3.5	17,820,000.00	855.01
3/23/2017 10:25	9,240	3.3	18,000,000.00	854.64
3/23/2017 10:26	9,240	3.2	18,036,000.00	853.69
3/23/2017 10:27	9,240	3.28	17,934,000.00	853.4
3/23/2017 10:28	9,240	3.53	17,988,000.00	853.6
3/23/2017 10:29	9,240	3.6	17,898,000.00	854.43
3/23/2017 10:30	9,240	3.58	18,186,000.00	855.35
3/23/2017 10:31	9,240	3.62	17,400,000.00	856.15
3/23/2017 10:32	9,240	3.42	18,000,000.00	855.73
3/23/2017 10:33	9,240	3.34	17,664,000.00	856.47
3/23/2017 10:34	9,240	3.2	17,928,000.00	856.08
3/23/2017 10:35	9,240	3.38	17,682,000.00	856.12
3/23/2017 10:36	9,240	3.29	17,994,000.00	856.75
3/23/2017 10:37	9,240	3.14	18,264,000.00	856.16
3/23/2017 10:38	9,240	3.12	17,838,000.00	854.73
3/23/2017 10:39	9,240	3.5	18,270,000.00	854.35
3/23/2017 10:40	9,240	3.54	18,024,000.00	855.85
3/23/2017 10:41	9,240	3.5	18,192,000.00	856.63
3/23/2017 10:42	9,240	3.68	18,174,000.00	858
3/23/2017 10:43	9,240	3.63	18,048,000.00	858.78
3/23/2017 10:44	9,240	3.46	17,844,000.00	858.92
3/23/2017 10:45	9,240	3.32	17,778,000.00	859.26
3/23/2017 10:46	9,240	3.25	18,030,000.00	858.39
3/23/2017 10:47	9,240	3.3	18,324,000.00	857.92

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 10:48	9,240	3.41	18,396,000.00	857.23
3/23/2017 10:49	9,240	3.4	18,126,000.00	856.82
3/23/2017 10:50	9,240	3.58	18,276,000.00	856.92
3/23/2017 10:51	9,240	3.53	17,964,000.00	856.45
3/23/2017 10:52	9,240	3.58	18,324,000.00	857.18
3/23/2017 10:53	9,240	3.59	18,060,000.00	857.3
3/23/2017 10:54	9,240	3.46	18,420,000.00	857.19
3/23/2017 10:55	9,240	3.37	18,378,000.00	856.51
3/23/2017 10:56	9,240	3.43	18,426,000.00	856.35
3/23/2017 10:57	9,240	3.28	18,084,000.00	855.87
3/23/2017 10:58	9,240	3.51	18,132,000.00	855.93
3/23/2017 10:59	9,240	3.68	18,420,000.00	855.92
3/23/2017 11:00	9,240	3.41	17,838,000.00	855.95
3/23/2017 11:01	9,240	3.25	18,090,000.00	855.84
3/23/2017 11:02	9,240	3.3	18,210,000.00	856.39
3/23/2017 11:03	9,240	3.39	17,976,000.00	856.29
3/23/2017 11:04	9,240	3.28	17,790,000.00	856.06
3/23/2017 11:05	9,240	2.9	17,910,000.00	856.41
3/23/2017 11:06	9,240	3.1	18,162,000.00	855.67
3/23/2017 11:07	9,240	3.22	18,264,000.00	855.94
3/23/2017 11:08	9,240	3.29	18,324,000.00	855.86
3/23/2017 11:09	9,240	3.3	18,516,000.00	854.8
3/23/2017 11:10	9,240	3.4	18,066,000.00	854.53
3/23/2017 11:11	9,240	3.54	18,408,000.00	855.13
3/23/2017 11:12	9,240	3.61	18,396,000.00	855.64
3/23/2017 11:13	9,240	3.52	18,690,000.00	855.96
3/23/2017 11:14	9,240	3.53	18,456,000.00	855.22
3/23/2017 11:15	9,240	3.69	18,354,000.00	856.1
3/23/2017 11:16	9,240	3.55	18,174,000.00	855.89
3/23/2017 11:17	9,240	3.5	18,426,000.00	855.17
3/23/2017 11:18	9,240	3.65	18,126,000.00	855.33
3/23/2017 11:19	9,240	3.56	18,522,000.00	855.03
3/23/2017 11:20	9,240	3.57	18,264,000.00	855.56
3/23/2017 11:21	9,240	3.52	18,000,000.00	855.71
3/23/2017 11:22	9,240	3.41	18,570,000.00	856.47
3/23/2017 11:23	9,240	3.34	17,940,000.00	856.56
3/23/2017 11:24	9,240	3.12	18,486,000.00	855.55
3/23/2017 11:25	9,240	3.31	18,132,000.00	855.51
3/23/2017 11:26	9,240	3.2	18,252,000.00	855.42
3/23/2017 11:27	9,240	3.3	18,462,000.00	855.54
3/23/2017 11:28	9,240	3.24	18,372,000.00	854.92
3/23/2017 11:29	9,240	3.33	18,588,000.00	855.11
3/23/2017 11:30	9,240	3.44	18,252,000.00	855.19
3/23/2017 11:31	9,240	3.51	18,018,000.00	856.03
3/23/2017 11:32	9,240	3.4	18,324,000.00	855.14
3/23/2017 11:33	9,240	3.6	18,738,000.00	855.45
3/23/2017 11:34	9,240	3.42	18,486,000.00	855.91
3/23/2017 11:35	9,240	3.27	18,066,000.00	856.34
3/23/2017 11:36	9,240	3.29	18,174,000.00	855.73
3/23/2017 11:37	9,240	3.44	18,246,000.00	855.27
3/23/2017 11:38	9,240	3.34	18,762,000.00	854.25
3/23/2017 11:39	9,240	3.43	18,306,000.00	854.15
3/23/2017 11:40	9,240	3.31	18,372,000.00	854.79
3/23/2017 11:41	9,240	3.57	18,540,000.00	854.8
3/23/2017 11:42	9,240	3.42	18,450,000.00	854.81
3/23/2017 11:43	9,240	3.67	18,222,000.00	855.05
3/23/2017 11:44	9,240	3.63	18,528,000.00	855.14
3/23/2017 11:45	9,240	3.54	18,624,000.00	856.15
3/23/2017 11:46	9,240	3.34	18,504,000.00	856.78
3/23/2017 11:47	9,240	3.38	18,462,000.00	855.59
3/23/2017 11:48	9,240	3.42	18,132,000.00	854.68
3/23/2017 11:49	9,240	3.51	18,360,000.00	854.96
3/23/2017 11:50	9,240	3.54	18,282,000.00	855.98
3/23/2017 11:51	9,240	3.47	18,234,000.00	855.53
3/23/2017 11:52	9,240	3.56	18,132,000.00	856.67
3/23/2017 11:53	9,240	3.43	18,000,000.00	856.76
3/23/2017 11:54	9,240	3.33	18,216,000.00	856.55
3/23/2017 11:55	9,240	3.33	18,186,000.00	856.21

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 11:56	9,240	3.23	18,330,000.00	856
3/23/2017 11:57	9,240	3.27	18,348,000.00	856.18
3/23/2017 11:58	9,240	3.32	18,534,000.00	856.79
3/23/2017 11:59	9,240	3.21	18,156,000.00	855.88
3/23/2017 12:00	9,240	3.28	18,660,000.00	855.41
3/23/2017 12:01	9,240	3.24	18,546,000.00	855.17
3/23/2017 12:02	9,240	3.32	18,582,000.00	854.93
3/23/2017 12:03	9,240	3.39	18,372,000.00	855.31
3/23/2017 12:04	9,240	3.45	18,522,000.00	855.46
3/23/2017 12:05	9,240	3.52	18,294,000.00	854.8
3/23/2017 12:06	9,240	3.56	18,420,000.00	855.71
3/23/2017 12:07	9,240	3.59	18,252,000.00	855.78
3/23/2017 12:08	9,240	3.62	18,504,000.00	856.7
3/23/2017 12:09	9,240	3.41	18,528,000.00	857.15
3/23/2017 12:10	9,240	3.37	18,384,000.00	856.92
3/23/2017 12:11	9,240	3.48	18,588,000.00	856.69
3/23/2017 12:12	9,240	3.44	18,480,000.00	856.77
3/23/2017 12:13	9,240	3.5	18,486,000.00	856.32
3/23/2017 12:14	9,240	3.6	18,714,000.00	855.63
3/23/2017 12:15	9,240	3.52	18,888,000.00	855.15
3/23/2017 12:16	9,240	3.54	18,930,000.00	855.26
3/23/2017 12:17	9,240	3.58	18,708,000.00	855.03
3/23/2017 12:18	9,240	3.65	18,762,000.00	855.04
3/23/2017 12:19	9,240	3.61	18,024,000.00	854.77
3/23/2017 12:20	9,240	3.7	17,766,000.00	854.66
3/23/2017 12:21	9,240	3.58	17,994,000.00	855.28
3/23/2017 12:22	9,240	3.58	18,252,000.00	856.78
3/23/2017 12:23	9,240	3.4	18,222,000.00	857.09
3/23/2017 12:24	9,240	3.4	18,180,000.00	858.06
3/23/2017 12:25	9,240	3.42	18,300,000.00	857.6
3/23/2017 12:26	9,240	3.32	18,372,000.00	857.03
3/23/2017 12:27	9,240	3.57	18,246,000.00	856.05
3/23/2017 12:28	9,240	3.44	18,408,000.00	856.09
3/23/2017 12:29	9,240	3.33	18,378,000.00	856.45
3/23/2017 12:30	9,240	3.32	18,228,000.00	856.13
3/23/2017 12:31	9,240	3.51	18,276,000.00	856.28
3/23/2017 12:32	9,240	3.45	18,600,000.00	857.49
3/23/2017 12:33	9,240	3.7	18,648,000.00	857.43
3/23/2017 12:34	9,240	3.66	18,378,000.00	857.04
3/23/2017 12:35	9,240	3.5	18,516,000.00	856.56
3/23/2017 12:36	9,240	3.57	18,924,000.00	856.07
3/23/2017 12:37	9,240	3.56	18,414,000.00	855.98
3/23/2017 12:38	9,240	3.8	19,134,000.00	855.21
3/23/2017 12:39	9,240	3.67	18,660,000.00	855.03
3/23/2017 12:40	9,240	3.67	18,732,000.00	855.24
3/23/2017 12:41	9,240	3.8	18,414,000.00	856.87
3/23/2017 12:42	9,240	3.52	18,684,000.00	857.05
3/23/2017 12:43	9,240	3.38	18,330,000.00	856.36
3/23/2017 12:44	9,240	3.42	18,216,000.00	855.73
3/23/2017 12:45	9,240	3.24	18,312,000.00	856.48
3/23/2017 12:46	9,240	3.39	18,312,000.00	856.73
3/23/2017 12:47	9,240	3.29	18,072,000.00	856.39
3/23/2017 12:48	9,240	3.32	18,240,000.00	856.23
3/23/2017 12:49	9,240	3.26	18,450,000.00	856.75
3/23/2017 12:50	9,240	3.31	18,510,000.00	858.36
3/23/2017 12:51	9,240	3.21	18,690,000.00	857.38
3/23/2017 12:52	9,240	3.12	18,492,000.00	856.79
3/23/2017 12:53	9,240	3.25	18,324,000.00	855.63
3/23/2017 12:54	9,240	3.48	18,444,000.00	855.89
3/23/2017 12:55	9,240	3.39	18,336,000.00	855.43
3/23/2017 12:56	9,240	3.58	18,528,000.00	855.77
3/23/2017 12:57	9,240	3.37	18,504,000.00	856.32
3/23/2017 12:58	9,240	3.38	18,648,000.00	856.28
3/23/2017 12:59	9,240	3.34	18,438,000.00	856
3/23/2017 13:00	9,240	3.57	18,204,000.00	855.69
3/23/2017 13:01	9,240	3.71	18,330,000.00	855.59
3/23/2017 13:02	9,240	3.72	18,594,000.00	855.43
3/23/2017 13:03	9,240	3.65	18,126,000.00	856.31

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 13:04	9,240	3.46	18,168,000.00	856.96
3/23/2017 13:05	9,240	3.27	18,168,000.00	857.05
3/23/2017 13:06	9,240	3.38	18,210,000.00	856.68
3/23/2017 13:07	9,240	3.33	18,426,000.00	856.18
3/23/2017 13:08	9,240	3.24	18,210,000.00	856.64
3/23/2017 13:09	9,240	3.24	18,408,000.00	856.46
3/23/2017 13:10	9,240	3.4	18,504,000.00	856.12
3/23/2017 13:11	9,240	3.35	18,588,000.00	854.55
3/23/2017 13:12	9,240	3.6	18,510,000.00	854.99
3/23/2017 13:13	9,240	3.52	18,636,000.00	855.36
3/23/2017 13:14	9,240	3.66	18,582,000.00	856.09
3/23/2017 13:15	9,240	3.47	18,252,000.00	855.76
3/23/2017 13:16	9,240	3.57	18,618,000.00	855.65
3/23/2017 13:17	9,240	3.54	18,204,000.00	855.64
3/23/2017 13:18	9,240	3.38	18,702,000.00	855.53
3/23/2017 13:19	9,240	3.5	18,486,000.00	854.76
3/23/2017 13:20	9,240	3.57	18,612,000.00	854.7
3/23/2017 13:21	9,240	3.56	18,282,000.00	855.4
3/23/2017 13:22	9,240	3.26	18,102,000.00	855.3
3/23/2017 13:23	9,240	3.39	18,036,000.00	854.9
3/23/2017 13:24	9,240	3.41	17,970,000.00	855.05
3/23/2017 13:25	9,240	3.32	18,042,000.00	855.89
3/23/2017 13:26	9,240	3.3	18,024,000.00	856.52
3/23/2017 13:27	9,240	3.24	17,976,000.00	856.26
3/23/2017 13:28	9,240	3.37	18,192,000.00	855.98
3/23/2017 13:29	9,240	3.38	18,102,000.00	855.23
3/23/2017 13:30	9,240	3.3	18,630,000.00	855.69
3/23/2017 13:31	9,240	3.46	18,552,000.00	856.59
3/23/2017 13:32	9,240	3.53	18,876,000.00	855.83
3/23/2017 13:33	9,240	3.5	18,450,000.00	857.25
3/23/2017 13:34	9,240	3.37	19,050,000.00	857.34
3/23/2017 13:35	9,240	3.45	18,546,000.00	856.14
3/23/2017 13:36	9,240	3.56	18,606,000.00	855.19
3/23/2017 13:37	9,240	3.73	18,486,000.00	855.83
3/23/2017 13:38	9,240	3.72	18,528,000.00	856.33
3/23/2017 13:39	9,240	3.66	18,720,000.00	856.63
3/23/2017 13:40	9,240	3.79	18,576,000.00	857.52
3/23/2017 13:41	9,240	3.52	17,940,000.00	857.86
3/23/2017 13:42	9,240	3.42	18,396,000.00	857.22
3/23/2017 13:43	9,240	3.65	18,318,000.00	856.9
3/23/2017 13:44	9,240	3.45	18,372,000.00	857.5
3/23/2017 13:45	9,240	3.31	18,150,000.00	857.23
3/23/2017 13:46	9,240	3.17	18,336,000.00	857.59
3/23/2017 13:47	9,240	3.23	18,102,000.00	856.82
3/23/2017 13:48	9,240	3.27	18,162,000.00	856.17
3/23/2017 13:49	9,240	3.36	18,426,000.00	855.38
3/23/2017 13:50	9,240	3.59	18,660,000.00	855.14
3/23/2017 13:51	9,240	3.53	18,732,000.00	856.93
3/23/2017 13:52	9,240	3.44	18,378,000.00	856.6
3/23/2017 13:53	9,240	3.49	18,612,000.00	855.38
3/23/2017 13:54	9,240	3.6	18,516,000.00	856.29
3/23/2017 13:55	9,240	3.69	18,408,000.00	856.47
3/23/2017 13:56	9,240	3.55	18,384,000.00	856.01
3/23/2017 13:57	9,240	3.63	18,480,000.00	856.62
3/23/2017 13:58	9,240	3.67	18,078,000.00	856.22
3/23/2017 13:59	9,240	3.51	18,252,000.00	856.1
3/23/2017 14:00	9,240	3.43	18,306,000.00	856.69
3/23/2017 14:01	9,240	3.42	18,264,000.00	856.08
3/23/2017 14:02	9,240	3.39	18,192,000.00	856.08
3/23/2017 14:03	9,240	3.36	17,916,000.00	855.95
3/23/2017 14:04	9,240	3.35	17,964,000.00	855.46
3/23/2017 14:05	9,240	3.46	17,832,000.00	855.7
3/23/2017 14:06	9,240	3.37	18,006,000.00	856.03
3/23/2017 14:07	9,240	3.39	18,252,000.00	855.93
3/23/2017 14:08	9,240	3.41	18,114,000.00	856.33
3/23/2017 14:09	9,240	3.34	18,840,000.00	856.18
3/23/2017 14:10	9,240	3.38	18,564,000.00	855.4
3/23/2017 14:11	9,240	3.31	18,480,000.00	855.06

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 14:12	9,240	3.42	18,504,000.00	853.4
3/23/2017 14:13	9,240	3.66	18,378,000.00	853.24
3/23/2017 14:14	9,240	3.63	18,384,000.00	853.15
3/23/2017 14:15	9,240	3.74	18,720,000.00	854.04
3/23/2017 14:16	9,240	3.64	17,988,000.00	855.06
3/23/2017 14:17	9,240	3.57	18,054,000.00	854.85
3/23/2017 14:18	9,240	3.48	18,276,000.00	855.37
3/23/2017 14:19	9,240	3.16	17,388,000.00	856.33
3/23/2017 14:20	9,240	3.2	17,940,000.00	855.2
3/23/2017 14:21	9,240	3.38	18,228,000.00	855.06
3/23/2017 14:22	9,240	3.22	17,820,000.00	856.02
3/23/2017 14:23	9,240	3.17	18,072,000.00	855.6
3/23/2017 14:24	9,240	3.3	18,282,000.00	855.73
3/23/2017 14:25	9,240	3.43	18,654,000.00	855.92
3/23/2017 14:26	9,240	3.42	18,252,000.00	855.73
3/23/2017 14:27	9,240	3.37	18,264,000.00	855.85
3/23/2017 14:28	9,240	3.47	18,042,000.00	855.33
3/23/2017 14:29	9,240	3.54	18,348,000.00	855.53
3/23/2017 14:30	9,240	3.57	18,696,000.00	855.75
3/23/2017 14:31	9,240	3.68	18,180,000.00	855.91
3/23/2017 14:32	9,240	3.71	18,504,000.00	855.62
3/23/2017 14:33	9,240	3.52	18,408,000.00	854.98
3/23/2017 14:34	9,240	3.37	18,492,000.00	854.78
3/23/2017 14:35	9,240	3.41	18,348,000.00	854.4
3/23/2017 14:36	9,240	3.48	18,366,000.00	853.8
3/23/2017 14:37	9,240	3.4	18,672,000.00	853.9
3/23/2017 14:38	9,240	3.64	18,576,000.00	853.37
3/23/2017 14:39	9,240	3.57	18,102,000.00	854.59
3/23/2017 14:40	9,240	3.47	17,904,000.00	855.01
3/23/2017 14:41	9,240	3.41	17,784,000.00	855.82
3/23/2017 14:42	9,240	3.04	17,724,000.00	855.42
3/23/2017 14:43	9,240	3.17	18,144,000.00	855.77
3/23/2017 14:44	9,240	3.18	17,982,000.00	855.61
3/23/2017 14:45	9,240	3.19	17,826,000.00	855.86
3/23/2017 14:46	9,240	3.25	17,808,000.00	855.96
3/23/2017 14:47	9,240	3.3	18,012,000.00	856.13
3/23/2017 14:48	9,240	3.33	18,168,000.00	855.92
3/23/2017 14:49	9,240	3.42	18,126,000.00	857.29
3/23/2017 14:50	9,240	3.37	18,552,000.00	857.14
3/23/2017 14:51	9,240	3.17	18,474,000.00	856.17
3/23/2017 14:52	9,240	3.26	18,564,000.00	855.35
3/23/2017 14:53	9,240	3.34	19,026,000.00	853.75
3/23/2017 14:54	9,240	3.42	18,288,000.00	852.8
3/23/2017 14:55	9,240	3.76	18,660,000.00	852.47
3/23/2017 14:56	9,240	3.86	18,300,000.00	853.25
3/23/2017 14:57	9,240	3.59	18,312,000.00	853.88
3/23/2017 14:58	9,240	3.59	17,754,000.00	855.39
3/23/2017 14:59	9,240	3.33	17,952,000.00	855.17
3/23/2017 15:00	9,240	3.32	17,862,000.00	855.05
3/23/2017 15:01	9,240	3.38	17,856,000.00	855.2
3/23/2017 15:02	9,240	3.37	18,024,000.00	855.64
3/23/2017 15:03	9,240	3.41	17,484,000.00	855.73
3/23/2017 15:04	9,240	3.4	18,036,000.00	855.83
3/23/2017 15:05	9,240	3.42	17,772,000.00	856.54
3/23/2017 15:06	9,240	3.45	18,174,000.00	857.1
3/23/2017 15:07	9,240	3.55	18,570,000.00	857.63
3/23/2017 15:08	9,240	3.55	19,074,000.00	857.49
3/23/2017 15:09	9,240	3.37	18,858,000.00	856.37
3/23/2017 15:10	9,240	3.55	18,750,000.00	856.03
3/23/2017 15:11	9,240	3.58	18,756,000.00	855.21
3/23/2017 15:12	9,240	3.62	18,486,000.00	853.57
3/23/2017 15:13	9,240	3.72	18,528,000.00	852.53
3/23/2017 15:14	9,240	3.82	18,396,000.00	853.32
3/23/2017 15:15	9,240	3.73	18,324,000.00	853.66
3/23/2017 15:16	9,240	3.43	18,270,000.00	852.97
3/23/2017 15:17	9,240	3.55	17,796,000.00	854.84
3/23/2017 15:18	9,240	3.31	18,012,000.00	854.97
3/23/2017 15:19	9,240	3.36	17,514,000.00	855.21

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 15:20	9,240	3.38	18,024,000.00	855.92
3/23/2017 15:21	9,240	3.46	17,826,000.00	856.62
3/23/2017 15:22	9,240	3.43	18,060,000.00	857.7
3/23/2017 15:23	9,240	3.18	18,060,000.00	858.29
3/23/2017 15:24	9,240	3.16	18,204,000.00	857.33
3/23/2017 15:25	9,240	3.33	18,444,000.00	856.72
3/23/2017 15:26	9,240	3.26	18,804,000.00	856.53
3/23/2017 15:27	9,240	3.38	18,546,000.00	855.26
3/23/2017 15:28	9,240	3.5	18,918,000.00	854.99
3/23/2017 15:29	9,240	3.86	18,858,000.00	854.31
3/23/2017 15:30	9,240	3.7	18,762,000.00	853.68
3/23/2017 15:31	9,240	3.66	18,744,000.00	854.19
3/23/2017 15:32	9,240	3.63	18,420,000.00	854.61
3/23/2017 15:33	9,240	3.56	18,492,000.00	853.83
3/23/2017 15:34	9,240	3.68	18,312,000.00	853.08
3/23/2017 15:35	9,240	3.58	17,844,000.00	853.82
3/23/2017 15:36	9,240	3.59	17,976,000.00	853.81
3/23/2017 15:37	9,240	3.36	18,132,000.00	854.84
3/23/2017 15:38	9,240	3.24	17,688,000.00	855.42
3/23/2017 15:39	9,240	3.23	17,910,000.00	855.15
3/23/2017 15:40	9,240	3.22	17,814,000.00	855.04
3/23/2017 15:41	9,240	3.3	17,826,000.00	854.89
3/23/2017 15:42	9,240	3.26	18,126,000.00	855.07
3/23/2017 15:43	9,240	3.37	18,156,000.00	853.77
3/23/2017 15:44	9,240	3.44	18,168,000.00	854.06
3/23/2017 15:45	9,240	3.39	18,102,000.00	854.75
3/23/2017 15:46	9,240	3.39	18,222,000.00	854.83
3/23/2017 15:47	9,240	3.34	18,420,000.00	854.05
3/23/2017 15:48	9,240	3.53	18,564,000.00	854.66
3/23/2017 15:49	9,240	3.44	18,390,000.00	855.33
3/23/2017 15:50	9,240	3.54	18,360,000.00	854.87
3/23/2017 15:51	9,240	3.64	18,552,000.00	856
3/23/2017 15:52	9,240	3.51	18,432,000.00	855.69
3/23/2017 15:53	9,240	3.49	18,228,000.00	855.08
3/23/2017 15:54	9,240	3.56	18,372,000.00	855.73
3/23/2017 15:55	9,240	3.53	18,768,000.00	855.39
3/23/2017 15:56	9,240	3.62	18,576,000.00	855.59
3/23/2017 15:57	9,240	3.41	18,678,000.00	856.27
3/23/2017 15:58	9,240	3.48	18,138,000.00	855.7
3/23/2017 15:59	9,240	3.71	18,162,000.00	855.98
3/23/2017 16:00	9,240	3.53	18,360,000.00	856.29
3/23/2017 16:01	9,240	3.43	17,922,000.00	856.1
3/23/2017 16:02	9,240	3.48	18,324,000.00	856.72
3/23/2017 16:03	9,240	3.5	18,150,000.00	857
3/23/2017 16:04	9,240	3.41	18,150,000.00	856.29
3/23/2017 16:05	9,240	3.37	18,060,000.00	855.95
3/23/2017 16:06	9,240	3.48	18,126,000.00	856.28
3/23/2017 16:07	9,240	3.42	18,030,000.00	856.47
3/23/2017 16:08	9,240	3.41	17,922,000.00	856.3
3/23/2017 16:09	9,240	3.59	18,102,000.00	856.77
3/23/2017 16:10	9,240	3.26	18,222,000.00	856.57
3/23/2017 16:11	9,240	3.41	18,222,000.00	856.77
3/23/2017 16:12	9,240	3.58	18,246,000.00	856.36
3/23/2017 16:13	9,240	3.49	18,462,000.00	856.46
3/23/2017 16:14	9,240	3.34	18,636,000.00	855.75
3/23/2017 16:15	9,240	3.48	18,054,000.00	854.96
3/23/2017 16:16	9,240	3.58	18,570,000.00	855.46
3/23/2017 16:17	9,240	3.54	18,522,000.00	854.9
3/23/2017 16:18	9,240	3.67	17,982,000.00	854.61
3/23/2017 16:19	9,240	3.66	18,624,000.00	854.69
3/23/2017 16:20	9,240	3.8	18,252,000.00	855.67
3/23/2017 16:21	9,240	3.46	18,132,000.00	856.14
3/23/2017 16:22	9,240	3.44	17,940,000.00	856.1
3/23/2017 16:23	9,240	3.42	18,174,000.00	856.22
3/23/2017 16:24	9,240	3.37	17,934,000.00	856.8
3/23/2017 16:25	9,240	3.22	18,066,000.00	855.53
3/23/2017 16:26	9,240	3.3	17,784,000.00	855.09
3/23/2017 16:27	9,240	3.34	18,162,000.00	855.49

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 16:28	9,240	3.24	18,450,000.00	855.64
3/23/2017 16:29	9,240	3.46	18,420,000.00	855.24
3/23/2017 16:30	9,240	3.51	17,982,000.00	854.92
3/23/2017 16:31	9,240	3.29	18,180,000.00	855.75
3/23/2017 16:32	9,240	3.4	18,198,000.00	855.55
3/23/2017 16:33	9,240	3.38	18,228,000.00	854.39
3/23/2017 16:34	9,240	3.48	18,372,000.00	854.66
3/23/2017 16:35	9,240	3.52	18,564,000.00	854.49
3/23/2017 16:36	9,240	3.46	18,030,000.00	853.88
3/23/2017 16:37	9,240	3.62	18,126,000.00	853.82
3/23/2017 16:38	9,240	3.65	17,916,000.00	854.6
3/23/2017 16:39	9,240	3.61	17,748,000.00	856.04
3/23/2017 16:40	9,240	3.3	17,880,000.00	855.33
3/23/2017 16:41	9,240	3.14	18,042,000.00	854.3
3/23/2017 16:42	9,240	3.44	17,754,000.00	855.55
3/23/2017 16:43	9,240	3.46	17,754,000.00	856.21
3/23/2017 16:44	9,240	3.24	17,856,000.00	855.37
3/23/2017 16:45	9,240	3.27	17,850,000.00	853.68
3/23/2017 16:46	9,240	3.38	18,300,000.00	855.04
3/23/2017 16:47	9,240	3.4	18,222,000.00	855.09
3/23/2017 16:48	9,240	3.31	18,282,000.00	854.47
3/23/2017 16:49	9,240	3.31	18,264,000.00	854.48
3/23/2017 16:50	9,240	3.34	18,102,000.00	854.74
3/23/2017 16:51	9,240	3.41	18,060,000.00	854.42
3/23/2017 16:52	9,240	3.4	18,186,000.00	853.7
3/23/2017 16:53	9,240	3.52	18,126,000.00	854.13
3/23/2017 16:54	9,240	3.53	18,204,000.00	855.34
3/23/2017 16:55	9,240	3.44	17,844,000.00	855.03
3/23/2017 16:56	9,240	3.48	18,204,000.00	854.43
3/23/2017 16:57	9,240	3.47	17,976,000.00	855.17
3/23/2017 16:58	9,240	3.42	17,934,000.00	855.53
3/23/2017 16:59	9,240	3.39	17,994,000.00	854.94
3/23/2017 17:00	9,240	3.38	17,730,000.00	854.6
3/23/2017 17:01	9,240	3.4	18,156,000.00	855.8
3/23/2017 17:02	9,240	3.49	17,826,000.00	855.9
3/23/2017 17:03	9,240	3.53	18,204,000.00	855.33
3/23/2017 17:04	9,240	3.26	18,306,000.00	854.83
3/23/2017 17:05	9,240	3.25	18,192,000.00	854.68
3/23/2017 17:06	9,240	3.22	18,102,000.00	853.62
3/23/2017 17:07	9,240	3.52	18,156,000.00	852.89
3/23/2017 17:08	9,240	3.62	18,456,000.00	852.9
3/23/2017 17:09	9,240	3.73	18,060,000.00	853.65
3/23/2017 17:10	9,240	3.64	18,546,000.00	853.9
3/23/2017 17:11	9,240	3.74	18,108,000.00	853.73
3/23/2017 17:12	9,240	3.61	17,994,000.00	854.54
3/23/2017 17:13	9,240	3.29	17,814,000.00	853.98
3/23/2017 17:14	9,240	3.27	17,868,000.00	852.99
3/23/2017 17:15	9,240	3.44	17,700,000.00	853.77
3/23/2017 17:16	9,240	3.3	17,472,000.00	853.22
3/23/2017 17:17	9,240	3.29	17,838,000.00	852.98
3/23/2017 17:18	9,240	3.46	17,292,000.00	853.69
3/23/2017 17:19	9,240	3.6	17,850,000.00	853.48
3/23/2017 17:20	9,240	3.58	17,838,000.00	854.6
3/23/2017 17:21	9,240	3.58	17,724,000.00	855.39
3/23/2017 17:22	9,240	3.15	17,796,000.00	854.74
3/23/2017 17:23	9,240	3.15	17,724,000.00	854.11
3/23/2017 17:24	9,240	3.5	18,252,000.00	854.29
3/23/2017 17:25	9,240	3.31	18,318,000.00	853.22
3/23/2017 17:26	9,240	3.54	17,994,000.00	853.2
3/23/2017 17:27	9,240	3.65	18,384,000.00	852.07
3/23/2017 17:28	9,240	3.84	17,910,000.00	851.35
3/23/2017 17:29	9,240	3.74	18,156,000.00	852.23
3/23/2017 17:30	9,240	3.51	18,000,000.00	851.85
3/23/2017 17:31	9,240	3.72	17,850,000.00	852.96
3/23/2017 17:32	9,240	3.5	17,748,000.00	853.47
3/23/2017 17:33	9,240	3.26	17,724,000.00	852.99
3/23/2017 17:34	9,240	3.15	17,502,000.00	853.28
3/23/2017 17:35	9,240	3.02	17,748,000.00	852.71

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 17:36	9,240	3.07	17,652,000.00	852.39
3/23/2017 17:37	9,240	3.23	17,748,000.00	852.17
3/23/2017 17:38	9,240	3.37	17,532,000.00	851.84
3/23/2017 17:39	9,240	3.17	17,286,000.00	852.76
3/23/2017 17:40	9,240	3.3	17,442,000.00	853.82
3/23/2017 17:41	9,240	3.19	17,898,000.00	854.37
3/23/2017 17:42	9,240	3.38	17,640,000.00	854.7
3/23/2017 17:43	9,240	3.27	17,868,000.00	855.05
3/23/2017 17:44	9,240	3.2	17,646,000.00	854.72
3/23/2017 17:45	9,240	3.18	17,982,000.00	854.3
3/23/2017 17:46	9,240	3.34	18,078,000.00	854.79
3/23/2017 17:47	9,240	3.43	18,042,000.00	854.16
3/23/2017 17:48	9,240	3.44	18,480,000.00	852.85
3/23/2017 17:49	9,240	3.45	18,420,000.00	852.77
3/23/2017 17:50	9,240	3.44	18,336,000.00	852.04
3/23/2017 17:51	9,240	3.5	18,360,000.00	852.33
3/23/2017 17:52	9,240	3.62	18,120,000.00	851.64
3/23/2017 17:53	9,240	3.7	18,036,000.00	851.31
3/23/2017 17:54	9,240	3.68	17,646,000.00	851.75
3/23/2017 17:55	9,240	3.71	17,670,000.00	852.11
3/23/2017 17:56	9,240	3.58	17,730,000.00	853.03
3/23/2017 17:57	9,240	3.37	17,622,000.00	853
3/23/2017 17:58	9,240	3.26	17,448,000.00	853.16
3/23/2017 17:59	9,240	3.26	17,844,000.00	854.07
3/23/2017 18:00	9,240	3.2	17,406,000.00	854.05
3/23/2017 18:01	9,240	3.17	17,340,000.00	854.33
3/23/2017 18:02	9,240	3.06	17,760,000.00	854.01
3/23/2017 18:03	9,240	3.24	17,328,000.00	853.43
3/23/2017 18:04	9,240	3.43	17,478,000.00	854.22
3/23/2017 18:05	9,240	3.36	17,952,000.00	854.42
3/23/2017 18:06	9,240	3.44	18,114,000.00	853.83
3/23/2017 18:07	9,240	3.42	17,976,000.00	854.34
3/23/2017 18:08	9,240	3.38	18,186,000.00	854.74
3/23/2017 18:09	9,240	3.45	18,420,000.00	853.62
3/23/2017 18:10	9,240	3.46	18,042,000.00	853.85
3/23/2017 18:11	9,240	3.49	18,186,000.00	853.47
3/23/2017 18:12	9,240	3.39	17,772,000.00	852.87
3/23/2017 18:13	9,240	3.46	17,736,000.00	853.3
3/23/2017 18:14	9,240	3.53	18,120,000.00	853.2
3/23/2017 18:15	9,240	3.44	17,856,000.00	852.92
3/23/2017 18:16	9,240	3.62	17,592,000.00	853.19
3/23/2017 18:17	9,240	3.4	17,706,000.00	853.32
3/23/2017 18:18	9,240	3.18	17,502,000.00	853.38
3/23/2017 18:19	9,240	3.29	16,962,000.00	853.26
3/23/2017 18:20	9,240	3.44	17,268,000.00	853.1
3/23/2017 18:21	9,240	3.25	17,778,000.00	853.89
3/23/2017 18:22	9,240	3.24	18,000,000.00	853.69
3/23/2017 18:23	9,240	3.23	17,574,000.00	853.83
3/23/2017 18:24	9,240	3.36	17,808,000.00	854.43
3/23/2017 18:25	9,240	3.43	17,760,000.00	854.83
3/23/2017 18:26	9,240	3.37	17,706,000.00	854.34
3/23/2017 18:27	9,240	3.31	18,084,000.00	854.26
3/23/2017 18:28	9,240	3.38	18,024,000.00	854.11
3/23/2017 18:29	9,240	3.25	18,030,000.00	853.8
3/23/2017 18:30	9,240	3.52	17,970,000.00	853.61
3/23/2017 18:31	9,240	3.49	18,174,000.00	853.12
3/23/2017 18:32	9,240	3.62	18,168,000.00	853.8
3/23/2017 18:33	9,240	3.66	18,354,000.00	853.99
3/23/2017 18:34	9,240	3.54	18,108,000.00	853.81
3/23/2017 18:35	9,240	3.52	18,222,000.00	853.14
3/23/2017 18:36	9,240	3.43	17,892,000.00	852.39
3/23/2017 18:37	9,240	3.45	17,880,000.00	852.1
3/23/2017 18:38	9,240	3.43	17,922,000.00	852.2
3/23/2017 18:39	9,240	3.4	18,180,000.00	852.21
3/23/2017 18:40	9,240	3.31	17,820,000.00	852.3
3/23/2017 18:41	9,240	3.33	17,490,000.00	852.49
3/23/2017 18:42	9,240	3.43	17,742,000.00	853.43
3/23/2017 18:43	9,240	3.16	17,466,000.00	853.68

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/23/2017 18:44	9,240	3.16	17,388,000.00	853.75
3/23/2017 18:45	9,240	3.36	17,658,000.00	853.93
3/23/2017 18:46	9,240	3.31	17,652,000.00	854.23
				855.10
3/24/2017 8:00	9,240	3.1	17,814,000.00	853.55
3/24/2017 8:01	9,240	3.2	18,054,000.00	852.85
3/24/2017 8:02	9,240	3.4	17,340,000.00	851.31
3/24/2017 8:03	9,240	3.76	18,258,000.00	851.15
3/24/2017 8:04	9,240	3.98	17,940,000.00	851.98
3/24/2017 8:05	9,240	3.84	17,736,000.00	853.73
3/24/2017 8:06	9,240	3.42	17,760,000.00	852.99
3/24/2017 8:07	9,240	3.57	18,048,000.00	852.47
3/24/2017 8:08	9,240	3.4	17,688,000.00	852.31
3/24/2017 8:09	9,240	3.69	17,766,000.00	851.78
3/24/2017 8:10	9,240	3.42	17,544,000.00	852.14
3/24/2017 8:11	9,240	3.54	17,376,000.00	853.76
3/24/2017 8:12	9,240	3.35	18,162,000.00	853.17
3/24/2017 8:13	9,240	3.22	17,970,000.00	851.76
3/24/2017 8:14	9,240	3.12	18,408,000.00	851.17
3/24/2017 8:15	9,240	3.23	17,988,000.00	851.19
3/24/2017 8:16	9,240	3.3	17,886,000.00	849.88
3/24/2017 8:17	9,240	3.44	17,718,000.00	850.1
3/24/2017 8:18	9,240	3.55	16,758,000.00	851.3
3/24/2017 8:19	9,240	3.62	16,794,000.00	851.67
3/24/2017 8:20	9,240	3.68	17,160,000.00	851.79
3/24/2017 8:21	9,240	3.39	17,568,000.00	852.87
3/24/2017 8:22	9,240	3.36	17,448,000.00	853.18
3/24/2017 8:23	9,240	3.34	17,142,000.00	852.2
3/24/2017 8:24	9,240	3.44	16,608,000.00	851.46
3/24/2017 8:25	9,240	3.4	16,968,000.00	852.38
3/24/2017 8:26	9,240	3.13	16,866,000.00	852.51
3/24/2017 8:27	9,240	3.36	16,914,000.00	851.57
3/24/2017 8:28	9,240	3.42	17,058,000.00	851
3/24/2017 8:29	9,240	3.57	17,652,000.00	852.03
3/24/2017 8:30	9,240	3.7	16,776,000.00	853.57
3/24/2017 8:31	9,240	3.58	17,490,000.00	852.68
3/24/2017 8:32	9,240	3.35	17,838,000.00	851.98
3/24/2017 8:33	9,240	3.51	17,268,000.00	852.66
3/24/2017 8:34	9,240	3.34	17,544,000.00	852.63
3/24/2017 8:35	9,240	3.22	17,868,000.00	850.82
3/24/2017 8:36	9,240	3.13	17,658,000.00	849.82
3/24/2017 8:37	9,240	3.29	16,830,000.00	850.15
3/24/2017 8:38	9,240	3.52	17,634,000.00	849.76
3/24/2017 8:39	9,240	3.59	17,676,000.00	849.94
3/24/2017 8:40	9,240	3.49	17,628,000.00	850.84
3/24/2017 8:41	9,240	3.44	17,412,000.00	851.76
3/24/2017 8:42	9,240	3.46	16,908,000.00	852.65
3/24/2017 8:43	9,240	3.21	16,974,000.00	853.66
3/24/2017 8:44	9,240	3.2	16,812,000.00	854.37
3/24/2017 8:45	9,240	3.11	17,160,000.00	854.97
3/24/2017 8:46	9,240	2.87	16,794,000.00	853.84
3/24/2017 8:47	9,240	2.83	17,502,000.00	852.91
3/24/2017 8:48	9,240	3.18	18,024,000.00	853.38
3/24/2017 8:49	9,240	3.29	17,958,000.00	853.23
3/24/2017 8:50	9,240	3.28	18,132,000.00	852.37
3/24/2017 8:51	9,240	3.48	18,108,000.00	853.24
3/24/2017 8:52	9,240	3.42	18,060,000.00	853.62
3/24/2017 8:53	9,240	3.5	17,988,000.00	852.93
3/24/2017 8:54	9,240	3.8	18,102,000.00	852.35
3/24/2017 8:55	9,240	3.7	17,736,000.00	853.17
3/24/2017 8:56	9,240	3.55	17,904,000.00	854.57
3/24/2017 8:57	9,240	3.22	18,264,000.00	854
3/24/2017 8:58	9,240	3.14	18,036,000.00	851.68
3/24/2017 8:59	9,240	3.53	17,790,000.00	851.45
3/24/2017 9:00	9,240	3.52	17,916,000.00	852.87
3/24/2017 9:01	9,240	3.5	17,922,000.00	852.33

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/24/2017 9:02	9,240	3.44	17,196,000.00	852.02
3/24/2017 9:03	9,240	3.47	16,656,000.00	853
3/24/2017 9:04	9,240	3.4	16,950,000.00	854.4
3/24/2017 9:05	9,240	3.15	17,508,000.00	853.5
3/24/2017 9:06	9,240	3.25	17,904,000.00	853.1
3/24/2017 9:07	9,240	3.04	17,250,000.00	852.4
3/24/2017 9:08	9,240	3.04	16,620,000.00	851.18
3/24/2017 9:09	9,240	3.24	16,848,000.00	851.55
3/24/2017 9:10	9,240	3.48	17,718,000.00	852.39
3/24/2017 9:11	9,240	3.44	16,794,000.00	852.65
3/24/2017 9:12	9,240	3.39	16,908,000.00	853.52
3/24/2017 9:13	9,240	3.35	16,746,000.00	854.19
3/24/2017 9:14	9,240	3.27	16,692,000.00	853.31
3/24/2017 9:15	9,240	3.18	16,830,000.00	852.95
3/24/2017 9:16	9,240	3.31	16,374,000.00	853.14
3/24/2017 9:17	9,240	3.58	17,262,000.00	853.12
3/24/2017 9:18	9,240	3.31	18,078,000.00	853.16
3/24/2017 9:19	9,240	3.24	17,640,000.00	852.92
3/24/2017 9:20	9,240	3.16	16,554,000.00	852.56
3/24/2017 9:21	9,240	3.54	16,416,000.00	852.45
3/24/2017 9:22	9,240	3.45	16,896,000.00	852.24
3/24/2017 9:23	9,240	3.21	17,790,000.00	852.66
3/24/2017 9:24	9,240	3.37	18,282,000.00	852.35
3/24/2017 9:25	9,240	3.54	18,168,000.00	852.2
3/24/2017 9:26	9,240	3.32	17,478,000.00	852.47
3/24/2017 9:27	9,240	3.34	17,904,000.00	852.61
3/24/2017 9:28	9,240	3.49	18,216,000.00	850.76
3/24/2017 9:29	9,240	3.56	18,246,000.00	850.84
3/24/2017 9:30	9,240	3.63	17,754,000.00	850.88
3/24/2017 9:31	9,240	3.64	16,734,000.00	852.05
3/24/2017 9:32	9,240	3.54	17,634,000.00	852.43
3/24/2017 9:33	9,240	3.5	17,628,000.00	852.85
3/24/2017 9:34	9,240	3.26	17,898,000.00	853.15
3/24/2017 9:35	9,240	3.37	17,190,000.00	853.07
3/24/2017 9:36	9,240	3.26	16,512,000.00	852.75
3/24/2017 9:37	9,240	3.49	16,770,000.00	853.22
3/24/2017 9:38	9,240	3.23	16,956,000.00	853.32
3/24/2017 9:39	9,240	3.19	17,610,000.00	852.93
3/24/2017 9:40	9,240	3.19	16,776,000.00	852.91
3/24/2017 9:41	9,240	3.3	17,850,000.00	853.85
3/24/2017 9:42	9,240	3.49	16,824,000.00	853.62
3/24/2017 9:43	9,240	3.44	17,904,000.00	854.19
3/24/2017 9:44	9,240	3.3	17,514,000.00	854.47
3/24/2017 9:45	9,240	3.37	17,718,000.00	854.2
3/24/2017 9:46	9,240	3.46	17,940,000.00	854.19
3/24/2017 9:47	9,240	3.53	17,058,000.00	853.99
3/24/2017 9:48	9,240	3.44	16,968,000.00	854.21
3/24/2017 9:49	9,240	3.49	17,088,000.00	855.06
3/24/2017 9:50	9,240	3.42	17,916,000.00	854.89
3/24/2017 9:51	9,240	3.46	17,772,000.00	854.71
3/24/2017 9:52	9,240	3.17	17,634,000.00	854.9
3/24/2017 9:53	9,240	3.07	17,280,000.00	853.03
3/24/2017 9:54	9,240	3.08	16,992,000.00	851.62
3/24/2017 9:55	9,240	3.28	17,862,000.00	851.95
3/24/2017 9:56	9,240	3.44	17,826,000.00	851.91
3/24/2017 9:57	9,240	3.44	17,976,000.00	852.63
3/24/2017 9:58	9,240	3.5	17,736,000.00	853.61
3/24/2017 9:59	9,240	3.44	17,988,000.00	854.8
3/24/2017 10:00	9,240	3.51	17,790,000.00	854.57
3/24/2017 10:01	9,240	3.38	17,754,000.00	855.17
3/24/2017 10:02	9,240	3.4	17,856,000.00	854.91
3/24/2017 10:03	9,240	3.35	18,198,000.00	854.86
3/24/2017 10:04	9,240	3.42	18,528,000.00	855.21
3/24/2017 10:05	9,240	3.26	17,454,000.00	853.5
3/24/2017 10:06	9,240	3.42	17,928,000.00	852.72
3/24/2017 10:07	9,240	3.5	18,294,000.00	852.64
3/24/2017 10:08	9,240	3.6	18,372,000.00	852.81
3/24/2017 10:09	9,240	3.64	17,838,000.00	852.63

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/24/2017 10:10	9,240	3.62	17,610,000.00	852.53
3/24/2017 10:11	9,240	3.6	17,772,000.00	852.45
3/24/2017 10:12	9,240	3.58	17,658,000.00	852.82
3/24/2017 10:13	9,240	3.55	17,202,000.00	853.3
3/24/2017 10:14	9,240	3.5	17,682,000.00	853.32
3/24/2017 10:15	9,240	3.4	17,112,000.00	854.05
3/24/2017 10:16	9,240	3.14	16,944,000.00	854.47
3/24/2017 10:17	9,240	2.91	17,256,000.00	855.16
3/24/2017 10:18	9,240	3.16	17,022,000.00	854.4
3/24/2017 10:19	9,240	3.14	17,148,000.00	854.28
3/24/2017 10:20	9,240	3.3	17,124,000.00	854.48
3/24/2017 10:21	9,240	3.53	17,328,000.00	855.06
3/24/2017 10:22	9,240	3.6	17,430,000.00	855.51
3/24/2017 10:23	9,240	3.45	17,676,000.00	855.96
3/24/2017 10:24	9,240	3.44	17,934,000.00	855.87
3/24/2017 10:25	9,240	3.52	18,324,000.00	855.97
3/24/2017 10:26	9,240	3.47	18,264,000.00	854.24
3/24/2017 10:27	9,240	3.75	18,174,000.00	853.92
3/24/2017 10:28	9,240	3.8	17,976,000.00	853.84
3/24/2017 10:29	9,240	3.62	18,120,000.00	854.53
3/24/2017 10:30	9,240	3.64	17,754,000.00	853.42
3/24/2017 10:31	9,240	3.62	18,228,000.00	852.01
3/24/2017 10:32	9,240	3.65	17,784,000.00	851.55
3/24/2017 10:33	9,240	3.83	17,574,000.00	851.79
3/24/2017 10:34	9,240	3.82	17,466,000.00	851.74
3/24/2017 10:35	9,240	3.79	17,286,000.00	852.8
3/24/2017 10:36	9,240	3.57	17,214,000.00	854.46
3/24/2017 10:37	9,240	3.24	17,016,000.00	855.9
3/24/2017 10:38	9,240	3.06	17,142,000.00	855.05
3/24/2017 10:39	9,240	3.31	17,064,000.00	854.37
3/24/2017 10:40	9,240	3.22	17,058,000.00	853.74
3/24/2017 10:41	9,240	3.39	17,520,000.00	854.13
3/24/2017 10:42	9,240	3.47	18,126,000.00	855.12
3/24/2017 10:43	9,240	3.42	17,730,000.00	854.97
3/24/2017 10:44	9,240	3.39	17,424,000.00	854.39
3/24/2017 10:45	9,240	3.5	17,826,000.00	855.23
3/24/2017 10:46	9,240	3.58	17,844,000.00	855.37
3/24/2017 10:47	9,240	3.35	17,532,000.00	854.99
3/24/2017 10:48	9,240	3.59	17,832,000.00	854.54
3/24/2017 10:49	9,240	3.41	17,640,000.00	853.95
3/24/2017 10:50	9,240	3.41	18,090,000.00	852.46
3/24/2017 10:51	9,240	3.8	17,592,000.00	852
3/24/2017 10:52	9,240	3.89	17,190,000.00	851.37
3/24/2017 10:53	9,240	3.8	17,424,000.00	851.45
3/24/2017 10:54	9,240	3.69	17,058,000.00	852.35
3/24/2017 10:55	9,240	3.55	17,454,000.00	853.06
3/24/2017 10:56	9,240	3.45	16,836,000.00	853.38
3/24/2017 10:57	9,240	3.5	17,712,000.00	854.17
3/24/2017 10:58	9,240	3.28	16,650,000.00	854.18
3/24/2017 10:59	9,240	3.24	16,470,000.00	854.45
3/24/2017 11:00	9,240	3.17	16,968,000.00	853.93
3/24/2017 11:01	9,240	3.26	17,142,000.00	853.85
3/24/2017 11:02	9,240	3.36	16,836,000.00	853.47
3/24/2017 11:03	9,240	3.28	16,860,000.00	853.49
3/24/2017 11:04	9,240	3.25	16,938,000.00	852.5
3/24/2017 11:05	9,240	3.16	17,754,000.00	852.65
3/24/2017 11:06	9,240	3.33	17,976,000.00	853.39
3/24/2017 11:07	9,240	3.4	17,928,000.00	853.38
3/24/2017 11:08	9,240	3.3	17,916,000.00	853.12
3/24/2017 11:09	9,240	3.29	17,718,000.00	852.36
3/24/2017 11:10	9,240	3.47	18,006,000.00	852.77
3/24/2017 11:11	9,240	3.75	17,028,000.00	852.92
3/24/2017 11:12	9,240	3.43	17,748,000.00	852.29
3/24/2017 11:13	9,240	3.47	17,250,000.00	853.03
3/24/2017 11:14	9,240	3.4	17,502,000.00	853.02
3/24/2017 11:15	9,240	3.31	17,670,000.00	853.05
3/24/2017 11:16	9,240	3.45	17,418,000.00	852.36
3/24/2017 11:17	9,240	3.73	16,986,000.00	852.48

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/24/2017 11:18	9,240	3.46	16,884,000.00	853.47
3/24/2017 11:19	9,240	3.34	17,238,000.00	853.97
3/24/2017 11:20	9,240	3.36	17,028,000.00	853.27
3/24/2017 11:21	9,240	3.12	17,880,000.00	853.63
3/24/2017 11:22	9,240	3.01	17,874,000.00	852.83
3/24/2017 11:23	9,240	3.01	17,610,000.00	851.92
3/24/2017 11:24	9,240	3.32	16,944,000.00	851.64
3/24/2017 11:25	9,240	3.48	17,514,000.00	851.54
3/24/2017 11:26	9,240	3.4	17,646,000.00	851.83
3/24/2017 11:27	9,240	3.54	17,952,000.00	852.66
3/24/2017 11:28	9,240	3.33	17,862,000.00	852.08
3/24/2017 11:29	9,240	3.35	17,694,000.00	852.85
3/24/2017 11:30	9,240	3.42	17,208,000.00	853.08
3/24/2017 11:31	9,240	3.38	17,040,000.00	853.1
3/24/2017 11:32	9,240	3.2	17,478,000.00	853.37
3/24/2017 11:33	9,240	3.22	18,042,000.00	852.31
3/24/2017 11:34	9,240	3.26	17,124,000.00	851.72
3/24/2017 11:35	9,240	3.31	17,364,000.00	851.57
3/24/2017 11:36	9,240	3.36	17,820,000.00	851.78
3/24/2017 11:37	9,240	3.47	16,890,000.00	853.01
3/24/2017 11:38	9,240	3.42	17,232,000.00	853.34
3/24/2017 11:39	9,240	3.2	17,742,000.00	853.4
3/24/2017 11:40	9,240	3.27	17,586,000.00	853.33
3/24/2017 11:41	9,240	3.25	17,328,000.00	853.31
3/24/2017 11:42	9,240	3.24	17,754,000.00	852.98
3/24/2017 11:43	9,240	3.3	17,604,000.00	853.35
3/24/2017 11:44	9,240	3.35	17,526,000.00	853.92
3/24/2017 11:45	9,240	3.39	18,096,000.00	854.29
3/24/2017 11:46	9,240	3.25	17,970,000.00	853.46
3/24/2017 11:47	9,240	3.49	17,472,000.00	853.25
3/24/2017 11:48	9,240	3.75	18,042,000.00	853.4
3/24/2017 11:49	9,240	3.6	18,144,000.00	853.64
3/24/2017 11:50	9,240	3.5	18,456,000.00	852.69
3/24/2017 11:51	9,240	3.31	18,126,000.00	852.04
3/24/2017 11:52	9,240	3.43	18,390,000.00	850.82
3/24/2017 11:53	9,240	3.53	17,814,000.00	850.67
3/24/2017 11:54	9,240	3.55	18,030,000.00	850.93
3/24/2017 11:55	9,240	3.67	17,778,000.00	850.92
3/24/2017 11:56	9,240	3.5	17,640,000.00	850.4
3/24/2017 11:57	9,240	3.4	17,274,000.00	851.57
3/24/2017 11:58	9,240	3.47	17,538,000.00	852.59
3/24/2017 11:59	9,240	3.17	16,470,000.00	852.68
3/24/2017 12:00	9,240	3.26	16,620,000.00	853.53
3/24/2017 12:01	9,240	3	17,160,000.00	853.64
3/24/2017 12:02	9,240	3.1	17,520,000.00	853.26
3/24/2017 12:03	9,240	3.18	17,364,000.00	852.99
3/24/2017 12:04	9,240	3.24	17,838,000.00	854.06
3/24/2017 12:05	9,240	3.04	17,724,000.00	854.02
3/24/2017 12:06	9,240	3.16	17,760,000.00	853.53
3/24/2017 12:07	9,240	3.42	17,886,000.00	853.1
3/24/2017 12:08	9,240	3.53	18,546,000.00	853.2
3/24/2017 12:09	9,240	3.72	18,384,000.00	853.36
3/24/2017 12:10	9,240	3.57	18,180,000.00	854.58
3/24/2017 12:11	9,240	3.44	18,162,000.00	853.81
3/24/2017 12:12	9,240	3.47	18,030,000.00	852.96
3/24/2017 12:13	9,240	3.42	18,114,000.00	852.73
3/24/2017 12:14	9,240	3.46	18,198,000.00	852.13
3/24/2017 12:15	9,240	3.47	18,048,000.00	851.4
3/24/2017 12:16	9,240	3.44	17,940,000.00	850.67
3/24/2017 12:17	9,240	3.64	18,018,000.00	850.49
3/24/2017 12:18	9,240	3.72	18,018,000.00	851.52
3/24/2017 12:19	9,240	3.68	18,246,000.00	852.48
3/24/2017 12:20	9,240	3.56	17,592,000.00	853.92
3/24/2017 12:21	9,240	3.28	17,688,000.00	853.69
3/24/2017 12:22	9,240	3.17	17,472,000.00	854.1
3/24/2017 12:23	9,240	3.18	17,454,000.00	853.65
3/24/2017 12:24	9,240	3.25	17,604,000.00	853.8
3/24/2017 12:25	9,240	3.28	17,610,000.00	854.46

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/24/2017 12:26	9,240	3.18	17,634,000.00	854.6
3/24/2017 12:27	9,240	3.06	17,598,000.00	854.93
3/24/2017 12:28	9,240	3.25	17,688,000.00	855.33
3/24/2017 12:29	9,240	3.42	18,054,000.00	855.75
3/24/2017 12:30	9,240	3.28	17,592,000.00	854.94
3/24/2017 12:31	9,240	3.43	17,952,000.00	854.88
3/24/2017 12:32	9,240	3.56	18,252,000.00	855
3/24/2017 12:33	9,240	3.65	18,258,000.00	855.32
3/24/2017 12:34	9,240	3.33	18,126,000.00	854.88
3/24/2017 12:35	9,240	3.43	18,486,000.00	854.69
3/24/2017 12:36	9,240	3.47	18,240,000.00	855.21
3/24/2017 12:37	9,240	3.36	17,988,000.00	853.97
3/24/2017 12:38	9,240	3.56	18,102,000.00	853.45
3/24/2017 12:39	9,240	3.78	18,282,000.00	853.44
3/24/2017 12:40	9,240	3.58	17,850,000.00	853.59
3/24/2017 12:41	9,240	3.54	17,796,000.00	853.87
3/24/2017 12:42	9,240	3.59	17,688,000.00	853.82
3/24/2017 12:43	9,240	3.7	18,036,000.00	854.54
3/24/2017 12:44	9,240	3.74	17,610,000.00	855.07
3/24/2017 12:45	9,240	3.38	17,700,000.00	856.37
3/24/2017 12:46	9,240	3.21	17,778,000.00	855.94
3/24/2017 12:47	9,240	3.32	17,844,000.00	855.75
3/24/2017 12:48	9,240	3.28	17,928,000.00	854.55
3/24/2017 12:49	9,240	3.4	17,868,000.00	854.1
3/24/2017 12:50	9,240	3.32	17,778,000.00	853.81
3/24/2017 12:51	9,240	3.32	17,994,000.00	854.51
3/24/2017 12:52	9,240	3.34	18,168,000.00	853.64
3/24/2017 12:53	9,240	3.34	18,156,000.00	853.08
3/24/2017 12:54	9,240	3.48	17,706,000.00	853.88
3/24/2017 12:55	9,240	3.59	17,994,000.00	854.38
3/24/2017 12:56	9,240	3.56	18,060,000.00	854.33
3/24/2017 12:57	9,240	3.46	18,306,000.00	854.13
3/24/2017 12:58	9,240	3.43	17,964,000.00	853.74
3/24/2017 12:59	9,240	3.43	17,994,000.00	853.03
3/24/2017 13:00	9,240	3.5	17,820,000.00	853.23
3/24/2017 13:01	9,240	3.62	17,928,000.00	853.13
3/24/2017 13:02	9,240	3.47	17,670,000.00	853.4
3/24/2017 13:03	9,240	3.23	17,556,000.00	854.24
3/24/2017 13:04	9,240	3.35	17,496,000.00	854.22
3/24/2017 13:05	9,240	3.39	17,880,000.00	853.26
3/24/2017 13:06	9,240	3.51	17,550,000.00	852.57
3/24/2017 13:07	9,240	3.32	17,772,000.00	853.36
3/24/2017 13:08	9,240	3.45	17,634,000.00	854.24
3/24/2017 13:09	9,240	3.43	17,448,000.00	855.02
3/24/2017 13:10	9,240	3.21	17,736,000.00	855.04
3/24/2017 13:11	9,240	3.38	17,466,000.00	855.07
3/24/2017 13:12	9,240	3.19	18,072,000.00	854.91
3/24/2017 13:13	9,240	3.31	17,784,000.00	854.53
3/24/2017 13:14	9,240	3.47	18,174,000.00	854.66
3/24/2017 13:15	9,240	3.54	18,138,000.00	854.45
3/24/2017 13:16	9,240	3.54	17,856,000.00	853.26
3/24/2017 13:17	9,240	3.48	17,922,000.00	853.55
3/24/2017 13:18	9,240	3.39	18,084,000.00	853.02
3/24/2017 13:19	9,240	3.55	18,108,000.00	851.48
3/24/2017 13:20	9,240	3.77	18,180,000.00	852.5
3/24/2017 13:21	9,240	3.74	18,084,000.00	853.25
3/24/2017 13:22	9,240	3.64	17,106,000.00	853
3/24/2017 13:23	9,240	3.62	17,526,000.00	853.5
3/24/2017 13:24	9,240	3.33	17,478,000.00	853.84
3/24/2017 13:25	9,240	3.23	17,382,000.00	854.65
3/24/2017 13:26	9,240	3.02	17,454,000.00	853.76
3/24/2017 13:27	9,240	3.21	17,118,000.00	852.89
3/24/2017 13:28	9,240	3.42	16,788,000.00	853.84
3/24/2017 13:29	9,240	3.24	17,568,000.00	853.76
3/24/2017 13:30	9,240	3.32	17,496,000.00	853.98
3/24/2017 13:31	9,240	3.44	17,406,000.00	853.23
3/24/2017 13:32	9,240	3.37	18,048,000.00	853.28
3/24/2017 13:33	9,240	3.59	17,976,000.00	853.36

Date/Time	BFB1: FD_WOOD (DSCFMMBTU)	BFB1: O2_P60 (PCT)	BFB1: STACK_FLOW_SCFH_P60 (SCFH)	BFB1: STEAM (KLBHR) Raw Value
3/24/2017 13:34	9,240	3.58	17,820,000.00	854.76
3/24/2017 13:35	9,240	3.48	18,498,000.00	855.83
3/24/2017 13:36	9,240	3.27	18,336,000.00	854.24
3/24/2017 13:37	9,240	3.53	18,366,000.00	852.57
3/24/2017 13:38	9,240	3.67	18,132,000.00	852.54
3/24/2017 13:39	9,240	3.66	18,498,000.00	853.33
3/24/2017 13:40	9,240	3.53	17,928,000.00	853.24
3/24/2017 13:41	9,240	3.52	17,808,000.00	852.3
3/24/2017 13:42	9,240	3.6	17,448,000.00	852.57
3/24/2017 13:43	9,240	3.44	17,658,000.00	853.06
3/24/2017 13:44	9,240	3.39	17,466,000.00	853.15
3/24/2017 13:45	9,240	3.23	16,272,000.00	853.74
				853.22

Appendix B: Mathematical Equations

Example Calculations from Run 1

Volume of Water Collected (scf)

$V_{w(std)} = 0.04707(V_t)$

Where:

Vt	= Total Volume of liquid collected in impingers, ml	=	0.00	ml
0.04707	= Water Volume to Standard Water Vapor (ft^3/ml)	=	0.04707	ft3/ml
$V_{wc(std)}$	= Volume of Water Vapor, Corrected to Standard Conditions (scf)	=	0.00	scf

Volume of Water Collected, by weight (scf)

$V_{w(std)} = 0.04715(W_t)$

Where:

Wt	= Total mass of liquid collected in impingers, g	=	717.50	g
0.04715	= Water Volume to Standard Water Vapor (ft^3/ml)	=	0.04715	ft3/ml
$V_{wsg(std)}$	= Volume of Water Vapor, Corrected to Standard Conditions (scf)	=	33.83	scf

Volume of dry gas sampled at standard conditions (dscf)

$$V_{m(std)} = V_m Y \frac{T_{std}\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{T_m P_{std}}$$

Where:

V_m	= Volume of Gas Sampled, as Measured by the Dry Gas Meter (dcf)	=	133.82	dcf
Y	= Dry Gas Meter Calibration Factor	=	1.012	
P_{bar}	= Barometric Pressure at the Sample Location (in. Hg)	=	29.93	in. Hg
T_{std}	= Standard Absolute Temperature, (528°R)	=	528.00	°R
ΔH	= Average Differential Pressure Accoss the Orifice Meter (in. H_2O)	=	2.01	in. H_2O
13.6	= Specific Gravity of Mercury (in. H_2O/in. Hg)	=	13.60	in. H2O/in. Hg
T_m	= Average Absolute Dry Gas Meter Temperature (°F+460)(°R)	=	548.19	°R
P_{std}	= Standard Absolute Pressure (29.92 in. Hg)	=	29.92	in. Hg
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.13	dscf

Portion of Water Vapor in Gas Stream, by Volume

$$B_{ws} = 100 * \frac{V_{wc(std)} + V_{wsg(std)}}{(V_{wc(std)} + V_{wsg(std)}) + V_{m(std)}}$$

Where:

$V_{wc(std)}$	= Volume of Water Vapor, Corrected to Standard Conditions (scf)	=	0.00	scf
$V_{wsg(std)}$	= Volume of Water Vapor, Corrected to Standard Conditions (scf)	=	33.83	scf
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.13	dscf
B_{ws}	= Portion of Water Vapor in the Gas Stream (% by volume)	=	20.5	%

Molecular Weight of Dry Stack Gas, lb/lb-mole

$M_d = 0.440(\%CO_2) + 0.320(\%O_2) + 0.280(\%N_2 + \%CO)$

Where:

0.44	= Molecular Weight ot CO_2, divided by 100	=	0.44	lb/lb-mole
0.32	= Molecular Weight ot O_2, divided by 100	=	0.32	lb/lb-mole
0.28	= Molecular Weight of N_2 or CO, divided by 100	=	0.28	lb/lb-mole
$\%CO_2$	= Percent CO_2 by Volume, dry basis (%)	=	17.30	%
$\%O_2$	= Percent O_2 by Volume, dry basis (%)	=	3.30	%
$\%N_2$	= Percent N_2 by Volume, dry basis (%)	=	79.40	%
%CO	= Percent CO by Volume, dry basis (%)	=	0.00	%
Md	= Dry Molecular Weight of Sample Gas (lb/lb-mole)	=	30.90	lb/lb-mole

Molecular Weight of Wet Stack Gas, lb/lb-mole

$M_w = M_d\left(1 - \frac{B_{ws}}{100}\right) + \left(18\frac{B_{ws}}{100}\right)$

Where:

Md	= Dry Molecular Weight of Sample Gas (lb/lb-mole)	=	30.90	lb/lb-mole
B_{ws}	= Portion of Water Vapor in the Gas Stream (% by volume)	=	20.43	%
100	= Convert % Water to Fraction	=	100.00	
18	= Molecular Weight of Water, (lb/lb-mole)	=	18.00	lb/lb-mole
M_w	= Wet Molecular Weight of Sample Gas (lb/lb-mole)	=	28.26	lb/lb-mole

Calculated Fuel Factor

$F_o = \frac{20.9 - \%O_s}{\%CO_2}$

Where:

20.9	= Percent of O2 in ambient air (%)	=	20.90	%
$\%CO_2$	= Percent CO_2 by Volume, dry basis (%)	=	17.30	%
$\%O_2$	= Percent O_2 by Volume, dry basis (%)	=	3.30	%
F_o	= Fuel Factor	=	1.017	

Percent Excess Air

$\%EA = \frac{\%O_2 - 0.5\%CO}{0.264\%N_2 - (\%O_2 - 0.5\%CO)} \times 100$

Where:

$\%O_2$	= Percent O_2 by Volume, dry basis (%)	=	3.30	%
%CO	= Percent CO by Volume, dry basis (%)	=	0.00	%
0.264	= Ratio of O2 to N2 in air (v/v)	=	0.264	
$\%N_2$	= Percent N_2 by Volume, dry basis (%)	=	79.40	%
%EA	= Percent of Excess Air in Sample Gas (%)	=	18.68	%

Average Stack Gas Velocity

$V_s = K_p C_p \left(\sqrt{\Delta P_{avg}}\right)\left(\sqrt{\frac{T_s + 460}{M_w P_s}}\right)$

Where:

K_p	= Velocity Equation Constant	=	85.49	
C_p	= Pitot Tube Coefficient	=	0.84	
$\sqrt{\Delta P_{avg}}$	= Average Square Roots of Velocity Head Readings (in. H20)	=	0.94	Sq. Root in. H20
T_s	= Average Sample Gas Temperature (°F)	=	334.44	°F
460	= °F to °R Conversion Constant	=	460.00	
Mw	= Wet Molecular Weight of Sample Gas (lb/lb-mole)	=	28.26	lb/lb-mole
P_s	= Absolute Sample Gas Pressure (in. Hg)	=	29.89	in. Hg
V_s	= Average Stack Gas Velocity (ft/sec)	=	65.36	ft/sec

Actual Stack Gas Flow Rate

$$Q_{aw} = 60 A_s V_s$$

Where:

60	= Conversion Factor (sec/min)	=	60.00	
A_s	= Cross Sectional Area of the Sample Location (ft^2)	=	112.31	ft^2
V_s	= Average Stack Gas Velocity (ft/sec)	=	65.36	ft/sec
Q_{aw}	= Actual Stack Gas Flow Rate at actual conditions (acfm)	=	440452	acfm

Dry Standard Sample Gas Flow Rate

$$Q_{sd} = 60\left(1-\frac{B_{ws}}{100}\right)V_s A_s\left[\frac{T_{std}P_s}{(T_s+460)P_{std}}\right]$$

Where:

60	= Conversion Factor (sec/min)	=	60.00	
B_{ws}	= Portion of Water Vapor in the Gas Stream (% by volume)	=	20.43	%
V_s	= Average Stack Gas Velocity (ft/sec)	=	65.36	ft/sec
A_s	= Cross Sectional Area of the Sample Location (ft^2)	=	112.31	ft^2
T_{std}	= Standard Absolute Temperature (°R)	=	528.00	°R
P_s	= Absolute Sample Gas Pressure (in. Hg)	=	29.89	in. Hg
T_s	= Average Sample Gas Temperature (°F)	=	334.44	°F
460	= °F to °R Conversion Constant	=	460.00	
P_{std}	= Standard Absolute Pressure (29.92 in. Hg)	=	29.92	in. Hg
Q_{sd}	= Dry Volumetric Sample Gas Flow Rate, Corrected to Standard Conditions	=	232703	dscfm

Wet Standard Sample Gas Flow Rate

$$Q_{sw} = \left(\frac{Q_{sd}}{1-\left(\frac{B_{ws}}{100}\right)}\right)\frac{60}{1000}$$

Where:

Q_{sd}	= Dry Volumetric Sample Gas Flow Rate, Corrected to Standard Conditions	=	232702.57	dscfm
B_{ws}	= Portion of Water Vapor in the Gas Stream (% by volume)	=	20.43	%
100	= Convert % Water to Fraction	=	100	
60	= Conversion Factor (min/hr)	=	60	
1000	= Conversion Factor (wscfh/wkscfh)	=	1000	
Q_{sw}	= Wet Volumetric Sample Gas Flow Rate, Corrected to Standard Conditions	=	17547	wkscfh

Percent of Isokinetic Rate

$$I = \frac{(T_s + 460)V_{m(std)}P_{std}100}{T_{std}V_s\pi(\frac{D_n^{0.5}}{12})^2)60\Theta\left(1-\left(\frac{B_{ws}}{100}\right)\right)}$$

where:

T_s	= Average Sample Gas Temperature (°F)	=	334.44	°F
460	= °F to °R Conversion Constant	=	460	
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.78	dscf
P_{std}	= Standard Absolute Pressure (29.92 in. Hg)	=	29.92	in. Hg
P_s	= Absolute Sample Gas Pressure (in. Hg)	=	29.89	in. Hg
V_s	= Average Stack Gas Velocity (ft/sec)	=	65.36	ft/sec
D_n	= Inner Diameter of nozzle (in.)	=	0.257	in.
100	= Conversion to Percent	=	100	
T_{std}	= Standard Absolute Temperature (°R)	=	528	°R
12	= Conversion from inches to feet	=	12	
60	= Conversion Factor (min/hr)	=	60	
Θ	= Total Sampling Time (min.)	=	180.0	min
B_{ws}	= Portion of Water Vapor in the Gas Stream (% by volume)	=	20.43	%
I	= Percent of Isokinetic Sampling (%)	=	98.08	%

Total Mass of Particulates

$$M_n = M_f + M_a - W_a$$

where:

M_f	= Mass of particulate in the filter (mg)	=	0.00	mg
M_a	= Mass of Particulate in acetone rinse (mg)	=	4.80	mg
W_a	= Mass of Acetone Blank (mg)	=	0.00	mg
M_n	= Total Mass of Particulate Matter Collected during Test Run (mg)	=	4.80	mg

Concentration of Particulate Matter in Gas Sample

$$C_s = \frac{0.001M_n}{V_{m(std)}}$$

where:

0.001	= Conversion contant (g/mg)	=	0.001	
M_n	= Total Mass of Particulate Matter Collected during Test Run (mg)	=	4.80	mg
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.78	dscf
C_s	= Concentration of Particulate Matter (g/dscf)	=	0.000	g/dscf

Concentration of Particulate Matter in Gas Sample

$$C_s = \frac{0.0154 M_n}{V_{m(std)}}$$

where:

0.0154	= Conversion Constant (gr/mg)	=	0.0154	
M_n	= Total Mass of Particulate Matter Collected during Test Run (mg)	=	4.80	mg
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.78	dscf
C_s	= Concentration of Particulate Matter (gr/dscf)	=	0.001	gr/dscf

Particulate Emissions Rate (kg/hr)

$$E = \frac{C_s Q_{sd} 60}{1000}$$

where:

C_s	= Concentration of Particulate Matter (g/dscf)	=	0.00	g/dscf
Q_{sd}	= Dry Volumetric Sample Gas Flow Rate, Corrected to Standard Conditions	=	232702.57	dscfm
60	= Conversion Constant (min/hr)	=	60	
1000	= Conversion Constant (g/kg)	=	1000	
E	= Particulate Emissions Rate (kg/hr)	=	0.51	kg/hr

Particulate Emissions Rate (lbs/hr)

$$E = \frac{\left(\frac{60}{453.592}\right)\left(\frac{M_n}{1000}\right)}{V_{m(std)}} \times Q_{sd}$$

where:

60	= Conversion Constant (min/hr)	=	60	
453.592	= Conversion Constant (g/lb)	=	453.592	
1000	= Conversion Constant (mg/g)	=	1000	
M_n	= Total Mass of Particulate Matter Collected during Test Run (mg)	=	4.80	mg
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.78	dscf
Q_{sd}	= Dry Volumetric Sample Gas Flow Rate, Corrected to Standard Conditions	=	232702.57	dscfm
E	= Particulate Emissions Rate (lb/hr)	=	1.12	lb/hr

Particulate Emissions Rate (lbs/mmBtu, O_2)

$$E = \left(\frac{\frac{M_n}{1000}}{V_{m(std)} 453.592} \right) F_d \left(\frac{20.9}{20.9 - \%O_2} \right)$$

where:

M_n	= Total Mass of Particulate Matter Collected during Test Run (mg)	=	4.80	mg
1000	= Conversion Constant (mg/g)	=	1000	
$V_{m(std)}$	= Volume of Gas Measured by the Dry Gas Meter, Corrected to Standard Conditions (dscf)	=	131.78	dscf
453.592	= Conversion Constant (g/lb)	=	453.592	
F_d	= Ratio of Gas Volume to Heat Content of Fuel (dscf/mmBtu)	=	9240.00	dscf/mmBtu
20.9	= Percent of O2 in ambient air (%)	=	20.90	%
$\%O_2$	= Percent O_2 by Volume, dry basis (%)	=	3.30	%
E	= Particulate Emissions Rate (lb/mmBtu, O_2)	=	0.0009	lb/mmBtu, O_2

Example Calculations From Run 1

Calculation of Breakthrough Trap A

$$B = \frac{m_2}{m_1} \times 100$$

Where:

B=Breakthrough	=	1	%
m_2= Mass of Hg measured on sorbent trap section 2	=	0.647	ng
m_1= Mass of Hg measured on sorbent trap section 1	=	112.425	ng

Calculation of Breakthrough Trap B

$$B = \frac{m_2}{m_1} \times 100$$

Where:

B= Breakthrough	=	0	%
m_2= Mass of Hg measured on sorbent trap section 2	=	0.338	ng
m_1= Mass of Hg measured on sorbent trap section 1	=	79.775	ng

Calculation of Hg Concentration Trap A

$$C_a = \frac{(m_1 + m_2) - spike}{V_t}$$

Where:

C_a= Concentration of Hg for the sample collection period, for sorbent trap A	=	0.497	µg/dscm
m_1= Mass of Hg measured on sorbent trap section 1	=	112.425	ng
m_2= Mass of Hg measured on sorbent trap section 2	=	0.647	ng
spike = Mass of Hg spike concentration		50.000	ng
V_t= Total volume of dry gas metered corrected STP defined as to 20° C and 760 mm Hg	=	126.913	L

Calculation of Hg Concentration Trap B

$$C_b = \frac{(m_1 + m_2) - spike}{V_t}$$

Where:

C_b= Concentration of Hg for the sample collection period, for sorbent trap B	=	0.633	µg/dscm
m_1= Mass of Hg measured on sorbent trap section 1	=	79.775	ng
m_2= Mass of Hg measured on sorbent trap section 2	=	0.338	ng
spike = Mass of Hg spike concentration		0.000	ng
V_t= Total volume of dry gas metered corrected STP defined as to 20° C and 760 mm Hg	=	126.476	L

Calculation of Average Hg Concentration

$$Ave\ \ Conc\ \ = \frac{1}{2}(C_a + C_b)$$

Where:

C_a = Concentration of Hg for the sample collection period, for sorbent trap A	=	0.497	µg/dscm
C_b = Concentration of Hg for the sample collection period, for sorbent trap B	=	0.633	µg/dscm
Average Concentration	=	0.565	µg/dscm

Moisture Correction Calculation

$$C_w = C_d \times (1 - B_{ws})$$

Where:

C_w = Hg concentration, wet basis (µg/dscm)	=	0.486	µg/dscm
C_d = Hg concentration, dry basis (µg/dscm)	=	0.565	µg/dscm
B_{ws} = Moisture content of sample gas as measured by Method 4, percent/100.	=	0.14	%/100

Calculation of Paired Trap Agreement

$$RD = \frac{|C_a - C_b|}{C_a + C_b} \times 100$$

Where:

RD = Relative deviation between the Hg concentrations from traps "a" and "b" (%)	=	12	%
C_a = Concentration of Hg for the sample collection period, for sorbent trap A	=	0.497	µg/dscm
C_b = Concentration of Hg for the sample collection period, for sorbent trap B	=	0.633	µg/dscm

Calculation of Measured Spike Hg Concentration

$$C_{rec} = \frac{m_s}{v_s} - \frac{m_u}{v_u}$$

Where:

C_{rec} = Concentration of spiked compound measured (µg/m^3)	=	0.258	µg/m^3
m_s = Total mass of Hg measured on spiked trap in Field Recovery Test (µg).	=	0.113	µg
m_u = Total mass of Hg measured on unspiked trap in Field Recovery Test (µg).	=	0.080	µg
v_s = Volume of gas sampled, spiked trap in Field Recovery Test (dscm).	=	0.127	dscm
v_u = Volume of gas sampled, unspiked trap in Field Recovery Test (dscm).	=	0.126	dscm

Calculation of Spiked Hg Recovery

$$R = \frac{C_{rec} \times v_s}{m_{spiked}} \times 100$$

Where:

R = Percentage of spiked mass recovered. (%)	=	65	%
C_{rec} = Concentration of spiked compound measured (µg/m^3)	=	0.258	µg/m^3
v_s = Volume of gas sampled, spiked trap in Field Recovery Test (dscm).	=	0.127	dscm
m_{spiked} = Mass of Hg spiked in Analytical Bias of Field Recovery Test (µg).	=	0.050	µg

Appendix C: Sample Location Diagram/Traverse Points

CEM Solutions, Inc.
METHOD 1: Determining Number of Particulate and Velocity Traverse Points for a Stack or Duct

Company:	GREC	**Date:**	9/30/2014
Facility:	Gainesville	**Project:**	7864
Unit Number:	1	**Operator:**	C. Horton
Sample Location:	Stack		

Stack Measurements

Shape of Stack:	Circular		**Stack Diameter:**	143.50	Inches
# of Test Ports:	4		**Stack Area:**	112.3133	ft^2
Port Depth:	8	Inches			

Distance from Test Ports to Disturbances

Distance Upstream:	222.00	Inches (A)	**Distance Downstream:**	1326.00	Inches (B)
Diameters Upstream:	1.55	(A_D)	**Diameters Downstream:**	9.24	(B_D)

Minimum # of Velocity Traverse Points		
From Upstream:	16	
From Downstream:	12	
12-24in Diameter?	False	
Points to be used:	16	

Minimum # of Particulate Traverse Points		
From Upstream:	16	
From Downstream:	12	
12-24in Diameter?	False	
Points to be used:	16	

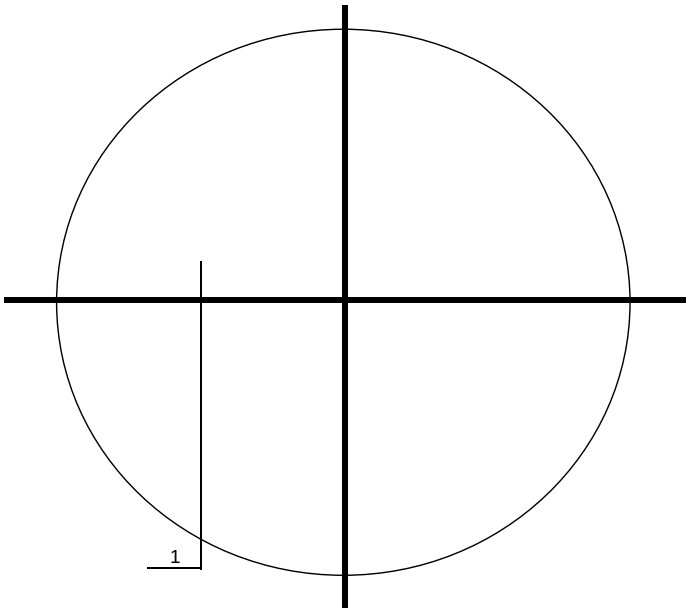
C.E.M. Solutions, INC.

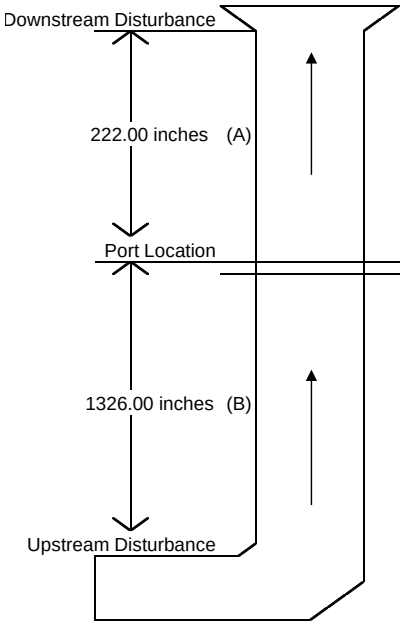
Method 1 Determination

Single Point

Sample taken from the following point:

Traverse Point	Distance	Distance from stack wall (Inches)	Distance including port depth (Inches)
1	1 Meter	39.37	47.37





Test Matrix Diagrams

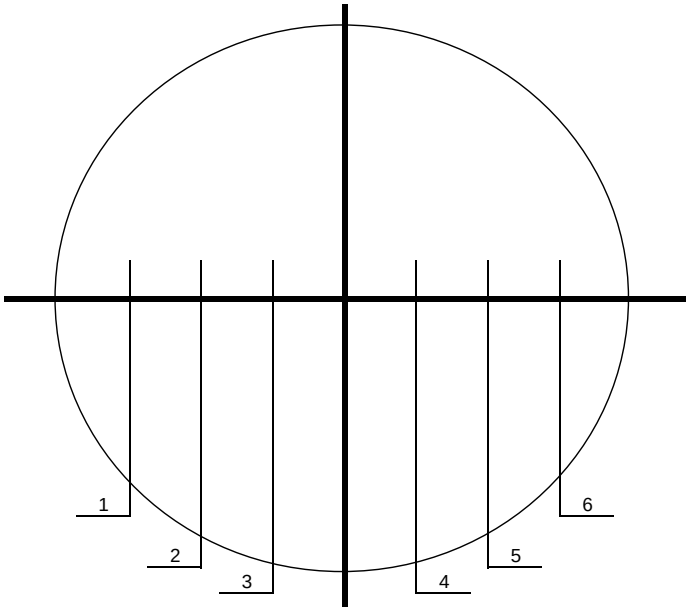
C.E.M. Solutions, INC.

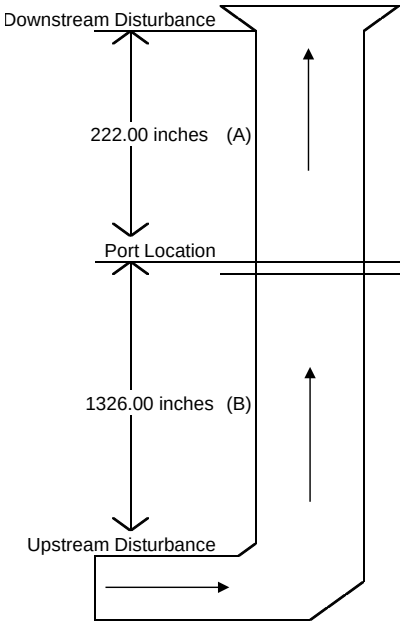
Method 1 Determination

12 Point Traverse

Determined according to 40CFR60 Appendix A, Method 1, Figures 1-1 and 1-2. Sample taken from the following points:

Traverse Point	% of diameter	Distance from stack wall (Inches)	Distance including port depth (Inches)
1	4.4	6.31	14.31
2	14.6	20.95	28.95
3	29.6	42.48	50.48
4	70.4	101.02	109.02
5	85.4	122.55	130.55
6	95.6	137.19	145.19





Test Matrix Diagrams

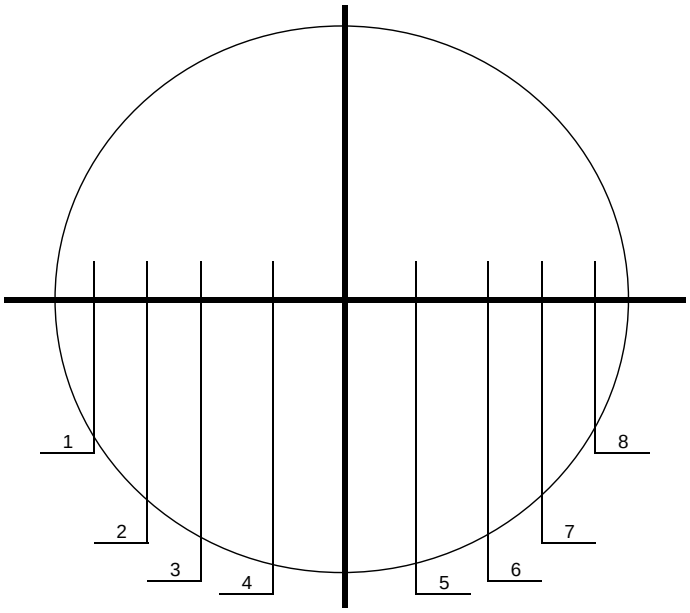
C.E.M. Solutions, INC.

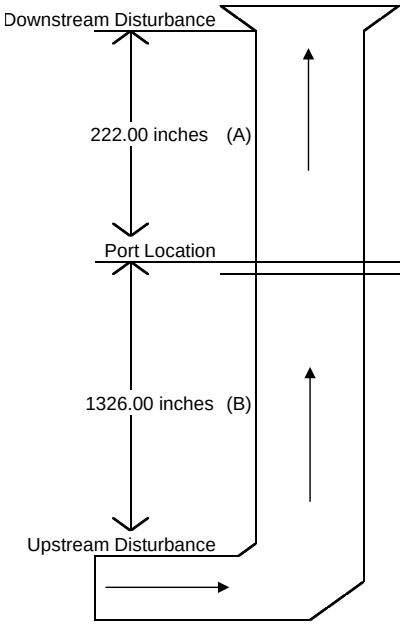
Method 1 Determination

16 Point Traverse

Determined according to 40CFR60 Appendix A, Method 1, Figures 1-1 and 1-2. Sample taken from the following points:

Traverse Point	% of diameter	Distance from stack wall (Inches)	Distance including port depth (Inches)
1	3.2	4.59	12.59
2	10.5	15.07	23.07
3	19.4	27.84	35.84
4	32.3	46.35	54.35
5	67.7	97.15	105.15
6	80.6	115.66	123.66
7	89.5	128.43	136.43
8	96.8	138.91	146.91





Test Matrix Diagrams

Appendix D: Reference Method QA/QC

Appendix D-1: Instrumental Method QA/QC

Analyzer Calibration Error Tests
Bias and Drift Tests
Calibration Gas Cylinder Certificates of Analysis

Analyzer Calibration Error

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/22/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 1

Oxygen Monitor

Method 3A

Full Scale: 100.00 %

Serial Number: 1151210012

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
CC263051/cg1	0.00 %	0.05 %	0.05 %	0.24 %
EB0070863/cg2	10.11 %	10.27 %	0.16 %	0.78 %
CC221880/cg3	20.61 %	20.67 %	0.06 %	0.29 %

Carbon Dioxide Monitor

Method 3A

Full Scale: 20.00 %

Serial Number: 1151210012

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
CC263051/cg1	0.00 %	-0.20 %	-0.20 %	-1.04 %
EB0070863/cg2	9.44 %	9.48 %	0.04 %	0.22 %
CC221880/cg3	19.26 %	19.41 %	0.15 %	0.78 %

Total Hydrocarbon Monitor

Method 25A

Full Scale: 30.0 ppm

Serial Number: 1106047146

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
CC281749/cg14	0.0 ppm	0.0 ppm	0.0 ppm	N/A
CC453989/cg11	8.93 ppm	8.6 ppm	-0.3 ppm	-3.65 %
CC454100/cg12	15.20 ppm	15.2 ppm	0.0 ppm	0.00 %
CC458494/cg13	25.53 ppm	26.5 ppm	1.0 ppm	3.80 %

Analyzer Calibration Error

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/23/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 3

Oxygen Monitor

Method 3A

Full Scale: 100.00 %

Serial Number: 1151210012

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
CC263051/cg1	0.00 %	0.09 %	0.09 %	0.44 %
EB0070863/cg2	10.11 %	10.31 %	0.20 %	0.97 %
CC221880/cg3	20.61 %	20.72 %	0.11 %	0.53 %

Carbon Dioxide Monitor

Method 3A

Full Scale: 20.00 %

Serial Number: 1151210012

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
CC263051/cg1	0.00 %	-0.21 %	-0.21 %	-1.09 %
EB0070863/cg2	9.44 %	9.45 %	0.01 %	0.07 %
CC221880/cg3	19.26 %	19.39 %	0.13 %	0.67 %

Total Hydrocarbon Monitor

Method 25A

Full Scale: 30.0 ppm

Serial Number: 1106047146

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error (%)
CC281749/cg14	0.0 ppm	0.0 ppm	0.0 ppm	N/A
CC453989/cg11	8.93 ppm	8.7 ppm	-0.2 ppm	-2.53 %
CC454100/cg12	15.20 ppm	15.0 ppm	-0.2 ppm	-1.32 %
CC458494/cg13	25.53 ppm	26.6 ppm	1.1 ppm	4.19 %

Sampling System Bias and Drift

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/22/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 1

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O_2	0.05 %	0.49 %	2.13 %	0.43 %	1.84 %	-0.29 %
O_2	10.27 %	10.55 %	1.36 %	10.38 %	0.53 %	-0.82 %
CO_2	-0.20 %	-0.10 %	0.52 %	-0.15 %	0.26 %	-0.26 %
CO_2	9.48 %	9.12 %	-1.87 %	9.13 %	-1.82 %	0.05 %
THC	0.0 ppm	0.0 ppm	0.00 %	0.0 ppm	0.00 %	0.00 %
THC	15.2 ppm	14.4 ppm	-2.67 %	14.9 ppm	-1.00 %	1.67 %

Sampling System Bias and Drift

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/22/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 2

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O_2	0.05 %	0.43 %	1.84 %	0.48 %	2.09 %	0.24 %
O_2	10.27 %	10.38 %	0.53 %	10.46 %	0.92 %	0.39 %
CO_2	-0.20 %	-0.15 %	0.26 %	0.04 %	1.25 %	0.99 %
CO_2	9.48 %	9.13 %	-1.82 %	9.23 %	-1.30 %	0.52 %
THC	0.0 ppm	0.0 ppm	0.00 %	0.0 ppm	0.00 %	0.00 %
THC	15.2 ppm	14.9 ppm	-1.00 %	15.3 ppm	0.33 %	1.33 %

Sampling System Bias and Drift

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/23/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 3

Monitor Type	Analyzer Cal Response	Initial Cal Value	Pre Run Bias (%)	Final Cal Value	Post Run Bias (%)	Total Run Drift (%)
O_2	0.09 %	0.23 %	0.68 %	0.18 %	0.44 %	-0.24 %
O_2	10.31 %	10.23 %	-0.39 %	10.23 %	-0.39 %	0.00 %
CO_2	-0.21 %	-0.32 %	-0.57 %	-0.13 %	0.42 %	0.99 %
CO_2	9.45 %	9.24 %	-1.09 %	9.40 %	-0.26 %	0.83 %
THC	0.0 ppm	0.0 ppm	0.00 %	0.0 ppm	0.00 %	0.00 %
THC	15.0 ppm	15.2 ppm	0.67 %	15.4 ppm	1.33 %	0.67 %

Airgas
an Air Liquide company

Airgas South region
Airgas USA, LLC
8804 Maislin Dr
Temple Terrace, FL 33637
Airgas.com

CERTIFICATE OF BATCH ANALYSIS

Grade of Product: CEM-CAL ZERO

Part Number:	NI CZ15A	Reference Number:	21-400540138-1
Cylinder Analyzed:	CC355956	Cylinder Volume:	142.0 CF
Laboratory:	110 - Tampa Plant - FL	Cylinder Pressure:	2000 PSIG
Analysis Date:	May 08, 2015	Valve Outlet:	580
Lot Number:	21-400540138-1		

Expiration Date: May 08, 2023

ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
NITROGEN	99.9995 %	99.9995 %
CARBON DIOXIDE	< 1.0 PPM	<LDL 0.154 PPM
NOx	< 0.1 PPM	< 0.1 PPM
SO2	< 0.1 PPM	< 0.1 PPM
THC	< 0.1 PPM	<LDL 0.06 PPM
CARBON MONOXIDE	< 0.5 PPM	<LDL 0.154 PPM

Permanent Notes: Airgas certifies that the contents of this cylinder meet the requirements of 40 CFR 72.2

Cylinders in Batch:

CC174164, CC183268, CC185572, CC189776, CC263051, CC267188, CC288593, CC301816, CC308214, CC318826, CC319269, CC326641, CC355956, CC75029, SG9124272BAL, SG9169154BAL, XC015750B

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
630 United Drive
Durham, NC 27713
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI80E15A2872	Reference Number:	122-124564415-3
Cylinder Number:	EB0070863	Cylinder Volume:	150.6 CF
Laboratory:	124 - Durham - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22016	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Jul 11, 2016

Expiration Date: Jul 11, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	9.500 %	9.437 %	G1	+/- 0.6% NIST Traceable	07/11/2016
OXYGEN	10.00 %	10.11 %	G1	+/- 0.4% NIST Traceable	07/11/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061348	CC360808	11.002 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2018
NTRM	09060230	CC263091	9.961 % OXYGEN/NITROGEN	+/- 0.3%	Nov 08, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA510 CO2 2L6YXWY0	Nondispersive Infrared (NDIR)	Jun 23, 2016
Horiba MPA510 O2 41499150042	Paramagnetic	Jun 23, 2016

Triad Data Available Upon Request

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
630 United Drive
Durham, NC 27713
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI60E15A03W3	Reference Number:	122-124375364-1
Cylinder Number:	CC221880	Cylinder Volume:	158.8 CF
Laboratory:	124 - Durham - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22013	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	May 20, 2013

Expiration Date: May 20, 2021

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	19.00 %	19.26 %	G1	+/- 0.6% NIST Traceable	05/20/2013
OXYGEN	20.50 %	20.61 %	G1	+/- 1.0% NIST Traceable	05/20/2013
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061551	CC354889	19.87 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 27, 2018
NTRM	09061416	CC273522	22.53 % OXYGEN/NITROGEN	+/- 0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA510 CO2 42399380022	Nondispersive Infrared (NDIR)	May 06, 2013
Horiba MPA510 O2 41499150042	Paramagnetic	May 10, 2013

Triad Data Available Upon Request

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
630 United Drive
Durham, NC 27713
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02AI99E15A1486	Reference Number:	122-124459561-3
Cylinder Number:	CC453989	Cylinder Volume:	146.2 CF
Laboratory:	124 - Durham - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22014	Valve Outlet:	590
Gas Code:	PPN,BALA	Certification Date:	Oct 20, 2014

Expiration Date: Oct 20, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
PROPANE	9.000 PPM	8.926 PPM	G1	+/- 0.8% NIST Traceable	10/20/2014
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10061415	CC315930	9.93 PPM PROPANE/AIR	+/- 0.6%	Jul 20, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801333 C3H8	FTIR	Oct 03, 2014

Triad Data Available Upon Request

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
630 United Drive
Durham, NC 27713
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02AI99E15A1448	Reference Number:	122-124459561-2
Cylinder Number:	CC454100	Cylinder Volume:	146.2 CF
Laboratory:	124 - Durham - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22014	Valve Outlet:	590
Gas Code:	PPN,BALA	Certification Date:	Oct 20, 2014

Expiration Date: Oct 20, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
PROPANE	15.00 PPM	15.20 PPM	G1	+/- 1.0% NIST Traceable	10/20/2014
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10061415	CC315930	9.93 PPM PROPANE/AIR	+/- 0.6%	Jul 20, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801333 C3H8	FTIR	Oct 03, 2014

Triad Data Available Upon Request

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
630 United Drive
Durham, NC 27713
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02AI99E15A0080	Reference Number:	122-124460857-1
Cylinder Number:	CC458494	Cylinder Volume:	146.2 CF
Laboratory:	124 - Durham - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22014	Valve Outlet:	590
Gas Code:	PPN,BALA	Certification Date:	Oct 28, 2014

Expiration Date: Oct 28, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
PROPANE	25.50 PPM	25.53 PPM	G1	+/- 0.9% NIST Traceable	10/28/2014
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10061415	CC315930	9.93 PPM PROPANE/AIR	+/- 0.6%	Jul 20, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801333 C3H8	FTIR	Oct 03, 2014

Triad Data Available Upon Request

Signature on file
Approved for Release

Appendix D-2: Wet Chemistry Method QA/QC

Meter Box Pre and Post-Test Calibrations
Sample Probe Thermocouple Calibrations
Probe Nozzle Calibrations
Probe Pitot Tube Coefficient Calibrations

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	XC-522
Console Serial Number	CEMS3MB
DGM Model Number	S-110
DGM Serial Number	357811

Calibration Conditions			
Date	Time	27-Mar-17	12:40
Barometric Pressure		30.1	in Hg
Theoretical Critical Vacuum[1]		14.2	in Hg
Calibration Technician		AL	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
15.0	1.9	766.027	777.737	71	74	OB-63	0.5750	82	79	21
10.0	1.9	777.737	785.566	74	75	OB-63	0.5750	79	80	21
20.0	1.9	785.566	801.260	75	77	OB-63	0.5750	80	82	21

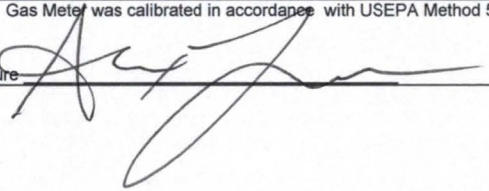
Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
11.751	0.783	11.182	0.745	0.952	-0.001	0.745	1.940	0.007
7.827	0.783	7.460	0.746	0.953	0.001	0.746	1.930	-0.003
15.646	0.782	14.901	0.745	0.952	0.000	0.745	1.930	-0.004
				0.952	Y Average		1.934	ΔH@ Average

Pre-test DGM Y_i	0.956
Post-test DGM Y_i	0.952
Percent Change	0.36

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Method 5, CFR 40 Part 60.

Signature 

Date 3/27/17

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	XC-522-0
Console Serial Number	CEMS5MB
DGM Model Number	S-110
DGM Serial Number	300919

Calibration Conditions			
Date	Time	27-Mar-17	12:40
Barometric Pressure		30.1	in Hg
Theoretical Critical Vacuum[1]		14.2	in Hg
Calibration Technician		AL	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
15.0	1.2	245.326	254.076	71	74	MZ-55	0.4571	82	79	21
10.0	1.2	254.076	259.939	74	76	MZ-55	0.4571	80	80	21
20.0	1.2	259.939	271.689	76	78	MZ-55	0.4571	80	83	21

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
8.765	0.584	8.889	0.593	1.014	0.000	0.593	1.933	0.008
5.846	0.585	5.929	0.593	1.014	0.000	0.593	1.922	-0.003
11.672	0.584	11.842	0.592	1.015	0.000	0.592	1.920	-0.005
				1.014	Y Average		1.925	ΔH@ Average

Pre-test DGM Y_i	1.012
Post-test DGM Y_i	1.014
Percent Change	0.19

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Method 5, CFR 40 Part 60.

Signature _____ Date 3/27/17

APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	XC-522
Console Serial Number	CEMS7MB
DGM Model Number	MS-4
DGM Serial Number	1504221

Calibration Conditions			
Date	Time	27-Mar-17	12:40
Barometric Pressure		30.1	in Hg
Theoretical Critical Vacuum[1]		14.2	in Hg
Calibration Technician		AL	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	oR/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

Calibration Data

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above2	°F	°F	in Hg
19.0	2.0	880.530	895.863	74	77	MZ-63	0.5940	82	79	20
10.0	2.0	895.863	903.968	77	78	MZ-63	0.5940	79	80	19
20.0	2.0	903.968	920.218	78	80	MZ-63	0.5940	80	83	19

Results

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH @	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
15.304	0.805	14.631	0.770	0.956	0.000	0.770	1.904	0.006
8.059	0.806	7.707	0.771	0.956	0.001	0.771	1.894	-0.004
16.114	0.806	15.387	0.769	0.955	-0.001	0.769	1.895	-0.002
				0.956	Y Average		1.898	ΔH@ Average

Pre-test DGM Y_i	0.965
Post-test DGM Y_i	0.956
Percent Change	0.91

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Method 5, CFR 40 Part 60.

Signature _____ Date 3/27/17

METHOD 30B POST-TEST CONSOLE CALIBRATION
USING Reference Dry Gas Meter

30B Meter Console Information		Meter A Console Information		Meter B Console Information		Reference Meter Information		Calibration Conditions		
Console Model Number	XC-260	DGM A Model Number	SK25EX	DGM B Model Number	SK25EX	Meter Serial #	1508011	Date	27-Mar-17	
Console Serial Number	CEMS30B-01	DGM A Serial Number	20140613	DGM B Serial Number	20140578	Reference Meter Gamma	1.0000	Barometric Pressure	30.14	in Hg
								Reference Thermometer Info.		
								Thermometer Serial #	150431556	
								Ambient Temp	79.3	°F

	3-Run Meter Calibration										
	Outlet TC Ambient Temp Measurement	Run Time Elapsed	Metering Console Flow Rate	Metering Console Volume Initial	Metering Console Volume Final	Metering Console Outlet Temp Initial	Metering Console Outlet Temp Final	Reference Meter Volume Initial	Reference Meter Volume Final	Reference Meter Outlet Temp Initial	Reference Meter Outlet Temp Final
		(Θ)		(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})
	°F	min	lpm	l	l	°F	°F	l	l	°F	°F
Meter A	81	16.0	2.00	0.000	35.377	78.0	80.0	0.000	35.439	77	79
		13.0	2.00	0.000	28.481	81.0	82.0	0.000	28.467	80	82
		31.0	2.00	0.000	67.226	82.0	84.0	0.000	67.146	82	86
Meter B	81	17.0	2.00	0.000	36.203	85.0	85.0	0.000	36.352	84	87
		10.0	2.00	0.000	21.225	85.0	86.0	0.000	21.245	87	86
		11.0	2.00	0.000	23.344	86.0	86.0	0.000	23.350	86	87

	Calibration Results										
	Standardized Data				Dry Gas Meter						
	Dry Gas Meter		Reference Meter		Calibration Factor		Flowrate	Outlet TC	Outlet TC		
	($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	Value (Y)	Variation (ΔY)	Std & Corr ($Q_{m(std)(corr)}$)	vs Reference TC	Calibration		
	l	lpm	l	lpm			lpm	°F	°F		
Meter A	34.913	2.182	35.040	2.190	1.004	0.00	2.19			Pre-test DGM Y	1.002
	27.978	2.152	27.990	2.153	1.000	0.00	2.15		Pass	Post-test DGM Y	1.000
	65.856	2.124	65.657	2.118	0.997	0.00	2.12	2		Percent Change	0
					1.000	Y Average					
Meter B	35.335	2.079	35.448	2.085	1.003	0.00	2.09			Pre-test DGM Y	1.001
	20.697	2.070	20.679	2.068	0.999	0.00	2.07		Pass	Post-test DGM Y	1.001
	22.743	2.068	22.728	2.066	0.999	0.00	2.07	2		Percent Change	0
					1.001	Y Average					

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
The Post-Test DGM Y must not differ from the Pre-Test DGM Y by more than 5%.
The DGM Outlet Thermocouple ambient temperature measurment must must not differ from the Reference Thermocouple ambient temperature measurment by more than 2 degrees oF.

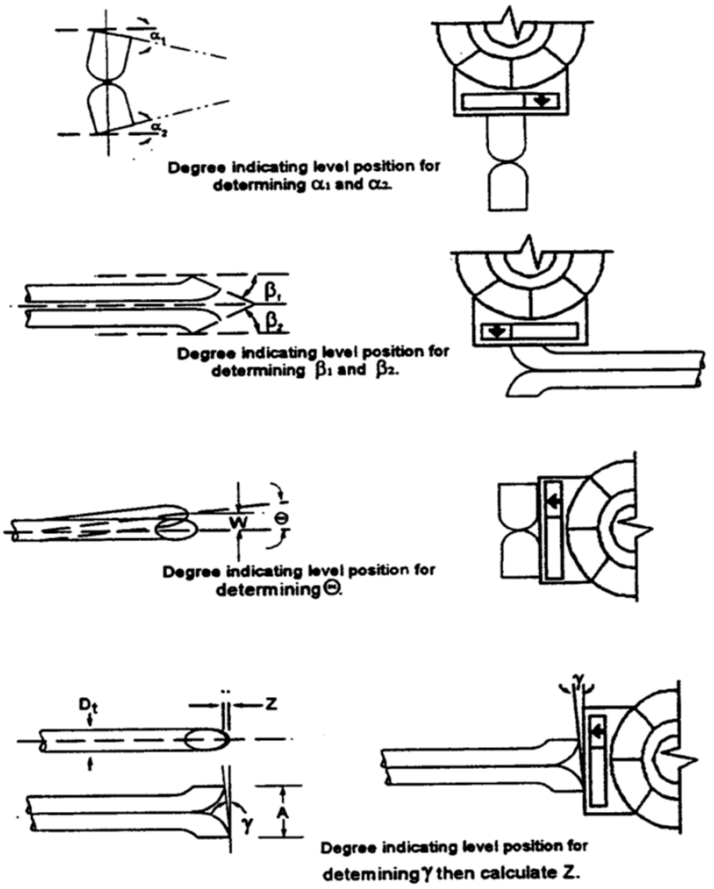
I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using a Calibrated Reference Dry Gas Meter (RDGM) Serial Number: 1508011
I certify that the above Dry Gas Meter Exit Thermocouples were calibrated in accordance with USEPA ALT-011, using a NIST-Traceable Reference Thermocouple Serial Number: 150431556

Signature _____ Date 3/27/17

C.E.M. Solutions, Inc.

Type S Pitot Tube Inspection

Date of Calibration	03/27/2017
Level and Perpendicular?	Yes
Obstruction?	No
Damaged?	No
α_1 $(-10^o<\alpha_1<+10^o)$	0
α_2 $(-10^o<\alpha_2<+10^o)$	-2
β_1 $(-5^o<\beta_1<+5^o)$	-1
β_2 $(-5^o<\beta_2<+5^o)$	1
γ	0
θ	0
D_t (3/16" < D_t < 3/8")	0.371
A	0.961
z = A tan γ (< 0.125")	0.000
w = A tan θ (< 0.03125")	0.000
A/2D_t (1.05 < P_A/D_t < 1.5)	1.295



QA/QC Check:

Completeness: x Legibility: x Reasonableness: x

Specifications: x Accuracy: x

Certification:

I certify that the Type S pitot tube/probe ID# A3424 meets or exceeds all specifications, criteria and/or applicable design features and is hearby assigned a pitot tube calibration factor (C_P) of 0.84.

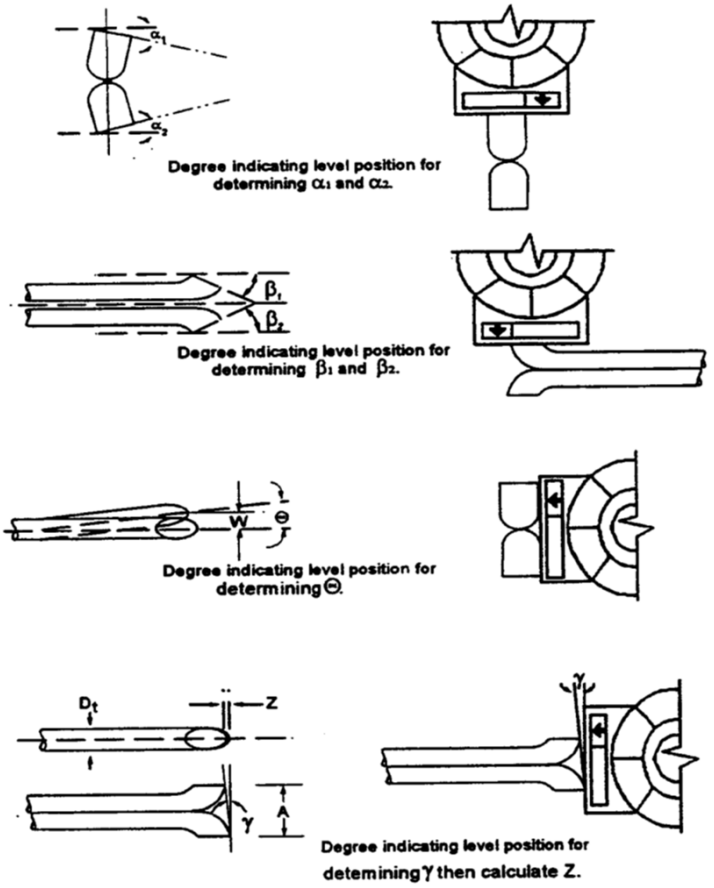
Certified by: Alexander Lagunas 3/27/2017

Personnel (Signature/Date)

C.E.M. Solutions, Inc.

Type S Pitot Tube Inspection

Date of Calibration	03/27/2017
Level and Perpendicular?	Yes
Obstruction?	No
Damaged?	No
α_1 $(-10^o<\alpha_1<+10^o)$	1
α_2 $(-10^o<\alpha_2<+10^o)$	-1
β_1 $(-5^o<\beta_1<+5^o)$	0
β_2 $(-5^o<\beta_2<+5^o)$	-1
γ	-2
θ	-1
D_t (3/16" < D_t < 3/8")	0.375
A	0.958
z = A tan γ (< 0.125")	-0.033
w = A tan θ (< 0.03125")	-0.017
A/2D_t (1.05 < P_A/D_t < 1.5)	1.277



QA/QC Check:

Completeness: x Legibility: x Reasonableness: x

Specifications: x Accuracy: x

Certification:

I certify that the Type S pitot tube/probe ID# A5400 meets or exceeds all specifications, criteria and/or applicable design features and is hearby assigned a pitot tube calibration factor (C_P) of 0.84.

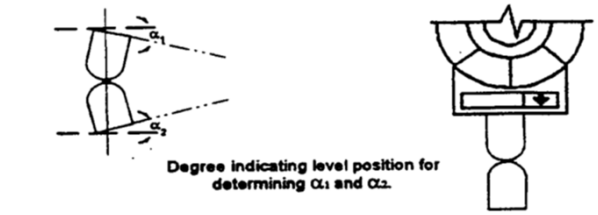
Certified by: Alexander Lagunas 3/27/2017

Personnel (Signature/Date)

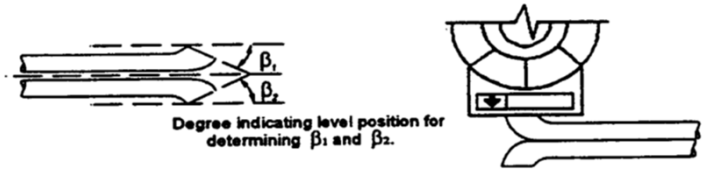
C.E.M. Solutions, Inc.

Type S Pitot Tube Inspection

Date of Calibration	03/27/2017
Level and Perpendicular?	Yes
Obstruction?	No
Damaged?	No
α_1 $(-10^o<\alpha_1<+10^o)$	-1
α_2 $(-10^o<\alpha_2<+10^o)$	0
β_1 $(-5^o<\beta_1<+5^o)$	1
β_2 $(-5^o<\beta_2<+5^o)$	1
γ	-1
θ	-2
D_t (3/16" < D_t < 3/8")	0.374
A	1.004
z = A tan γ (< 0.125")	-0.018
w = A tan θ (< 0.03125")	-0.035
A/2D_t (1.05 < P_A/D_t < 1.5)	1.342

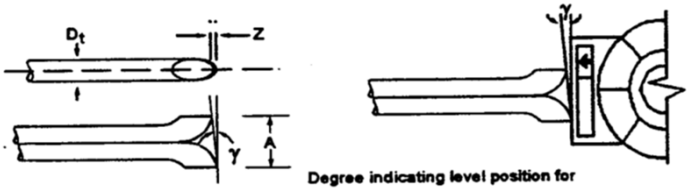


Degree indicating level position for determining α_1 and α_2.



Degree indicating level position for determining β_1 and β_2.

Degree indicating level position for determining Θ.



Degree indicating level position for determining γ then calculate Z.

QA/QC Check:

Completeness: x Legibility: x Reasonableness: x

Specifications: x Accuracy: x

Certification:

I certify that the Type S pitot tube/probe ID# PT-04 meets or exceeds all specifications, criteria and/or applicable design features and is hearby assigned a pitot tube calibration factor (C_P) of 0.84.

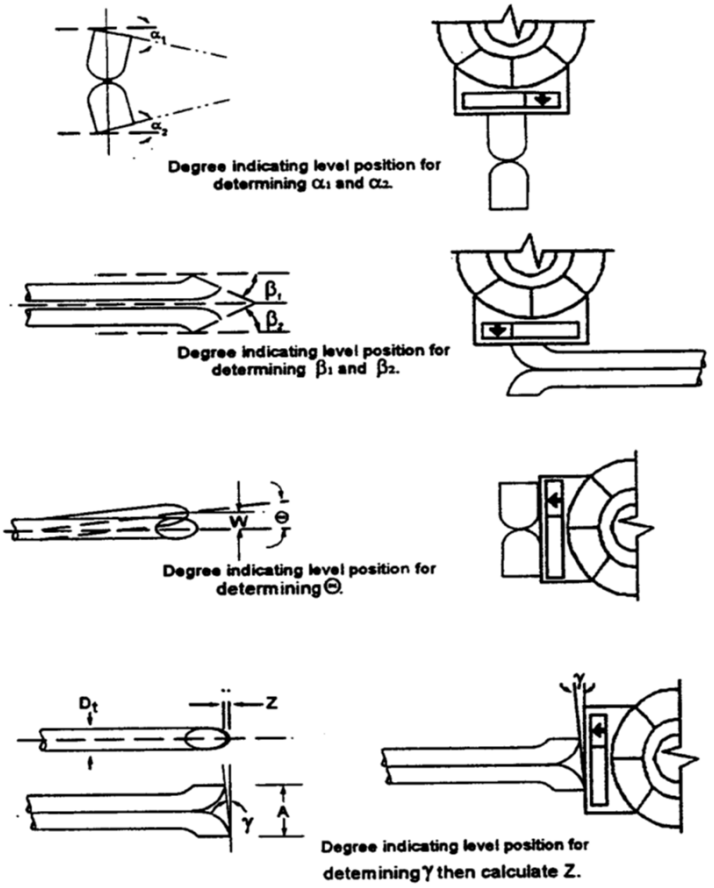
Certified by: Alexander Lagunas 3/27/2017

Personnel (Signature/Date)

C.E.M. Solutions, Inc.

Type S Pitot Tube Inspection

Date of Calibration	03/27/2017
Level and Perpendicular?	Yes
Obstruction?	No
Damaged?	No
α_1 $(-10^o<\alpha_1<+10^o)$	1
α_2 $(-10^o<\alpha_2<+10^o)$	-1
β_1 $(-5^o<\beta_1<+5^o)$	0
β_2 $(-5^o<\beta_2<+5^o)$	-1
γ	-2
θ	-1
D_t (3/16" < D_t < 3/8")	0.375
A	0.958
z = A tan γ (< 0.125")	-0.033
w = A tan θ (< 0.03125")	-0.017
A/2D_t (1.05 < P_A/D_t < 1.5)	1.277



QA/QC Check:

Completeness: x Legibility: x Reasonableness: x

Specifications: x Accuracy: x

Certification:

I certify that the Type S pitot tube/probe ID# A5400 meets or exceeds all specifications, criteria and/or applicable design features and is hearby assigned a pitot tube calibration factor (C_P) of 0.84.

Certified by: Alexander Lagunas 3/27/2017

Personnel (Signature/Date)

C.E.M. Solutions, Inc.

Thermocouple Post Test Calibration Check

Standard: Reference Thermometer (calibrated against NIST standards)

Reference: ALT-011 Alternative Method 2 Thermocouple Calibration Procedure

Procedure: Measure ambient temperature with the Reference Thermometer and the Measurement Thermocouple System. Record Results. Next, check the continuity of the Measurement Thermocouple System by subjecting it to a change in temperature. The Measurement Thermocouple System must respond accordingly.

Tolerance: ± 2° F of actual temperature

Plant: GREC
Thermocouple #: TC5

Date: 3/27/2017
Reference TC#: 150431556

Length (FT.)	Reference Temp. (°F)	Measured Temp. (°F)	Difference (°F)	Continuity Check (PASS/FAIL)
5	84.3	83.5	**0.8**	**PASS**

Technician: Alexander Lagunas
Date: 3/27/17

C.E.M. Solutions, Inc.

Thermocouple Post Test Calibration Check

Standard: Reference Thermometer (calibrated against NIST standards)

Reference: ALT-011 Alternative Method 2 Thermocouple Calibration Procedure

Procedure: Measure ambient temperature with the Reference Thermometer and the Measurement Thermocouple System. Record Results. Next, check the continuity of the Measurement Thermocouple System by subjecting it to a change in temperature. The Measurement Thermocouple System must respond accordingly.

Tolerance: ± 2° F of actual temperature

Plant: GREC
Thermocouple #: TC6-30B

Date: 3/27/2017
Reference TC#: 150431556

Length (FT.)	Reference Temp. (°F)	Measured Temp. (°F)	Difference (°F)	Continuity Check (PASS/FAIL)
6	83.4	83.2	**0.2**	**PASS**

Technician: Alexander Lagunas
Date: 3/27/17

C.E.M. Solutions, Inc.

Thermocouple Post Test Calibration Check

Standard: Reference Thermometer (calibrated against NIST standards)

Reference: ALT-011 Alternative Method 2 Thermocouple Calibration Procedure

Procedure: Measure ambient temperature with the Reference Thermometer and the Measurement Thermocouple System. Record Results. Next, check the continuity of the Measurement Thermocouple System by subjecting it to a change in temperature. The Measurement Thermocouple System must respond accordingly.

Tolerance: ± 2° F of actual temperature

Plant: GREC
Thermocouple #: TC6-1

Date: 3/27/2017
Reference TC#: 150431556

Length (FT.)	Reference Temp. (°F)	Measured Temp. (°F)	Difference (°F)	Continuity Check (PASS/FAIL)
6	83.5	83.6	**-0.1**	**PASS**

Technician: Alexander Lagunas
Date: 3/27/17

C.E.M. Solutions, Inc.

Thermocouple Post Test Calibration Check

Standard: Reference Thermometer (calibrated against NIST standards)

Reference: ALT-011 Alternative Method 2 Thermocouple Calibration Procedure

Procedure: Measure ambient temperature with the Reference Thermometer and the Measurement Thermocouple System. Record Results. Next, check the continuity of the Measurement Thermocouple System by subjecting it to a change in temperature. The Measurement Thermocouple System must respond accordingly.

Tolerance: ± 2° F of actual temperature

Plant: GREC
Thermocouple #: TC6-2

Date: 3/27/2017
Reference TC#: 150431556

Length (FT.)	Reference Temp. (°F)	Measured Temp. (°F)	Difference (°F)	Continuity Check (PASS/FAIL)
6	83.7	83	**0.7**	**PASS**

Technician: Alexander Lagunas
Date: 3/27/17

Field Balance Calibration Log

Balance Serial #: CP56590

Weight Serial #: 1000116732

Weights Expire: 1/21/2018

Date	Certified Standard (g)	Measured (g)	Difference (g)	Initial if PASS
3/20/17	500.0	499.8	.2	MB
3/21/17	500.0	499.8	.2	AL
3/22/17	500.0	499.91	.1	AL
3/23/17	500.0	499.8	0.2	MB
3/24/17	500.0	499.9	0.1	MB

Check daily before use; the field balance must measure the weight within ± 0.5 g of the certified mass.

Probe Nozzle Calibration Log

Nozzle ID	Date	Nozzle Diameter, D_n (Inches)					Initial if PASS
		(1)	(2)	(3)	Hi - Lo	Average	

Each diameter must be measured to within ±0.001 inches and the high-low difference must be ≤0.004 inches

Field Balance Calibration Log

Balance Serial #: PL4220035

Weight Serial #: 1000116731

Weights Expire: 1/21/2018

Date	Certified Standard (g)	Measured (g)	Difference (g)	Initial if PASS
3/21/2017	500g	499.7	0.3	CRH
3/22/2017	500g	499.7	0.3	CRH
3/23/2017	500g	499.6	0.4	CRH
3/24/2017	500g	499.7	0.3	CRH

Check daily before use; the field balance must measure the weight within ± 0.5 g of the certified mass.

Probe Nozzle Calibration Log

Nozzle ID	Date	Nozzle Diameter, D_n (Inches)					Initial if PASS
		(1)	(2)	(3)	Hi - Lo	Average	
G250-13	3/21/2017	0.258	0.257	0.256	0.002	0.257	CRH
G250-15	3/21/2017	0.257	0.257	0.257	0.000	0.257	CRH
G250-11	3/21/2017	0.253	0.252	0.253	0.001	0.253	CRH
G218-19	3/22/2017	0.221	0.221	0.223	0.002	0.222	CRH
G218-15	3/22/2017	0.217	0.220	0.218	0.003	0.218	CRH
G218-25	3/22/17	0.218	0.219	0.218	0.001	0.218	CRH
1-3	3/22/17	0.158	0.158	0.158	0.000	0.158	CRH
2-3	3/23/17	0.157	0.158	0.158	0.001	0.158	CRH

Each diameter must be measured to within ±0.001 inches and the high-low difference must be ≤0.004 inches

Appendix E: Reference Method Data

Appendix E-1: Instrumental Methods Test Data

Average Calculated Emissions
Raw RM Data

THC Compliance Summary

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/22/17

Run Number	Units	Run 1	Run 2	Run 3	Average	Standard
Date of Run	2017	22-Mar	22-Mar	23-Mar		
Start Time		14:10:00	18:18:00	7:23:00		
Stop Time		15:10:00	19:18:00	8:23:00		
Moisture Diff	B_{WS}	21.1	22.4	23.1	22.2	
THC	ppm	0.0	0.5	0.0	0.2	
THC / O_2	Lbs/mmBtu	0.000	0.001	0.000	0.000	0.009

Calculation of Average Emissions

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/22/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 1

Calibration Gas Value	Initial Calibration	Final Calibration	Average
0.00 percent O_2	0.49 %	0.43 %	0.46
10.11 percent O_2	10.55 %	10.38 %	10.46
0.00 percent CO_2	-0.10 %	-0.15 %	-0.12
9.44 percent CO_2	9.12 %	9.13 %	9.13
0.0 ppm THC	0.0 ppm	0.0 ppm	-0.01
15.2 ppm THC	14.4 ppm	14.9 ppm	14.65

Mean Reference Values:	**Corrected Results:**	**Basis:**
3.74 percent O_2	**3.3** percent O_2	DRY
16.92 percent CO_2	**17.4** percent CO_2	DRY
0.0 ppm THC	**0.0** ppm THC	WET

Emission Calculations:

0.000 THC Lbs/mmBtu from O_2

Bws: **21.10 %**

Fuel Factors:

9240 dscf/mmBtu

Calculation of Average Emissions

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/22/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 2

Calibration Gas Value	Initial Calibration	Final Calibration	Average
0.00 percent O_2	0.43 %	0.48 %	0.46
10.11 percent O_2	10.38 %	10.46 %	10.42
0.00 percent CO_2	-0.15 %	0.04 %	-0.06
9.44 percent CO_2	9.13 %	9.23 %	9.18
0.0 ppm THC	0.0 ppm	0.0 ppm	-0.01
15.2 ppm THC	14.9 ppm	15.3 ppm	15.10

Mean Reference Values:	**Corrected Results:**	**Basis:**
3.76 percent O_2	**3.40** percent O_2	DRY
16.84 percent CO_2	**17.30** percent CO_2	DRY
0.5 ppm THC	**0.5** ppm THC	WET

Emission Calculations:

0.001 THC Lbs/mmBtu from O_2

Bws: **22.40 %**

Fuel Factors:

9240 dscf/mmBtu

Calculation of Average Emissions

Test Performed For:
GREC
Gainesville
Boiler 1
Compliance
Date:3/23/17

Test Performed By:
C.E.M. Solutions, Inc.
1183 E. Overdrive Circle
Hernando, FL 34442
(352) 489-4337
THC Run 3

Calibration Gas Value	Initial Calibration	Final Calibration	Average
0.00 percent O_2	0.23 %	0.18 %	0.21
10.11 percent O_2	10.23 %	10.23 %	10.23
0.00 percent CO_2	-0.32 %	-0.13 %	-0.22
9.44 percent CO_2	9.24 %	9.40 %	9.32
0.0 ppm THC	0.0 ppm	0.0 ppm	-0.01
15.2 ppm THC	15.2 ppm	15.4 ppm	15.32

Mean Reference Values:	**Corrected Results:**	**Basis:**
3.55 percent O_2	**3.4** percent O_2	DRY
17.16 percent CO_2	**17.2** percent CO_2	DRY
0.0 ppm THC	**0.0** ppm THC	WET

Emission Calculations:

0.000 THC Lbs/mmBtu from O_2

Bws: **23.10 %**

Fuel Factors:

9240 dscf/mmBtu

filename		3/22/2017	9:49:21															
testby1	C.E.M. Solutions, Inc.																	
testby2	1183 E. Overdrive Circle																	
testby3	Hernando, FL 34442																	
testby4	(352) 489-4337																	
testfor1	GREC																	
testfor2	Gainesville																	
testfor3	Boiler 1																	
testfor4	Compliance																	
name				FE O2		FE CO2		A THC										
sn				1151210012		1151210012		1106047146										
offset				0		0		0										
fullscale				100		20		30										
train				1		1		1										
gastype				o2 3a		co2 3a		thc 25a										
dcg1		3/22/2017	9:49:45	3.20		17.40		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:50:00	1.83		14.52		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:50:15	0.34		4.80		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:50:30	0.12		0.47		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:50:45	0.08		-0.08		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:51:00	0.07		-0.17		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:51:15	0.05		-0.18		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:51:30	0.06		-0.19		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:51:45	0.05		-0.19		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:52:00	0.05		-0.19		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:52:15	0.06		-0.19		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:52:30	0.05		-0.19		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:52:45	0.05		-0.19		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:53:00	0.10		-0.20		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:53:15	0.05		-0.20		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:53:30	0.05		-0.20		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:53:45	0.05		-0.24		-0.1	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:54:00	0.05		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/22/2017	9:54:15	0.05		-0.20		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
o2ezero1		3/22/2017	9:54:15	0.05		-0.20		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
co2ezero1		3/22/2017	9:54:15	0.05		-0.20		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg3		3/22/2017	10:11:30	3.91		16.68		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:11:45	4.11		17.94		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:12:00	5.52		17.96		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:12:15	5.70		16.03		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:12:30	5.86		12.92		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:12:45	15.91		13.12		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:13:00	19.93		17.83		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:13:15	20.59		19.17		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/22/2017	10:13:30	20.67		19.41		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
o2high1		3/22/2017	10:13:30	20.67		19.41		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
co2high1		3/22/2017	10:13:30	20.67		19.41		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg2		3/22/2017	10:13:45	20.68		19.47		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:14:00	18.50		18.89		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:14:15	11.83		14.52		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:14:30	10.43		10.01		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:14:45	10.31		9.43		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:15:00	10.28		9.49		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:15:15	10.29		9.51		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:15:30	10.29		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:15:45	10.32		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:16:00	10.29		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:16:15	10.28		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:16:30	10.28		9.51		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:16:45	10.29		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:17:00	10.28		9.49		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:17:15	10.28		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:17:30	10.32		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:17:45	10.28		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:18:00	10.28		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:18:15	10.28		9.49		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:18:30	10.28		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:18:45	10.28		9.49		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:19:00	10.27		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:19:15	10.28		9.50		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:19:30	10.28		9.49		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/22/2017	10:19:45	10.27		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
o2mid1		3/22/2017	10:19:45	10.27		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
co2mid1		3/22/2017	10:19:45	10.27		9.48		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg14		3/22/2017	10:23:00	3.17		17.53		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:23:15	3.14		17.53		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:23:30	3.08		17.59		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:23:45	3.00		17.70		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:24:00	3.01		17.77		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:24:15	3.04		17.72		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:24:30	3.57		17.51		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:24:45	6.90		15.48		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:25:00	13.77		9.41		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:25:15	18.17		4.28		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:25:30	19.84		1.18		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:25:45	20.30		0.30		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:26:00	20.44		0.03		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:26:15	20.47		-0.04		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:26:30	20.49		-0.07		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:26:45	20.55		-0.09		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:27:00	20.50		-0.10		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:27:15	20.52		-0.11		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:27:30	20.52		-0.11		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:27:45	20.52		-0.12		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:28:00	20.53		-0.12		-0.4	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:28:15	20.53		-0.13		-1.3	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:28:30	20.54		-0.13		-1.2	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:28:45	20.54		-0.14		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/22/2017	10:29:00	20.54		-0.14		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
thcezero1		3/22/2017	10:29:00	20.54		-0.14		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg13		3/22/2017	10:29:15	20.55		-0.15		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/22/2017	10:29:30	20.55		-0.15		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/22/2017	10:29:45	20.55		-0.15		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/22/2017	10:30:00	20.56		-0.15		0.0	CC458494/cg13	THC	25.53		0		0		0	

name			FE O2	FE CO2	A THC									
sn			1151210012	1151210012	1106047146									
offset			0	0	0									
fullscale			100	20	30									
train			1	1	1									
gastype			o2 3a	co2 3a	thc 25a									
dcg13	3/22/2017	10:30:15	20.55	-0.16	0.0	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:30:30	20.56	-0.16	0.0	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:30:45	20.56	-0.16	2.9	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:31:00	19.04	0.08	12.2	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:31:15	11.56	3.35	15.8	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:31:30	8.03	10.31	16.1	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:31:45	13.26	10.54	16.2	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:32:00	18.14	5.49	16.2	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:32:15	20.18	1.90	16.3	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:32:30	20.81	0.38	16.3	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:32:45	20.96	0.00	16.3	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:33:00	21.00	-0.11	16.3	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:33:15	21.02	-0.14	24.1	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:33:30	21.02	-0.15	25.5	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:33:45	21.02	-0.15	25.5	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:34:00	21.04	-0.16	25.5	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:34:15	21.02	-0.16	25.6	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:34:30	21.04	-0.17	25.6	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:34:45	21.03	-0.17	25.6	CC458494/cg13	THC	25.53		0		0		0
thchigh1	3/22/2017	10:34:45	21.03	-0.17	25.6	CC458494/cg13	THC	25.53		0		0		0
dcg12	3/22/2017	10:35:00	21.03	-0.17	25.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:35:15	21.09	-0.17	25.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:35:30	21.04	-0.17	25.5	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:35:45	21.05	-0.18	25.4	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:36:00	21.05	-0.18	20.4	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:36:15	21.05	-0.18	16.4	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:36:30	21.05	-0.18	15.1	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:36:45	20.43	-0.09	14.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:37:00	18.19	1.06	14.7	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:37:15	18.98	2.27	14.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:37:30	20.30	1.26	14.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:37:45	20.86	0.29	14.6	CC454100/cg12	THC	15.2		0		0		0
thcmid1	3/22/2017	10:37:30	20.30	1.26	14.6	CC454100/cg12	THC	15.2		0		0		0
dcg11	3/22/2017	10:38:00	21.01	-0.07	14.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:38:15	21.04	-0.14	14.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:38:30	21.06	-0.17	14.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:38:45	21.06	-0.18	14.1	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:39:00	21.05	-0.18	10.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:39:15	21.07	-0.18	8.4	CC453989/cg11	THC	8.926		0		0		0
dcg14	3/22/2017	10:39:45	20.99	-0.17	8.2	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:40:00	20.99	-0.16	8.2	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:40:15	21.03	-0.17	8.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:40:30	21.06	-0.18	6.7	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:40:45	21.06	-0.19	1.5	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:41:00	21.11	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:41:15	21.06	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:41:30	20.96	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg14	3/22/2017	10:41:45	20.71	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
thcezero1	3/22/2017	10:41:45	20.71	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
dcg13	3/22/2017	10:42:15	20.64	-0.21	0.0	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:42:30	20.59	-0.19	0.0	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:42:45	20.61	-0.19	0.0	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:43:00	20.60	-0.20	5.2	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:43:15	20.65	-0.20	20.2	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:43:30	20.60	-0.20	24.9	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:43:45	20.61	-0.20	25.4	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:44:00	20.75	-0.20	25.4	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:44:15	20.91	-0.20	25.9	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:44:30	21.01	-0.20	26.6	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:44:45	21.04	-0.20	26.5	CC458494/cg13	THC	25.53		0		0		0
dcg13	3/22/2017	10:45:00	21.06	-0.20	26.5	CC458494/cg13	THC	25.53		0		0		0
thchigh1	3/22/2017	10:44:45	21.04	-0.20	26.5	CC458494/cg13	THC	25.53		0		0		0
dcg11	3/22/2017	10:45:15	21.07	-0.20	26.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:45:30	21.06	-0.20	26.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:45:45	21.07	-0.20	26.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:46:00	21.11	-0.20	23.8	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:46:15	21.06	-0.20	13.6	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:46:30	21.07	-0.20	8.9	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:46:45	21.11	-0.20	8.5	CC453989/cg11	THC	8.926		0		0		0
dcg11	3/22/2017	10:47:00	21.05	-0.20	8.6	CC453989/cg11	THC	8.926		0		0		0
thclow1	3/22/2017	10:47:00	21.05	-0.20	8.6	CC453989/cg11	THC	8.926		0		0		0
dcg12	3/22/2017	10:47:15	21.03	-0.20	8.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:47:30	21.09	-0.20	8.6	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:47:45	21.08	-0.20	8.5	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:48:00	21.13	-0.20	8.9	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:48:15	21.08	-0.20	12.4	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:48:30	21.09	-0.20	14.7	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:48:45	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:49:00	20.94	-0.21	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:49:15	20.83	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:49:30	20.63	-0.29	14.9	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:49:45	21.10	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:50:00	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:50:15	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:50:30	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:50:45	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:51:00	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:51:15	21.10	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:51:30	21.09	-0.20	15.1	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:51:45	21.10	-0.20	15.1	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:52:00	21.10	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:52:15	21.09	-0.20	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:52:30	21.10	-0.20	15.1	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/22/2017	10:52:45	21.09	-0.20	15.2	CC454100/cg12	THC	15.2		0		0		0
thcmid1	3/22/2017	10:52:45	21.09	-0.20	15.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	10:53:15	21.09	-0.20	15.2	CC454100/cg12	THC	15.2		0		0		0
thcspan1	3/22/2017	10:53:15	21.09	-0.20	15.2	CC454100/cg12	THC	15.2		0		0		0
scg14	3/22/2017	10:53:30	21.09	-0.20	15.2	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0

name			FE O2	FE CO2	A THC									
sn			1151210012	1151210012	1106047146									
offset			0	0	0									
fullscale			100	20	30									
train			1	1	1									
gastype			o2 3a	co2 3a	thc 25a									
scg14	3/22/2017	10:53:45	21.10	-0.20	14.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	10:54:00	21.09	-0.20	12.3	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	10:54:15	21.10	-0.20	12.6	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	10:54:30	21.06	-0.20	3.9	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	10:54:45	19.59	0.11	0.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	10:55:00	19.03	1.50	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	10:55:15	20.05	1.35	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
thczero1	3/22/2017	10:55:15	20.05	1.35	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg1	3/22/2017	10:55:30	20.49	0.37	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:55:45	20.60	-0.03	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:56:00	20.62	-0.16	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:56:15	20.62	-0.19	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:56:30	20.63	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:56:45	20.63	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:57:00	20.18	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:57:15	13.97	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:57:30	5.50	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:57:45	1.78	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:58:00	0.69	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:58:15	0.46	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:58:30	0.34	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:58:45	0.35	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/22/2017	10:59:00	0.30	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
o2zero1	3/22/2017	10:59:00	0.30	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
co2zero1	3/22/2017	10:59:00	0.30	-0.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg2	3/22/2017	10:59:15	0.28	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	10:59:30	0.27	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	10:59:45	-0.01	-0.27	-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:00:00	0.10	-0.24	-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:00:15	0.26	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:00:30	0.25	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:00:45	0.24	-0.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:01:00	1.39	-0.07	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:01:15	5.86	1.60	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:01:30	8.55	5.78	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:01:45	9.92	8.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:02:00	10.09	8.93	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:02:15	10.26	9.13	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:02:30	10.22	9.19	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:02:45	10.28	9.24	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/22/2017	11:03:00	10.20	9.22	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
o2span1	3/22/2017	11:02:45	10.28	9.24	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
co2span1	3/22/2017	11:02:45	10.28	9.24	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg14	3/22/2017	12:34:15	3.41	16.83	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:34:30	3.66	16.84	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:34:45	3.70	16.89	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:35:00	3.78	16.89	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:35:15	3.70	16.89	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:35:30	3.56	16.99	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:35:45	3.62	17.06	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:36:00	6.13	16.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:36:15	12.63	12.13	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:36:30	17.37	5.77	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:36:45	19.63	2.27	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:37:00	20.34	0.65	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:37:15	20.54	0.18	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:37:30	20.61	0.02	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:37:45	20.64	-0.03	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:38:00	20.64	-0.06	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:38:15	20.66	-0.08	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:38:30	20.67	-0.09	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:38:45	20.68	-0.10	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	12:39:00	20.69	-0.11	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
thczero1	3/22/2017	12:38:45	20.68	-0.10	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg12	3/22/2017	12:39:15	20.68	-0.11	0.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:39:30	20.48	-0.14	0.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:39:45	20.39	-0.17	0.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:40:00	20.70	-0.13	0.7	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:40:15	20.72	-0.14	8.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:40:30	20.72	-0.14	14.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:40:45	20.71	-0.14	14.8	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	12:41:00	20.72	-0.14	14.8	CC454100/cg12	THC	15.2		0		0		0
thcspan1	3/22/2017	12:41:00	20.72	-0.14	14.8	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:43:00	3.82	16.87	0.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:43:15	3.76	16.88	0.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:43:30	3.65	16.92	0.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:43:45	3.56	17.01	1.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:44:00	3.57	17.08	7.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:44:15	3.63	17.05	12.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:44:30	4.21	16.91	13.4	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:44:45	9.56	14.94	13.5	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:45:00	16.11	8.65	13.7	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:45:15	19.58	3.81	14.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:45:30	20.73	1.05	14.1	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:45:45	21.07	0.29	14.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:46:00	21.16	0.03	14.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:46:15	21.17	-0.04	14.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:46:30	21.20	-0.07	14.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/22/2017	13:46:45	21.20	-0.09	14.4	CC454100/cg12	THC	15.2		0		0		0
thcspan1	3/22/2017	13:46:45	21.20	-0.09	14.4	CC454100/cg12	THC	15.2		0		0		0
scg14	3/22/2017	13:47:00	21.22	-0.10	14.5	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:47:15	21.27	-0.11	13.6	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:47:30	21.08	-0.15	12.4	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:47:45	21.23	-0.12	13.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:48:00	21.15	-0.15	4.8	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:48:15	21.00	-0.17	0.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:48:30	20.76	-0.24	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/22/2017	13:48:45	21.16	-0.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0

name			FE O2	FE CO2	A THC										
sn			1151210012	1151210012	1106047146										
offset			0	0	0										
fullscale			100	20	30										
train			1	1	1										
gastype			o2 3a	co2 3a	thc 25a										
scg14	3/22/2017	13:49:00	20.97	-0.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
thczero1	3/22/2017	13:49:00	20.97	-0.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg2	3/22/2017	13:49:15	20.86	-0.15	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:49:30	20.80	-0.15	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:49:45	20.80	-0.15	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:50:00	20.79	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:50:15	20.79	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:50:30	20.79	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:50:45	20.80	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:51:00	19.97	-0.04	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:51:15	15.58	1.41	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:51:30	12.17	5.49	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:51:45	10.97	7.81	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:52:00	10.66	8.81	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:52:15	10.57	9.04	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	13:52:30	10.55	9.12	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
o2span1	3/22/2017	13:52:30	10.55	9.12	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
co2span1	3/22/2017	13:52:30	10.55	9.12	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg1	3/22/2017	13:53:00	10.53	9.16	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:53:15	10.53	9.18	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:53:30	10.52	9.19	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:53:45	10.52	9.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:54:00	10.51	9.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:54:15	10.50	9.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:54:30	10.37	9.19	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:54:45	7.89	8.47	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:55:00	3.78	5.24	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:55:15	1.57	2.45	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:55:30	0.77	0.60	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:55:45	0.57	0.12	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:56:00	0.51	-0.06	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	13:56:15	0.49	-0.10	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
o2zero1	3/22/2017	13:56:15	0.49	-0.10	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
co2zero1	3/22/2017	13:56:15	0.49	-0.10	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
THC run1	3/22/2017	13:57:45	0.45	-0.15	0.0										
THC run1	3/22/2017	13:58:00	0.45	-0.15	0.0										
THC run1	3/22/2017	13:58:15	1.04	0.30	0.0										
THC run1	3/22/2017	13:58:30	2.63	5.04	0.0										
THC run1	3/22/2017	13:58:45	3.42	11.38	0.0										
THC run1	3/22/2017	13:59:00	3.39	15.27	-0.1										
THC run1	3/22/2017	13:59:15	3.57	16.34	0.0										
THC run1	3/22/2017	13:59:30	3.62	16.73	0.0										
THC run1	3/22/2017	13:59:45	3.63	16.80	0.0										
THC run1	3/22/2017	14:00:00	3.63	16.86	0.0										
THC run1	3/22/2017	14:00:15	3.64	16.89	0.0										
THC run1	3/22/2017	14:00:30	3.31	16.82	-0.1										
THC run1	3/22/2017	14:00:45	3.31	16.81	-0.1										
THC run1	3/22/2017	14:01:00	3.55	16.91	-0.1										
THC run1	3/22/2017	14:01:15	3.33	16.93	-0.1										
THC run1	3/22/2017	14:01:30	3.07	17.05	-0.1										
THC run1	3/22/2017	14:01:45	3.44	17.19	0.0										
THC run1	3/22/2017	14:02:00	3.42	17.17	0.0										
THC run1	3/22/2017	14:02:15	3.34	17.19	0.0										
THC run1	3/22/2017	14:02:30	3.24	17.30	0.0										
THC run1	3/22/2017	14:02:45	3.22	17.37	0.0										
THC run1	3/22/2017	14:03:00	3.31	17.38	0.0										
THC run1	3/22/2017	14:03:15	3.36	17.33	0.0										
THC run1	3/22/2017	14:03:30	3.46	17.23	0.0										
THC run1	3/22/2017	14:03:45	3.52	17.18	0.0										
THC run1	3/22/2017	14:04:00	3.52	17.14	0.0										
THC run1	3/22/2017	14:04:15	3.44	17.16	0.0										
THC run1	3/22/2017	14:04:30	3.38	17.19	0.0										
THC run1	3/22/2017	14:04:45	3.32	17.24	0.0										
THC run1	3/22/2017	14:05:00	3.32	17.29	0.0										
THC run1	3/22/2017	14:05:15	3.31	17.31	0.0										
THC run1	3/22/2017	14:05:30	3.38	17.29	0.0										
THC run1	3/22/2017	14:05:45	3.55	17.22	0.0										
THC run1	3/22/2017	14:06:00	3.48	17.16	0.0										
THC run1	3/22/2017	14:06:15	3.38	17.21	0.0										
THC run1	3/22/2017	14:06:30	3.32	17.30	0.0										
THC run1	3/22/2017	14:06:45	3.41	17.28	0.0										
THC run1	3/22/2017	14:07:00	3.57	17.14	0.0										
THC run1	3/22/2017	14:07:15	3.74	17.01	0.0										
THC run1	3/22/2017	14:07:30	3.80	16.88	0.0										
THC run1	3/22/2017	14:07:45	3.78	16.85	0.0										
THC run1	3/22/2017	14:08:00	3.71	16.92	0.0										
THC run1	3/22/2017	14:08:15	3.72	16.96	0.0										
THC run1	3/22/2017	14:08:30	3.83	16.92	0.0										
THC run1	3/22/2017	14:08:45	3.93	16.81	0.0										
THC run1	3/22/2017	14:09:00	4.02	16.66	0.0										
THC run1	3/22/2017	14:09:15	4.08	16.57	0.0										
THC run1	3/22/2017	14:09:30	4.17	16.49	0.0										
THC run1	3/22/2017	14:09:45	4.21	16.43	0.0										
THC run1	3/22/2017	14:10:00	4.06	16.47	0.0										
THC run1	3/22/2017	14:10:15	3.90	16.62	0.0										
THC run1	3/22/2017	14:10:30	3.86	16.79	0.0										
THC run1	3/22/2017	14:10:45	3.86	16.81	0.0										
THC run1	3/22/2017	14:11:00	3.86	16.81	0.0										
THC run1	3/22/2017	14:11:15	3.80	16.84	0.0										
THC run1	3/22/2017	14:11:30	3.74	16.88	0.0										
THC run1	3/22/2017	14:11:45	3.77	16.88	0.0										
THC run1	3/22/2017	14:12:00	3.82	16.86	0.0										
THC run1	3/22/2017	14:12:15	3.87	16.81	0.0										
THC run1	3/22/2017	14:12:30	3.87	16.79	0.0										
THC run1	3/22/2017	14:12:45	3.84	16.81	0.0										
THC run1	3/22/2017	14:13:00	3.84	16.83	0.0										
THC run1	3/22/2017	14:13:15	3.84	16.83	0.0										
THC run1	3/22/2017	14:13:30	3.82	16.84	0.0										

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run1	3/22/2017	14:13:45	3.74	16.88	0.0
THC run1	3/22/2017	14:14:00	3.65	16.95	0.0
THC run1	3/22/2017	14:14:15	3.59	16.99	0.0
THC run1	3/22/2017	14:14:30	3.57	17.06	0.0
THC run1	3/22/2017	14:14:45	3.60	17.07	0.0
THC run1	3/22/2017	14:15:00	3.64	17.03	0.0
THC run1	3/22/2017	14:15:15	3.67	17.02	0.0
THC run1	3/22/2017	14:15:30	3.74	16.97	0.0
THC run1	3/22/2017	14:15:45	3.76	16.92	0.0
THC run1	3/22/2017	14:16:00	3.69	16.93	0.0
THC run1	3/22/2017	14:16:15	3.64	16.99	0.0
THC run1	3/22/2017	14:16:30	3.64	17.01	0.0
THC run1	3/22/2017	14:16:45	3.70	16.96	0.0
THC run1	3/22/2017	14:17:00	3.66	16.96	0.0
THC run1	3/22/2017	14:17:15	3.53	17.04	0.0
THC run1	3/22/2017	14:17:30	3.47	17.16	0.0
THC run1	3/22/2017	14:17:45	3.48	17.20	0.0
THC run1	3/22/2017	14:18:00	3.55	17.18	0.0
THC run1	3/22/2017	14:18:15	3.54	17.14	0.0
THC run1	3/22/2017	14:18:30	3.56	17.14	0.0
THC run1	3/22/2017	14:18:45	3.60	17.12	0.0
THC run1	3/22/2017	14:19:00	3.66	17.04	0.0
THC run1	3/22/2017	14:19:15	3.72	16.96	0.0
THC run1	3/22/2017	14:19:30	3.78	16.90	0.0
THC run1	3/22/2017	14:19:45	3.78	16.89	0.0
THC run1	3/22/2017	14:20:00	3.76	16.89	0.0
THC run1	3/22/2017	14:20:15	3.75	16.91	0.0
THC run1	3/22/2017	14:20:30	3.79	16.93	0.0
THC run1	3/22/2017	14:20:45	3.89	16.87	0.0
THC run1	3/22/2017	14:21:00	3.92	16.76	0.0
THC run1	3/22/2017	14:21:15	3.80	16.79	0.0
THC run1	3/22/2017	14:21:30	3.68	16.94	0.0
THC run1	3/22/2017	14:21:45	3.59	17.00	0.0
THC run1	3/22/2017	14:22:00	3.56	17.07	0.0
THC run1	3/22/2017	14:22:15	3.64	17.10	0.0
THC run1	3/22/2017	14:22:30	3.65	17.06	0.0
THC run1	3/22/2017	14:22:45	3.68	17.02	0.0
THC run1	3/22/2017	14:23:00	3.68	16.99	0.0
THC run1	3/22/2017	14:23:15	3.67	17.01	0.0
THC run1	3/22/2017	14:23:30	3.74	16.98	0.0
THC run1	3/22/2017	14:23:45	3.79	16.94	0.0
THC run1	3/22/2017	14:24:00	3.85	16.87	0.0
THC run1	3/22/2017	14:24:15	3.87	16.80	0.0
THC run1	3/22/2017	14:24:30	3.79	16.81	0.0
THC run1	3/22/2017	14:24:45	3.80	16.86	0.0
THC run1	3/22/2017	14:25:00	3.88	16.84	0.0
THC run1	3/22/2017	14:25:15	3.98	16.74	0.0
THC run1	3/22/2017	14:25:30	4.03	16.64	0.0
THC run1	3/22/2017	14:25:45	4.07	16.62	0.0
THC run1	3/22/2017	14:26:00	4.13	16.57	0.0
THC run1	3/22/2017	14:26:15	4.14	16.52	0.0
THC run1	3/22/2017	14:26:30	4.04	16.55	0.0
THC run1	3/22/2017	14:26:45	4.02	16.60	0.0
THC run1	3/22/2017	14:27:00	4.09	16.57	0.0
THC run1	3/22/2017	14:27:15	4.10	16.54	0.0
THC run1	3/22/2017	14:27:30	4.10	16.53	0.0
THC run1	3/22/2017	14:27:45	4.08	16.55	0.0
THC run1	3/22/2017	14:28:00	4.05	16.57	0.0
THC run1	3/22/2017	14:28:15	4.03	16.61	0.0
THC run1	3/22/2017	14:28:30	3.95	16.67	0.0
THC run1	3/22/2017	14:28:45	3.86	16.74	0.0
THC run1	3/22/2017	14:29:00	3.85	16.84	0.0
THC run1	3/22/2017	14:29:15	3.91	16.79	0.0
THC run1	3/22/2017	14:29:30	3.95	16.69	0.0
THC run1	3/22/2017	14:29:45	3.92	16.69	0.0
THC run1	3/22/2017	14:30:00	3.85	16.76	0.0
THC run1	3/22/2017	14:30:15	3.88	16.83	0.0
THC run1	3/22/2017	14:30:30	3.86	16.83	0.0
THC run1	3/22/2017	14:30:45	3.91	16.78	0.0
THC run1	3/22/2017	14:31:00	3.92	16.75	0.0
THC run1	3/22/2017	14:31:15	3.92	16.74	0.0
THC run1	3/22/2017	14:31:30	3.90	16.75	0.0
THC run1	3/22/2017	14:31:45	3.86	16.80	0.0
THC run1	3/22/2017	14:32:00	3.94	16.76	0.0
THC run1	3/22/2017	14:32:15	3.99	16.67	0.0
THC run1	3/22/2017	14:32:30	3.92	16.66	0.0
THC run1	3/22/2017	14:32:45	3.89	16.72	0.0
THC run1	3/22/2017	14:33:00	3.85	16.78	0.0
THC run1	3/22/2017	14:33:15	3.79	16.84	0.0
THC run1	3/22/2017	14:33:30	3.76	16.91	0.0
THC run1	3/22/2017	14:33:45	3.69	16.95	0.0
THC run1	3/22/2017	14:34:00	3.64	17.00	0.0
THC run1	3/22/2017	14:34:15	3.68	17.02	0.0
THC run1	3/22/2017	14:34:30	3.72	16.99	0.0
THC run1	3/22/2017	14:34:45	3.81	16.91	0.0
THC run1	3/22/2017	14:35:00	3.87	16.82	0.0
THC run1	3/22/2017	14:35:15	3.87	16.79	0.0
THC run1	3/22/2017	14:35:30	3.82	16.81	0.0
THC run1	3/22/2017	14:35:45	3.78	16.86	0.0
THC run1	3/22/2017	14:36:00	3.76	16.90	0.0
THC run1	3/22/2017	14:36:15	3.70	16.93	0.0
THC run1	3/22/2017	14:36:30	3.62	17.01	0.0
THC run1	3/22/2017	14:36:45	3.55	17.08	0.0
THC run1	3/22/2017	14:37:00	3.51	17.18	0.0
THC run1	3/22/2017	14:37:15	3.57	17.17	0.0
THC run1	3/22/2017	14:37:30	3.63	17.06	0.0
THC run1	3/22/2017	14:37:45	3.57	17.05	0.0
THC run1	3/22/2017	14:38:00	3.52	17.11	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run1	3/22/2017	14:38:15	3.49	17.16	0.0
THC run1	3/22/2017	14:38:30	3.50	17.19	0.0
THC run1	3/22/2017	14:38:45	3.52	17.16	0.0
THC run1	3/22/2017	14:39:00	3.52	17.16	0.0
THC run1	3/22/2017	14:39:15	3.58	17.14	0.2
THC run1	3/22/2017	14:39:30	3.66	17.07	0.3
THC run1	3/22/2017	14:39:45	3.63	17.03	0.2
THC run1	3/22/2017	14:40:00	3.59	17.04	0.1
THC run1	3/22/2017	14:40:15	3.58	17.06	0.0
THC run1	3/22/2017	14:40:30	3.56	17.08	0.0
THC run1	3/22/2017	14:40:45	3.55	17.10	0.0
THC run1	3/22/2017	14:41:00	3.59	17.11	0.0
THC run1	3/22/2017	14:41:15	3.63	17.06	0.0
THC run1	3/22/2017	14:41:30	3.58	17.06	0.0
THC run1	3/22/2017	14:41:45	3.51	17.13	0.0
THC run1	3/22/2017	14:42:00	3.49	17.20	0.0
THC run1	3/22/2017	14:42:15	3.52	17.21	0.0
THC run1	3/22/2017	14:42:30	3.56	17.15	0.0
THC run1	3/22/2017	14:42:45	3.63	17.06	0.0
THC run1	3/22/2017	14:43:00	3.64	17.00	0.0
THC run1	3/22/2017	14:43:15	3.58	17.03	0.0
THC run1	3/22/2017	14:43:30	3.53	17.09	0.0
THC run1	3/22/2017	14:43:45	3.49	17.16	0.0
THC run1	3/22/2017	14:44:00	3.55	17.16	0.0
THC run1	3/22/2017	14:44:15	3.62	17.11	0.0
THC run1	3/22/2017	14:44:30	3.70	17.04	0.0
THC run1	3/22/2017	14:44:45	3.81	16.95	0.0
THC run1	3/22/2017	14:45:00	3.83	16.86	0.0
THC run1	3/22/2017	14:45:15	3.78	16.87	0.0
THC run1	3/22/2017	14:45:30	3.79	16.89	0.0
THC run1	3/22/2017	14:45:45	3.74	16.90	0.0
THC run1	3/22/2017	14:46:00	3.74	16.92	0.0
THC run1	3/22/2017	14:46:15	3.78	16.92	0.0
THC run1	3/22/2017	14:46:30	3.85	16.86	0.0
THC run1	3/22/2017	14:46:45	3.90	16.79	0.0
THC run1	3/22/2017	14:47:00	3.91	16.76	0.0
THC run1	3/22/2017	14:47:15	3.93	16.76	0.0
THC run1	3/22/2017	14:47:30	3.99	16.72	0.0
THC run1	3/22/2017	14:47:45	4.04	16.66	0.0
THC run1	3/22/2017	14:48:00	4.08	16.56	0.0
THC run1	3/22/2017	14:48:15	4.10	16.51	0.0
THC run1	3/22/2017	14:48:30	4.08	16.52	0.0
THC run1	3/22/2017	14:48:45	4.03	16.56	0.0
THC run1	3/22/2017	14:49:00	3.97	16.63	0.0
THC run1	3/22/2017	14:49:15	3.94	16.68	0.0
THC run1	3/22/2017	14:49:30	3.97	16.70	0.0
THC run1	3/22/2017	14:49:45	3.93	16.69	0.0
THC run1	3/22/2017	14:50:00	3.82	16.77	0.0
THC run1	3/22/2017	14:50:15	3.74	16.89	0.0
THC run1	3/22/2017	14:50:30	3.67	16.96	0.0
THC run1	3/22/2017	14:50:45	3.64	16.99	0.0
THC run1	3/22/2017	14:51:00	3.64	16.99	0.0
THC run1	3/22/2017	14:51:15	3.65	16.99	0.0
THC run1	3/22/2017	14:51:30	3.62	17.01	0.0
THC run1	3/22/2017	14:51:45	3.63	17.04	0.0
THC run1	3/22/2017	14:52:00	3.72	17.00	0.0
THC run1	3/22/2017	14:52:15	3.81	16.92	0.0
THC run1	3/22/2017	14:52:30	3.86	16.84	0.0
THC run1	3/22/2017	14:52:45	3.85	16.81	0.0
THC run1	3/22/2017	14:53:00	3.77	16.87	0.0
THC run1	3/22/2017	14:53:15	3.73	16.93	0.0
THC run1	3/22/2017	14:53:30	3.68	16.94	0.0
THC run1	3/22/2017	14:53:45	3.62	16.97	0.0
THC run1	3/22/2017	14:54:00	3.61	17.04	0.0
THC run1	3/22/2017	14:54:15	3.61	17.06	0.0
THC run1	3/22/2017	14:54:30	3.56	17.06	0.0
THC run1	3/22/2017	14:54:45	3.48	17.13	0.0
THC run1	3/22/2017	14:55:00	3.42	17.22	0.0
THC run1	3/22/2017	14:55:15	3.41	17.27	0.0
THC run1	3/22/2017	14:55:30	3.37	17.32	0.0
THC run1	3/22/2017	14:55:45	3.34	17.35	0.0
THC run1	3/22/2017	14:56:00	3.36	17.35	0.0
THC run1	3/22/2017	14:56:15	3.41	17.30	0.0
THC run1	3/22/2017	14:56:30	3.45	17.24	0.0
THC run1	3/22/2017	14:56:45	3.43	17.24	0.0
THC run1	3/22/2017	14:57:00	3.39	17.28	0.0
THC run1	3/22/2017	14:57:15	3.41	17.29	0.0
THC run1	3/22/2017	14:57:30	3.42	17.27	0.0
THC run1	3/22/2017	14:57:45	3.45	17.26	0.0
THC run1	3/22/2017	14:58:00	3.52	17.21	0.0
THC run1	3/22/2017	14:58:15	3.56	17.16	0.0
THC run1	3/22/2017	14:58:30	3.60	17.12	0.0
THC run1	3/22/2017	14:58:45	3.61	17.06	0.0
THC run1	3/22/2017	14:59:00	3.50	17.07	0.0
THC run1	3/22/2017	14:59:15	3.37	17.20	0.0
THC run1	3/22/2017	14:59:30	3.41	17.30	0.0
THC run1	3/22/2017	14:59:45	3.53	17.22	0.0
THC run1	3/22/2017	15:00:00	3.59	17.11	0.0
THC run1	3/22/2017	15:00:15	3.57	17.09	0.0
THC run1	3/22/2017	15:00:30	3.54	17.14	0.0
THC run1	3/22/2017	15:00:45	3.55	17.16	0.0
THC run1	3/22/2017	15:01:00	3.57	17.13	0.0
THC run1	3/22/2017	15:01:15	3.61	17.09	0.0
THC run1	3/22/2017	15:01:30	3.62	17.03	0.0
THC run1	3/22/2017	15:01:45	3.55	17.05	0.0
THC run1	3/22/2017	15:02:00	3.55	17.11	0.0
THC run1	3/22/2017	15:02:15	3.60	17.11	0.0
THC run1	3/22/2017	15:02:30	3.66	17.04	0.0

name			FE O2	FE CO2	A THC										
sn			1151210012	1151210012	1106047146										
offset			0	0	0										
fullscale			100	20	30										
train			1	1	1										
gastype			o2 3a	co2 3a	thc 25a										
THC run1	3/22/2017	15:02:45	3.72	17.00	0.0										
THC run1	3/22/2017	15:03:00	3.79	16.94	0.0										
THC run1	3/22/2017	15:03:15	3.83	16.88	0.0										
THC run1	3/22/2017	15:03:30	3.81	16.86	0.0										
THC run1	3/22/2017	15:03:45	3.80	16.87	0.0										
THC run1	3/22/2017	15:04:00	3.81	16.87	0.0										
THC run1	3/22/2017	15:04:15	3.81	16.82	0.0										
THC run1	3/22/2017	15:04:30	3.81	16.82	0.0										
THC run1	3/22/2017	15:04:45	3.80	16.86	0.0										
THC run1	3/22/2017	15:05:00	3.81	16.87	0.0										
THC run1	3/22/2017	15:05:15	3.82	16.85	0.0										
THC run1	3/22/2017	15:05:30	3.80	16.86	0.0										
THC run1	3/22/2017	15:05:45	3.78	16.88	0.0										
THC run1	3/22/2017	15:06:00	3.77	16.90	0.0										
THC run1	3/22/2017	15:06:15	3.78	16.92	0.0										
THC run1	3/22/2017	15:06:30	3.92	16.85	0.0										
THC run1	3/22/2017	15:06:45	4.04	16.70	0.0										
THC run1	3/22/2017	15:07:00	4.04	16.58	0.0										
THC run1	3/22/2017	15:07:15	4.01	16.58	0.0										
THC run1	3/22/2017	15:07:30	4.02	16.62	0.0										
THC run1	3/22/2017	15:07:45	4.03	16.60	0.0										
THC run1	3/22/2017	15:08:00	4.03	16.60	0.0										
THC run1	3/22/2017	15:08:15	3.97	16.63	0.0										
THC run1	3/22/2017	15:08:30	3.91	16.70	0.0										
THC run1	3/22/2017	15:08:45	3.86	16.79	0.0										
THC run1	3/22/2017	15:09:00	3.87	16.82	0.0										
THC run1	3/22/2017	15:09:15	3.88	16.78	0.0										
THC run1	3/22/2017	15:09:30	3.79	16.79	0.0										
THC run1	3/22/2017	15:09:45	3.72	16.88	0.0										
THC run1	3/22/2017	15:10:00	3.75	16.94	0.0										
THC run1	3/22/2017	15:10:15	3.81	16.90	0.0										
THC run1	3/22/2017	15:10:30	3.85	16.84	0.0										
THC run1	3/22/2017	15:10:45	3.79	16.85	0.0										
THC run1	3/22/2017	15:11:00	3.68	16.93	0.0										
aveTHC run	3/22/2017	14:10:00	3.74	16.92	0.0	60									
scg1	3/22/2017	15:11:30	3.62	17.05	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:11:45	3.62	17.06	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:12:00	3.59	17.04	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:12:15	3.57	17.08	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:12:30	3.54	17.10	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:12:45	3.47	17.15	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:13:00	3.43	16.63	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:13:15	2.50	12.94	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:13:30	1.31	6.33	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:13:45	0.71	2.60	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:14:00	0.54	0.64	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:14:15	0.45	0.16	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:14:30	0.46	-0.01	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:14:45	0.45	-0.06	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:15:00	0.44	-0.08	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:15:15	0.44	-0.09	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:15:30	0.43	-0.10	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:15:45	0.48	-0.11	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:16:00	0.44	-0.12	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:16:15	0.42	-0.13	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:16:30	0.45	-0.13	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:16:45	0.44	-0.14	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:17:00	0.43	-0.14	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:17:15	0.44	-0.15	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:17:30	0.42	-0.15	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg1	3/22/2017	15:17:45	0.43	-0.15	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
o2zero1	3/22/2017	15:17:45	0.43	-0.15	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
co2zero1	3/22/2017	15:17:30	0.42	-0.15	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
scg2	3/22/2017	15:18:00	0.43	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:18:15	0.42	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:18:30	0.44	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:18:45	0.43	-0.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:19:00	0.43	-0.17	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:19:15	-0.02	-0.28	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:19:30	0.01	-0.28	-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:19:45	0.95	-0.13	-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:20:00	5.06	1.33	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:20:15	8.64	4.76	-0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:20:30	9.78	7.79	-0.5	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:20:45	10.26	8.66	-0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:21:00	10.22	8.83	-0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:21:15	10.24	9.05	-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	15:21:30	10.38	9.13	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
o2span1	3/22/2017	15:21:30	10.38	9.13	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
co2span1	3/22/2017	15:21:30	10.38	9.13	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg14	3/22/2017	15:21:45	10.42	9.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:22:00	10.26	9.15	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:22:15	10.46	9.17	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:22:30	10.46	9.15	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:22:45	10.42	9.17	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:23:00	10.47	9.18	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:23:15	10.54	9.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:23:30	11.42	8.96	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:23:45	15.48	7.28	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:24:00	18.79	3.35	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:24:15	20.16	1.27	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:24:30	20.58	0.25	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:24:45	20.69	0.01	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:25:00	20.72	-0.08	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:25:15	20.76	-0.11	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	15:25:30	20.75	-0.12	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
thczero1	3/22/2017	15:25:30	20.75	-0.12	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg12	3/22/2017	15:25:45	20.82	-0.14	0.0	CC454100/cg12	THC	15.2		0		0		0	

name			FE O2	FE CO2	A THC						
sn			1151210012	1151210012	1106047146						
offset			0	0	0						
fullscale			100	20	30						
train			1	1	1						
gastype			o2 3a	co2 3a	thc 25a						
scg12	3/22/2017	15:26:00	20.82	-0.14	0.0	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:26:15	20.75	-0.16	0.0	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:26:30	20.76	-0.16	0.5	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:26:45	20.78	-0.15	7.4	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:27:00	20.79	-0.16	13.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:27:15	20.79	-0.16	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:27:30	20.80	-0.16	14.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:27:45	20.96	-0.15	14.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:28:00	21.15	-0.15	14.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:28:15	21.23	-0.16	14.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:28:30	21.27	-0.17	14.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:28:45	21.28	-0.17	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:29:00	20.95	-0.22	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:29:15	21.28	-0.18	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:29:30	21.27	-0.18	14.9	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:29:45	21.28	-0.18	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:30:00	21.29	-0.18	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:30:15	21.28	-0.19	14.8	CC454100/cg12	THC	15.2	0	0	0
scg12	3/22/2017	15:30:30	21.30	-0.19	14.9	CC454100/cg12	THC	15.2	0	0	0
thcspan1	3/22/2017	15:30:30	21.30	-0.19	14.9	CC454100/cg12	THC	15.2	0	0	0
THC run2	3/22/2017	15:50:30	3.69	16.94	0.0						
THC run2	3/22/2017	15:50:45	3.62	16.99	0.0						
THC run2	3/22/2017	15:51:00	3.59	17.05	0.0						
THC run2	3/22/2017	15:51:15	3.56	17.10	0.0						
THC run2	3/22/2017	15:51:30	3.53	17.14	0.0						
THC run2	3/22/2017	15:51:45	3.46	17.17	0.0						
THC run2	3/22/2017	15:52:00	2.75	17.12	-0.1						
THC run2	3/22/2017	15:52:15	3.38	17.24	0.0						
THC run2	3/22/2017	15:52:30	3.28	17.34	0.0						
THC run2	3/22/2017	15:52:45	3.26	17.40	0.0						
THC run2	3/22/2017	15:53:00	3.29	17.40	0.0						
THC run2	3/22/2017	15:53:15	3.26	17.40	0.0						
THC run2	3/22/2017	15:53:30	3.25	17.43	0.0						
THC run2	3/22/2017	15:53:45	3.30	17.43	0.0						
THC run2	3/22/2017	15:54:00	3.41	17.35	0.0						
THC run2	3/22/2017	15:54:15	3.50	17.22	0.0						
THC run2	3/22/2017	15:54:30	3.51	17.13	0.0						
THC run2	3/22/2017	15:54:45	3.50	17.14	0.0						
THC run2	3/22/2017	15:55:00	3.55	17.14	0.0						
THC run2	3/22/2017	15:55:15	3.56	17.12	0.0						
THC run2	3/22/2017	15:55:30	3.59	17.09	0.0						
THC run2	3/22/2017	15:55:45	3.60	17.07	0.0						
THC run2	3/22/2017	15:56:00	3.69	17.06	0.0						
THC run2	3/22/2017	15:56:15	3.72	17.02	0.0						
THC run2	3/22/2017	15:56:30	3.72	16.96	0.0						
THC run2	3/22/2017	15:56:45	3.62	16.95	0.0						
THC run2	3/22/2017	15:57:00	3.61	17.02	0.0						
THC run2	3/22/2017	15:57:15	3.66	17.02	0.0						
THC run2	3/22/2017	15:57:30	3.64	17.00	0.0						
THC run2	3/22/2017	15:57:45	3.68	17.00	0.0						
THC run2	3/22/2017	15:58:00	3.72	16.97	0.0						
THC run2	3/22/2017	15:58:15	3.75	16.94	0.0						
THC run2	3/22/2017	15:58:30	3.78	16.92	0.0						
THC run2	3/22/2017	15:58:45	3.87	16.87	0.0						
THC run2	3/22/2017	15:59:00	3.93	16.77	0.0						
THC run2	3/22/2017	15:59:15	3.97	16.68	0.0						
THC run2	3/22/2017	15:59:30	3.98	16.65	0.0						
THC run2	3/22/2017	15:59:45	3.92	16.70	0.0						
THC run2	3/22/2017	16:00:00	3.79	16.82	0.0						
THC run2	3/22/2017	16:00:15	3.80	16.88	0.0						
THC run2	3/22/2017	16:00:30	3.82	16.86	0.0						
THC run2	3/22/2017	16:00:45	3.90	16.83	0.0						
THC run2	3/22/2017	16:01:00	3.87	16.81	0.0						
THC run2	3/22/2017	16:01:15	3.84	16.83	0.0						
THC run2	3/22/2017	16:01:30	3.88	16.80	0.0						
THC run2	3/22/2017	16:01:45	3.94	16.74	0.0						
THC run2	3/22/2017	16:02:00	3.98	16.68	0.0						
THC run2	3/22/2017	16:02:15	3.96	16.66	0.0						
THC run2	3/22/2017	16:02:30	3.91	16.71	0.0						
THC run2	3/22/2017	16:02:45	3.87	16.76	0.0						
THC run2	3/22/2017	16:03:00	3.84	16.82	0.0						
THC run2	3/22/2017	16:03:15	3.79	16.87	0.0						
THC run2	3/22/2017	16:03:30	3.79	16.90	0.0						
THC run2	3/22/2017	16:03:45	3.84	16.85	0.0						
THC run2	3/22/2017	16:04:00	3.90	16.77	0.0						
THC run2	3/22/2017	16:04:15	3.91	16.74	0.0						
THC run2	3/22/2017	16:04:30	3.91	16.74	0.0						
THC run2	3/22/2017	16:04:45	3.92	16.74	0.0						
THC run2	3/22/2017	16:05:00	3.93	16.74	0.0						
THC run2	3/22/2017	16:05:15	3.96	16.73	0.0						
THC run2	3/22/2017	16:05:30	4.04	16.69	0.0						
THC run2	3/22/2017	16:05:45	4.08	16.61	0.0						
THC run2	3/22/2017	16:06:00	4.08	16.54	0.0						
THC run2	3/22/2017	16:06:15	4.10	16.54	0.0						
THC run2	3/22/2017	16:06:30	4.03	16.58	0.0						
THC run2	3/22/2017	16:06:45	4.06	16.60	0.0						
THC run2	3/22/2017	16:07:00	4.05	16.59	0.0						
THC run2	3/22/2017	16:07:15	4.04	16.61	0.0						
THC run2	3/22/2017	16:07:30	4.03	16.63	0.0						
THC run2	3/22/2017	16:07:45	3.98	16.65	0.0						
THC run2	3/22/2017	16:08:00	3.91	16.71	0.3						
THC run2	3/22/2017	16:08:15	3.89	16.75	0.5						
THC run2	3/22/2017	16:08:30	3.85	16.78	0.6						
THC run2	3/22/2017	16:08:45	3.87	16.80	0.6						
THC run2	3/22/2017	16:09:00	3.88	16.78	0.6						
THC run2	3/22/2017	16:09:15	3.88	16.76	0.4						
THC run2	3/22/2017	16:09:30	3.88	16.77	0.2						
THC run2	3/22/2017	16:09:45	3.86	16.80	0.0						

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	16:10:00	3.86	16.81	0.0
THC run2	3/22/2017	16:10:15	3.85	16.80	0.0
THC run2	3/22/2017	16:10:30	3.79	16.84	0.0
THC run2	3/22/2017	16:10:45	3.69	16.90	0.0
THC run2	3/22/2017	16:11:00	3.57	16.99	0.0
THC run2	3/22/2017	16:11:15	3.54	17.09	0.0
THC run2	3/22/2017	16:11:30	3.59	17.10	0.0
THC run2	3/22/2017	16:11:45	3.72	17.04	0.0
THC run2	3/22/2017	16:12:00	3.82	16.91	0.0
THC run2	3/22/2017	16:12:15	3.79	16.87	0.0
THC run2	3/22/2017	16:12:30	3.76	16.91	0.0
THC run2	3/22/2017	16:12:45	3.79	16.91	0.0
THC run2	3/22/2017	16:13:00	3.77	16.89	0.0
THC run2	3/22/2017	16:13:15	3.67	16.91	0.0
THC run2	3/22/2017	16:13:30	3.60	16.99	0.0
THC run2	3/22/2017	16:13:45	3.57	17.05	0.0
THC run2	3/22/2017	16:14:00	3.61	17.06	0.0
THC run2	3/22/2017	16:14:15	3.71	17.01	0.0
THC run2	3/22/2017	16:14:30	3.76	16.93	0.0
THC run2	3/22/2017	16:14:45	3.71	16.92	0.0
THC run2	3/22/2017	16:15:00	3.65	17.00	0.0
THC run2	3/22/2017	16:15:15	3.69	17.03	0.0
THC run2	3/22/2017	16:15:30	3.73	16.96	0.0
THC run2	3/22/2017	16:15:45	3.77	16.89	0.0
THC run2	3/22/2017	16:16:00	3.81	16.84	0.0
THC run2	3/22/2017	16:16:15	3.76	16.85	0.0
THC run2	3/22/2017	16:16:30	3.62	16.95	0.0
THC run2	3/22/2017	16:16:45	3.53	17.07	0.0
THC run2	3/22/2017	16:17:00	3.51	17.17	0.0
THC run2	3/22/2017	16:17:15	3.53	17.16	0.0
THC run2	3/22/2017	16:17:30	3.51	17.16	0.0
THC run2	3/22/2017	16:17:45	3.45	17.19	0.0
THC run2	3/22/2017	16:18:00	3.38	17.24	0.0
THC run2	3/22/2017	16:18:15	3.39	17.28	0.0
THC run2	3/22/2017	16:18:30	3.43	17.26	0.0
THC run2	3/22/2017	16:18:45	3.45	17.24	0.0
THC run2	3/22/2017	16:19:00	3.46	17.23	0.0
THC run2	3/22/2017	16:19:15	3.50	17.21	0.0
THC run2	3/22/2017	16:19:30	3.56	17.15	0.0
THC run2	3/22/2017	16:19:45	3.55	17.13	0.0
THC run2	3/22/2017	16:20:00	3.55	17.15	0.0
THC run2	3/22/2017	16:20:15	3.56	17.13	0.0
THC run2	3/22/2017	16:20:30	3.59	17.07	0.0
THC run2	3/22/2017	16:20:45	3.66	17.03	0.0
THC run2	3/22/2017	16:21:00	3.73	16.96	0.0
THC run2	3/22/2017	16:21:15	3.75	16.92	0.0
THC run2	3/22/2017	16:21:30	3.68	16.95	0.0
THC run2	3/22/2017	16:21:45	3.65	16.99	0.0
THC run2	3/22/2017	16:22:00	3.65	17.02	0.0
THC run2	3/22/2017	16:22:15	3.65	17.05	0.0
THC run2	3/22/2017	16:22:30	3.72	16.99	0.0
THC run2	3/22/2017	16:22:45	3.75	16.91	0.0
THC run2	3/22/2017	16:23:00	3.76	16.90	0.0
THC run2	3/22/2017	16:23:15	3.78	16.90	0.0
THC run2	3/22/2017	16:23:30	3.80	16.89	0.0
THC run2	3/22/2017	16:23:45	3.80	16.87	0.0
THC run2	3/22/2017	16:24:00	3.83	16.85	0.0
THC run2	3/22/2017	16:24:15	3.88	16.83	0.0
THC run2	3/22/2017	16:24:30	3.88	16.81	0.0
THC run2	3/22/2017	16:24:45	3.86	16.80	0.0
THC run2	3/22/2017	16:25:00	3.87	16.77	0.0
THC run2	3/22/2017	16:25:15	3.92	16.74	0.0
THC run2	3/22/2017	16:25:30	4.02	16.69	0.0
THC run2	3/22/2017	16:25:45	3.98	16.68	0.0
THC run2	3/22/2017	16:26:00	4.01	16.65	0.0
THC run2	3/22/2017	16:26:15	4.00	16.64	0.0
THC run2	3/22/2017	16:26:30	3.97	16.66	0.0
THC run2	3/22/2017	16:26:45	3.96	16.70	0.0
THC run2	3/22/2017	16:27:00	3.89	16.77	0.0
THC run2	3/22/2017	16:27:15	3.91	16.75	0.0
THC run2	3/22/2017	16:27:30	3.95	16.69	0.0
THC run2	3/22/2017	16:27:45	3.92	16.69	0.0
THC run2	3/22/2017	16:28:00	3.90	16.75	0.0
THC run2	3/22/2017	16:28:15	3.92	16.74	0.0
THC run2	3/22/2017	16:28:30	3.94	16.70	0.0
THC run2	3/22/2017	16:28:45	3.92	16.72	0.0
THC run2	3/22/2017	16:29:00	3.92	16.73	0.0
THC run2	3/22/2017	16:29:15	3.90	16.74	0.0
THC run2	3/22/2017	16:29:30	3.84	16.78	0.0
THC run2	3/22/2017	16:29:45	3.82	16.82	0.0
THC run2	3/22/2017	16:30:00	3.81	16.86	0.0
THC run2	3/22/2017	16:30:15	3.79	16.86	0.0
THC run2	3/22/2017	16:30:30	3.80	16.86	0.0
THC run2	3/22/2017	16:30:45	3.86	16.83	0.0
THC run2	3/22/2017	16:31:00	3.92	16.75	0.0
THC run2	3/22/2017	16:31:15	3.97	16.70	0.0
THC run2	3/22/2017	16:31:30	3.95	16.69	0.0
THC run2	3/22/2017	16:31:45	3.80	16.75	0.0
THC run2	3/22/2017	16:32:00	3.62	16.91	0.0
THC run2	3/22/2017	16:32:15	3.52	17.05	0.0
THC run2	3/22/2017	16:32:30	3.49	17.14	0.0
THC run2	3/22/2017	16:32:45	3.53	17.16	0.0
THC run2	3/22/2017	16:33:00	3.59	17.12	0.0
THC run2	3/22/2017	16:33:15	3.62	17.11	0.0
THC run2	3/22/2017	16:33:30	3.69	17.03	0.0
THC run2	3/22/2017	16:33:45	3.76	16.96	0.0
THC run2	3/22/2017	16:34:00	3.81	16.89	0.0
THC run2	3/22/2017	16:34:15	3.81	16.84	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	16:34:30	3.79	16.82	0.0
THC run2	3/22/2017	16:34:45	3.85	16.85	0.0
THC run2	3/22/2017	16:35:00	3.97	16.76	0.0
THC run2	3/22/2017	16:35:15	4.06	16.63	0.0
THC run2	3/22/2017	16:35:30	4.02	16.58	0.0
THC run2	3/22/2017	16:35:45	3.95	16.66	0.0
THC run2	3/22/2017	16:36:00	3.91	16.73	0.0
THC run2	3/22/2017	16:36:15	3.88	16.77	0.0
THC run2	3/22/2017	16:36:30	3.82	16.78	0.0
THC run2	3/22/2017	16:36:45	3.71	16.84	0.0
THC run2	3/22/2017	16:37:00	3.65	16.96	0.0
THC run2	3/22/2017	16:37:15	3.65	16.99	0.0
THC run2	3/22/2017	16:37:30	3.61	17.02	0.0
THC run2	3/22/2017	16:37:45	3.52	17.07	0.0
THC run2	3/22/2017	16:38:00	3.50	17.16	0.0
THC run2	3/22/2017	16:38:15	3.59	17.17	0.0
THC run2	3/22/2017	16:38:30	3.71	17.06	0.0
THC run2	3/22/2017	16:38:45	3.80	16.94	0.0
THC run2	3/22/2017	16:39:00	3.75	16.86	0.0
THC run2	3/22/2017	16:39:15	3.65	16.91	0.0
THC run2	3/22/2017	16:39:30	3.60	17.02	0.0
THC run2	3/22/2017	16:39:45	3.56	17.08	0.0
THC run2	3/22/2017	16:40:00	3.51	17.13	0.0
THC run2	3/22/2017	16:40:15	3.45	17.19	0.0
THC run2	3/22/2017	16:40:30	3.40	17.26	0.0
THC run2	3/22/2017	16:40:45	3.43	17.28	0.0
THC run2	3/22/2017	16:41:00	3.54	17.24	0.0
THC run2	3/22/2017	16:41:15	3.57	17.17	0.0
THC run2	3/22/2017	16:41:30	3.55	17.08	0.0
THC run2	3/22/2017	16:41:45	3.51	17.10	0.0
THC run2	3/22/2017	16:42:00	3.55	17.15	0.0
THC run2	3/22/2017	16:42:15	3.66	17.10	0.0
THC run2	3/22/2017	16:42:30	3.79	16.95	0.0
THC run2	3/22/2017	16:42:45	3.83	16.87	0.0
THC run2	3/22/2017	16:43:00	3.81	16.86	0.0
THC run2	3/22/2017	16:43:15	3.77	16.88	0.0
THC run2	3/22/2017	16:43:30	3.78	16.90	0.0
THC run2	3/22/2017	16:43:45	3.81	16.85	0.0
THC run2	3/22/2017	16:44:00	3.81	16.83	0.0
THC run2	3/22/2017	16:44:15	3.81	16.84	0.0
THC run2	3/22/2017	16:44:30	3.80	16.85	0.0
THC run2	3/22/2017	16:44:45	3.80	16.87	0.0
THC run2	3/22/2017	16:45:00	3.83	16.85	0.0
THC run2	3/22/2017	16:45:15	3.86	16.82	0.0
THC run2	3/22/2017	16:45:30	3.92	16.79	0.0
THC run2	3/22/2017	16:45:45	3.99	16.72	0.0
THC run2	3/22/2017	16:46:00	3.97	16.64	0.0
THC run2	3/22/2017	16:46:15	3.88	16.67	0.0
THC run2	3/22/2017	16:46:30	3.85	16.77	0.0
THC run2	3/22/2017	16:46:45	3.87	16.79	0.0
THC run2	3/22/2017	16:47:00	3.88	16.78	0.0
THC run2	3/22/2017	16:47:15	3.87	16.79	0.0
THC run2	3/22/2017	16:47:30	3.83	16.81	0.0
THC run2	3/22/2017	16:47:45	3.82	16.84	0.0
THC run2	3/22/2017	16:48:00	3.85	16.86	0.0
THC run2	3/22/2017	16:48:15	3.82	16.83	0.0
THC run2	3/22/2017	16:48:30	3.82	16.83	0.0
THC run2	3/22/2017	16:48:45	3.73	16.89	0.0
THC run2	3/22/2017	16:49:00	3.67	16.94	0.0
THC run2	3/22/2017	16:49:15	3.62	16.99	0.0
THC run2	3/22/2017	16:49:30	3.60	17.06	0.0
THC run2	3/22/2017	16:49:45	3.68	17.04	0.0
THC run2	3/22/2017	16:50:00	3.62	16.95	0.0
THC run2	3/22/2017	16:50:15	3.72	16.95	0.0
THC run2	3/22/2017	16:50:30	3.80	16.89	0.0
THC run2	3/22/2017	16:50:45	3.81	16.83	0.0
THC run2	3/22/2017	16:51:00	3.73	16.87	0.0
THC run2	3/22/2017	16:51:15	3.71	16.94	0.0
THC run2	3/22/2017	16:51:30	3.65	16.97	0.0
THC run2	3/22/2017	16:51:45	3.63	17.01	0.0
THC run2	3/22/2017	16:52:00	3.67	17.03	0.0
THC run2	3/22/2017	16:52:15	3.73	16.97	0.0
THC run2	3/22/2017	16:52:30	3.78	16.94	0.0
THC run2	3/22/2017	16:52:45	3.81	16.90	0.0
THC run2	3/22/2017	16:53:00	3.87	16.79	0.0
THC run2	3/22/2017	16:53:15	3.91	16.75	0.0
THC run2	3/22/2017	16:53:30	3.92	16.71	0.0
THC run2	3/22/2017	16:53:45	3.89	16.70	0.0
THC run2	3/22/2017	16:54:00	3.81	16.80	0.0
THC run2	3/22/2017	16:54:15	3.71	16.89	0.0
THC run2	3/22/2017	16:54:30	3.71	16.97	0.0
THC run2	3/22/2017	16:54:45	3.73	16.96	0.0
THC run2	3/22/2017	16:55:00	3.68	16.95	0.0
THC run2	3/22/2017	16:55:15	3.62	16.98	0.0
THC run2	3/22/2017	16:55:30	3.56	17.04	0.0
THC run2	3/22/2017	16:55:45	3.57	17.08	0.0
THC run2	3/22/2017	16:56:00	3.60	17.08	0.0
THC run2	3/22/2017	16:56:15	3.63	17.05	0.0
THC run2	3/22/2017	16:56:30	3.62	17.03	0.0
THC run2	3/22/2017	16:56:45	3.57	17.06	0.0
THC run2	3/22/2017	16:57:00	3.48	17.14	0.0
THC run2	3/22/2017	16:57:15	3.47	17.24	0.0
THC run2	3/22/2017	16:57:30	3.46	17.23	0.0
THC run2	3/22/2017	16:57:45	3.56	17.15	0.0
THC run2	3/22/2017	16:58:00	3.65	17.06	0.0
THC run2	3/22/2017	16:58:15	3.71	16.99	0.0
THC run2	3/22/2017	16:58:30	3.79	16.91	0.0
THC run2	3/22/2017	16:58:45	3.82	16.87	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	16:59:00	3.85	16.83	0.0
THC run2	3/22/2017	16:59:15	3.87	16.80	0.0
THC run2	3/22/2017	16:59:30	3.85	16.80	0.0
THC run2	3/22/2017	16:59:45	3.84	16.82	0.0
THC run2	3/22/2017	17:00:00	3.83	16.80	0.0
THC run2	3/22/2017	17:00:15	3.88	16.78	0.0
THC run2	3/22/2017	17:00:30	3.91	16.73	0.0
THC run2	3/22/2017	17:00:45	3.85	16.74	0.0
THC run2	3/22/2017	17:01:00	3.83	16.80	0.0
THC run2	3/22/2017	17:01:15	3.83	16.84	0.0
THC run2	3/22/2017	17:01:30	3.82	16.84	0.0
THC run2	3/22/2017	17:01:45	3.78	16.87	0.0
THC run2	3/22/2017	17:02:00	3.75	16.91	0.0
THC run2	3/22/2017	17:02:15	3.72	16.89	0.0
THC run2	3/22/2017	17:02:30	3.67	16.92	0.0
THC run2	3/22/2017	17:02:45	3.65	16.98	0.0
THC run2	3/22/2017	17:03:00	3.60	17.03	0.0
THC run2	3/22/2017	17:03:15	3.53	17.10	0.0
THC run2	3/22/2017	17:03:30	3.54	17.14	0.0
THC run2	3/22/2017	17:03:45	3.64	17.10	0.0
THC run2	3/22/2017	17:04:00	3.73	17.00	0.0
THC run2	3/22/2017	17:04:15	3.70	16.95	0.0
THC run2	3/22/2017	17:04:30	3.60	16.99	0.0
THC run2	3/22/2017	17:04:45	3.48	17.09	0.0
THC run2	3/22/2017	17:05:00	3.42	17.21	0.0
THC run2	3/22/2017	17:05:15	3.44	17.25	0.0
THC run2	3/22/2017	17:05:30	3.45	17.25	0.0
THC run2	3/22/2017	17:05:45	3.54	17.19	0.0
THC run2	3/22/2017	17:06:00	3.54	17.14	0.0
THC run2	3/22/2017	17:06:15	3.52	17.16	0.0
THC run2	3/22/2017	17:06:30	3.53	17.16	0.0
THC run2	3/22/2017	17:06:45	3.55	17.11	0.0
THC run2	3/22/2017	17:07:00	3.53	17.09	0.0
THC run2	3/22/2017	17:07:15	3.48	17.14	0.0
THC run2	3/22/2017	17:07:30	3.50	17.17	0.0
THC run2	3/22/2017	17:07:45	3.54	17.15	0.0
THC run2	3/22/2017	17:08:00	3.56	17.12	0.0
THC run2	3/22/2017	17:08:15	3.57	17.11	0.0
THC run2	3/22/2017	17:08:30	3.59	17.09	0.0
THC run2	3/22/2017	17:08:45	3.62	17.07	0.0
THC run2	3/22/2017	17:09:00	3.72	17.00	0.0
THC run2	3/22/2017	17:09:15	3.81	16.88	0.0
THC run2	3/22/2017	17:09:30	3.85	16.81	0.0
THC run2	3/22/2017	17:09:45	3.91	16.78	0.0
THC run2	3/22/2017	17:10:00	3.98	16.69	0.0
THC run2	3/22/2017	17:10:15	4.01	16.63	0.0
THC run2	3/22/2017	17:10:30	4.03	16.63	0.0
THC run2	3/22/2017	17:10:45	4.06	16.61	0.0
THC run2	3/22/2017	17:11:00	4.07	16.58	0.0
THC run2	3/22/2017	17:11:15	4.07	16.58	0.0
THC run2	3/22/2017	17:11:30	4.11	16.52	0.0
THC run2	3/22/2017	17:11:45	4.13	16.48	0.0
THC run2	3/22/2017	17:12:00	4.09	16.50	0.0
THC run2	3/22/2017	17:12:15	4.08	16.54	0.0
THC run2	3/22/2017	17:12:30	4.04	16.56	0.0
THC run2	3/22/2017	17:12:45	3.94	16.62	0.0
THC run2	3/22/2017	17:13:00	3.87	16.67	0.0
THC run2	3/22/2017	17:13:15	3.72	16.75	0.0
THC run2	3/22/2017	17:13:30	3.77	16.86	0.0
THC run2	3/22/2017	17:13:45	3.81	16.86	0.0
THC run2	3/22/2017	17:14:00	3.81	16.82	0.0
THC run2	3/22/2017	17:14:15	3.81	16.84	0.0
THC run2	3/22/2017	17:14:30	3.82	16.84	0.0
THC run2	3/22/2017	17:14:45	3.81	16.85	0.0
THC run2	3/22/2017	17:15:00	3.81	16.87	0.0
THC run2	3/22/2017	17:15:15	3.79	16.87	0.0
THC run2	3/22/2017	17:15:30	3.72	16.90	0.0
THC run2	3/22/2017	17:15:45	3.65	16.97	0.0
THC run2	3/22/2017	17:16:00	3.55	17.02	0.0
THC run2	3/22/2017	17:16:15	3.50	17.11	0.0
THC run2	3/22/2017	17:16:30	3.44	17.21	0.0
THC run2	3/22/2017	17:16:45	3.45	17.22	0.0
THC run2	3/22/2017	17:17:00	3.51	17.18	0.0
THC run2	3/22/2017	17:17:15	3.53	17.16	0.0
THC run2	3/22/2017	17:17:30	3.49	17.17	0.0
THC run2	3/22/2017	17:17:45	3.45	17.21	0.0
THC run2	3/22/2017	17:18:00	3.45	17.23	0.0
THC run2	3/22/2017	17:18:15	3.44	17.22	0.0
THC run2	3/22/2017	17:18:30	3.47	17.19	0.0
THC run2	3/22/2017	17:18:45	3.53	17.15	0.0
THC run2	3/22/2017	17:19:00	3.53	17.12	0.0
THC run2	3/22/2017	17:19:15	3.51	17.14	0.0
THC run2	3/22/2017	17:19:30	3.55	17.13	0.0
THC run2	3/22/2017	17:19:45	3.56	17.12	0.0
THC run2	3/22/2017	17:20:00	3.51	17.15	0.0
THC run2	3/22/2017	17:20:15	3.51	17.18	0.0
THC run2	3/22/2017	17:20:30	3.51	17.18	0.0
THC run2	3/22/2017	17:20:45	3.51	17.16	0.0
THC run2	3/22/2017	17:21:00	3.53	17.11	0.0
THC run2	3/22/2017	17:21:15	3.60	17.08	0.0
THC run2	3/22/2017	17:21:30	3.79	16.97	0.0
THC run2	3/22/2017	17:21:45	3.87	16.85	0.0
THC run2	3/22/2017	17:22:00	3.87	16.79	0.0
THC run2	3/22/2017	17:22:15	3.91	16.77	0.0
THC run2	3/22/2017	17:22:30	4.00	16.71	0.0
THC run2	3/22/2017	17:22:45	3.99	16.67	0.0
THC run2	3/22/2017	17:23:00	3.96	16.65	0.0
THC run2	3/22/2017	17:23:15	4.02	16.63	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	17:23:30	3.76	16.62	0.0
THC run2	3/22/2017	17:23:45	3.91	16.69	0.0
THC run2	3/22/2017	17:24:00	3.82	16.71	0.0
THC run2	3/22/2017	17:24:15	3.68	16.74	0.0
THC run2	3/22/2017	17:24:30	3.79	16.86	0.0
THC run2	3/22/2017	17:24:45	3.84	16.85	0.0
THC run2	3/22/2017	17:25:00	3.78	16.77	0.0
THC run2	3/22/2017	17:25:15	3.87	16.78	0.0
THC run2	3/22/2017	17:25:30	3.86	16.78	0.0
THC run2	3/22/2017	17:25:45	3.80	16.80	0.0
THC run2	3/22/2017	17:26:00	3.77	16.84	0.0
THC run2	3/22/2017	17:26:15	3.85	16.84	0.0
THC run2	3/22/2017	17:26:30	3.88	16.79	0.0
THC run2	3/22/2017	17:26:45	3.85	16.79	0.0
THC run2	3/22/2017	17:27:00	3.70	16.89	0.0
THC run2	3/22/2017	17:27:15	3.68	16.95	0.0
THC run2	3/22/2017	17:27:30	3.76	16.95	0.0
THC run2	3/22/2017	17:27:45	3.78	16.92	0.0
THC run2	3/22/2017	17:28:00	3.76	16.89	0.0
THC run2	3/22/2017	17:28:15	3.76	16.88	0.0
THC run2	3/22/2017	17:28:30	3.75	16.88	0.0
THC run2	3/22/2017	17:28:45	3.75	16.88	0.0
THC run2	3/22/2017	17:29:00	3.76	16.91	0.0
THC run2	3/22/2017	17:29:15	3.67	16.96	0.0
THC run2	3/22/2017	17:29:30	3.63	17.01	0.0
THC run2	3/22/2017	17:29:45	3.61	17.05	0.0
THC run2	3/22/2017	17:30:00	3.66	17.04	0.0
THC run2	3/22/2017	17:30:15	3.75	16.98	0.0
THC run2	3/22/2017	17:30:30	3.78	16.89	0.0
THC run2	3/22/2017	17:30:45	3.79	16.86	0.0
THC run2	3/22/2017	17:31:00	3.80	16.87	0.0
THC run2	3/22/2017	17:31:15	3.80	16.86	0.0
THC run2	3/22/2017	17:31:30	3.76	16.88	0.0
THC run2	3/22/2017	17:31:45	3.65	16.95	0.0
THC run2	3/22/2017	17:32:00	3.61	17.03	0.0
THC run2	3/22/2017	17:32:15	3.64	17.05	0.0
THC run2	3/22/2017	17:32:30	3.70	17.02	0.0
THC run2	3/22/2017	17:32:45	3.77	16.92	0.0
THC run2	3/22/2017	17:33:00	3.73	16.86	0.0
THC run2	3/22/2017	17:33:15	3.62	16.94	0.0
THC run2	3/22/2017	17:33:30	3.58	17.04	0.0
THC run2	3/22/2017	17:33:45	3.54	17.10	0.0
THC run2	3/22/2017	17:34:00	3.57	17.12	0.0
THC run2	3/22/2017	17:34:15	3.61	17.09	0.0
THC run2	3/22/2017	17:34:30	3.61	17.07	0.0
THC run2	3/22/2017	17:34:45	3.66	17.05	0.0
THC run2	3/22/2017	17:35:00	3.70	16.98	0.0
THC run2	3/22/2017	17:35:15	3.68	16.94	0.0
THC run2	3/22/2017	17:35:30	3.69	16.95	0.0
THC run2	3/22/2017	17:35:45	3.68	16.94	0.0
THC run2	3/22/2017	17:36:00	3.72	16.95	0.0
THC run2	3/22/2017	17:36:15	3.75	16.94	0.0
THC run2	3/22/2017	17:36:30	3.70	16.95	0.0
THC run2	3/22/2017	17:36:45	3.76	16.95	0.0
THC run2	3/22/2017	17:37:00	3.79	16.91	0.0
THC run2	3/22/2017	17:37:15	3.73	16.90	0.0
THC run2	3/22/2017	17:37:30	3.67	16.92	0.1
THC run2	3/22/2017	17:37:45	3.69	16.97	0.3
THC run2	3/22/2017	17:38:00	3.73	16.97	0.3
THC run2	3/22/2017	17:38:15	3.78	16.92	0.5
THC run2	3/22/2017	17:38:30	3.68	16.93	0.7
THC run2	3/22/2017	17:38:45	3.68	16.99	0.4
THC run2	3/22/2017	17:39:00	3.67	17.01	0.2
THC run2	3/22/2017	17:39:15	3.67	16.98	0.1
THC run2	3/22/2017	17:39:30	3.68	16.96	0.0
THC run2	3/22/2017	17:39:45	3.71	16.94	0.0
THC run2	3/22/2017	17:40:00	3.57	16.88	0.0
THC run2	3/22/2017	17:40:15	3.63	16.97	0.0
THC run2	3/22/2017	17:40:30	3.10	16.98	0.0
THC run2	3/22/2017	17:40:45	3.37	16.99	0.0
THC run2	3/22/2017	17:41:00	3.73	16.97	0.0
THC run2	3/22/2017	17:41:15	3.60	16.89	0.0
THC run2	3/22/2017	17:41:30	3.52	16.87	0.0
THC run2	3/22/2017	17:41:45	3.75	16.91	0.0
THC run2	3/22/2017	17:42:00	3.75	16.90	0.0
THC run2	3/22/2017	17:42:15	3.81	16.86	0.0
THC run2	3/22/2017	17:42:30	3.78	16.83	0.0
THC run2	3/22/2017	17:42:45	3.72	16.86	0.0
THC run2	3/22/2017	17:43:00	3.62	16.96	0.0
THC run2	3/22/2017	17:43:15	3.56	17.03	0.0
THC run2	3/22/2017	17:43:30	3.58	17.07	0.0
THC run2	3/22/2017	17:43:45	3.55	17.08	0.0
THC run2	3/22/2017	17:44:00	3.53	17.13	0.0
THC run2	3/22/2017	17:44:15	3.56	17.14	0.0
THC run2	3/22/2017	17:44:30	3.51	17.11	0.0
THC run2	3/22/2017	17:44:45	3.44	17.17	0.0
THC run2	3/22/2017	17:45:00	3.41	17.25	0.0
THC run2	3/22/2017	17:45:15	3.43	17.23	0.0
THC run2	3/22/2017	17:45:30	3.42	17.22	0.0
THC run2	3/22/2017	17:45:45	3.44	17.25	0.0
THC run2	3/22/2017	17:46:00	3.45	17.24	0.0
THC run2	3/22/2017	17:46:15	3.49	17.20	0.0
THC run2	3/22/2017	17:46:30	3.47	17.20	0.0
THC run2	3/22/2017	17:46:45	3.41	17.23	0.0
THC run2	3/22/2017	17:47:00	3.31	17.27	0.0
THC run2	3/22/2017	17:47:15	3.31	17.29	0.0
THC run2	3/22/2017	17:47:30	3.42	17.29	0.0
THC run2	3/22/2017	17:47:45	3.50	17.21	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	17:48:00	3.53	17.12	0.0
THC run2	3/22/2017	17:48:15	3.50	17.13	0.0
THC run2	3/22/2017	17:48:30	3.52	17.15	0.0
THC run2	3/22/2017	17:48:45	3.61	17.11	0.0
THC run2	3/22/2017	17:49:00	3.71	17.02	0.0
THC run2	3/22/2017	17:49:15	3.77	16.92	0.0
THC run2	3/22/2017	17:49:30	3.68	16.88	0.0
THC run2	3/22/2017	17:49:45	3.53	16.97	0.0
THC run2	3/22/2017	17:50:00	3.48	17.14	0.0
THC run2	3/22/2017	17:50:15	3.50	17.17	0.0
THC run2	3/22/2017	17:50:30	3.57	17.12	0.0
THC run2	3/22/2017	17:50:45	3.67	17.05	0.0
THC run2	3/22/2017	17:51:00	3.72	16.96	0.0
THC run2	3/22/2017	17:51:15	3.74	16.94	0.0
THC run2	3/22/2017	17:51:30	3.83	16.88	0.0
THC run2	3/22/2017	17:51:45	3.90	16.79	0.0
THC run2	3/22/2017	17:52:00	3.90	16.70	0.0
THC run2	3/22/2017	17:52:15	3.81	16.75	0.0
THC run2	3/22/2017	17:52:30	3.76	16.85	0.0
THC run2	3/22/2017	17:52:45	3.76	16.88	0.0
THC run2	3/22/2017	17:53:00	3.70	16.93	0.0
THC run2	3/22/2017	17:53:15	3.69	16.95	0.0
THC run2	3/22/2017	17:53:30	3.67	16.96	0.0
THC run2	3/22/2017	17:53:45	3.63	16.99	0.0
THC run2	3/22/2017	17:54:00	3.64	17.01	0.0
THC run2	3/22/2017	17:54:15	3.64	16.98	0.0
THC run2	3/22/2017	17:54:30	3.74	16.95	0.0
THC run2	3/22/2017	17:54:45	3.85	16.87	0.0
THC run2	3/22/2017	17:55:00	3.91	16.76	0.0
THC run2	3/22/2017	17:55:15	3.93	16.70	0.0
THC run2	3/22/2017	17:55:30	3.91	16.69	0.0
THC run2	3/22/2017	17:55:45	3.88	16.74	0.0
THC run2	3/22/2017	17:56:00	3.85	16.80	0.0
THC run2	3/22/2017	17:56:15	3.80	16.83	0.0
THC run2	3/22/2017	17:56:30	3.73	16.86	0.0
THC run2	3/22/2017	17:56:45	3.69	16.88	0.0
THC run2	3/22/2017	17:57:00	3.73	16.91	0.0
THC run2	3/22/2017	17:57:15	3.79	16.87	0.0
THC run2	3/22/2017	17:57:30	3.83	16.82	0.0
THC run2	3/22/2017	17:57:45	3.88	16.82	0.0
THC run2	3/22/2017	17:58:00	3.81	16.82	0.0
THC run2	3/22/2017	17:58:15	3.81	16.84	0.0
THC run2	3/22/2017	17:58:30	3.84	16.85	0.0
THC run2	3/22/2017	17:58:45	3.94	16.79	0.0
THC run2	3/22/2017	17:59:00	4.01	16.64	0.0
THC run2	3/22/2017	17:59:15	3.95	16.58	0.0
THC run2	3/22/2017	17:59:30	3.84	16.72	0.0
THC run2	3/22/2017	17:59:45	3.66	16.88	0.0
THC run2	3/22/2017	18:00:00	3.65	16.97	0.0
THC run2	3/22/2017	18:00:15	3.69	16.97	0.0
THC run2	3/22/2017	18:00:30	3.72	16.94	0.0
THC run2	3/22/2017	18:00:45	3.67	16.95	0.0
THC run2	3/22/2017	18:01:00	3.63	16.99	0.0
THC run2	3/22/2017	18:01:15	3.66	16.98	0.0
THC run2	3/22/2017	18:01:30	3.75	16.91	0.0
THC run2	3/22/2017	18:01:45	3.77	16.87	0.0
THC run2	3/22/2017	18:02:00	3.69	16.86	0.0
THC run2	3/22/2017	18:02:15	3.62	16.95	0.0
THC run2	3/22/2017	18:02:30	3.59	17.02	0.0
THC run2	3/22/2017	18:02:45	3.59	17.06	0.0
THC run2	3/22/2017	18:03:00	3.57	17.05	0.0
THC run2	3/22/2017	18:03:15	3.49	17.11	0.0
THC run2	3/22/2017	18:03:30	3.46	17.17	0.0
THC run2	3/22/2017	18:03:45	3.55	17.13	0.0
THC run2	3/22/2017	18:04:00	3.61	17.04	0.0
THC run2	3/22/2017	18:04:15	3.51	17.06	0.0
THC run2	3/22/2017	18:04:30	3.47	17.16	0.0
THC run2	3/22/2017	18:04:45	3.51	17.17	0.0
THC run2	3/22/2017	18:05:00	3.51	17.13	0.0
THC run2	3/22/2017	18:05:15	3.50	17.14	0.0
THC run2	3/22/2017	18:05:30	3.50	17.17	0.0
THC run2	3/22/2017	18:05:45	3.53	17.16	0.0
THC run2	3/22/2017	18:06:00	3.57	17.06	0.0
THC run2	3/22/2017	18:06:15	3.54	17.03	0.0
THC run2	3/22/2017	18:06:30	3.58	17.05	0.0
THC run2	3/22/2017	18:06:45	3.69	17.02	0.0
THC run2	3/22/2017	18:07:00	3.63	16.96	0.0
THC run2	3/22/2017	18:07:15	3.62	17.00	0.0
THC run2	3/22/2017	18:07:30	3.66	17.01	0.0
THC run2	3/22/2017	18:07:45	3.72	16.96	0.0
THC run2	3/22/2017	18:08:00	3.77	16.90	0.0
THC run2	3/22/2017	18:08:15	3.78	16.87	0.0
THC run2	3/22/2017	18:08:30	3.80	16.83	0.0
THC run2	3/22/2017	18:08:45	3.85	16.80	0.0
THC run2	3/22/2017	18:09:00	3.68	16.85	0.0
THC run2	3/22/2017	18:09:15	3.58	16.96	0.0
THC run2	3/22/2017	18:09:30	3.54	17.08	0.0
THC run2	3/22/2017	18:09:45	3.55	17.10	0.0
THC run2	3/22/2017	18:10:00	3.58	17.08	0.0
THC run2	3/22/2017	18:10:15	3.61	17.06	0.0
THC run2	3/22/2017	18:10:30	3.63	17.02	0.0
THC run2	3/22/2017	18:10:45	3.60	17.00	0.0
THC run2	3/22/2017	18:11:00	3.55	17.02	0.0
THC run2	3/22/2017	18:11:15	3.50	17.08	0.0
THC run2	3/22/2017	18:11:30	3.47	17.15	0.0
THC run2	3/22/2017	18:11:45	3.48	17.16	0.0
THC run2	3/22/2017	18:12:00	3.59	17.10	0.0
THC run2	3/22/2017	18:12:15	3.66	17.03	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	18:12:30	3.69	16.97	0.0
THC run2	3/22/2017	18:12:45	3.76	16.94	0.0
THC run2	3/22/2017	18:13:00	3.73	16.92	0.0
THC run2	3/22/2017	18:13:15	3.71	16.88	0.0
THC run2	3/22/2017	18:13:30	3.74	16.87	0.0
THC run2	3/22/2017	18:13:45	3.80	16.85	0.0
THC run2	3/22/2017	18:14:00	3.83	16.80	0.0
THC run2	3/22/2017	18:14:15	3.82	16.79	0.0
THC run2	3/22/2017	18:14:30	3.85	16.78	0.0
THC run2	3/22/2017	18:14:45	3.82	16.77	0.0
THC run2	3/22/2017	18:15:00	3.68	16.87	0.0
THC run2	3/22/2017	18:15:15	3.59	16.99	0.0
THC run2	3/22/2017	18:15:30	3.57	17.05	0.0
THC run2	3/22/2017	18:15:45	3.59	17.01	0.0
THC run2	3/22/2017	18:16:00	3.63	16.98	0.0
THC run2	3/22/2017	18:16:15	3.68	16.95	0.0
THC run2	3/22/2017	18:16:30	3.79	16.88	0.0
THC run2	3/22/2017	18:16:45	3.80	16.84	0.0
THC run2	3/22/2017	18:17:00	3.73	16.84	0.0
THC run2	3/22/2017	18:17:15	3.63	16.94	0.0
THC run2	3/22/2017	18:17:30	3.55	17.05	0.0
THC run2	3/22/2017	18:17:45	3.51	17.09	0.0
THC run2	3/22/2017	18:18:00	3.46	17.11	0.0
THC run2	3/22/2017	18:18:15	3.43	17.16	0.0
THC run2	3/22/2017	18:18:30	3.45	17.19	0.0
THC run2	3/22/2017	18:18:45	3.47	17.18	0.0
THC run2	3/22/2017	18:19:00	3.47	17.16	0.0
THC run2	3/22/2017	18:19:15	3.49	17.16	0.0
THC run2	3/22/2017	18:19:30	3.56	17.12	0.0
THC run2	3/22/2017	18:19:45	3.71	17.03	0.0
THC run2	3/22/2017	18:20:00	3.83	16.86	0.0
THC run2	3/22/2017	18:20:15	3.85	16.75	0.0
THC run2	3/22/2017	18:20:30	3.82	16.75	0.0
THC run2	3/22/2017	18:20:45	3.79	16.80	0.0
THC run2	3/22/2017	18:21:00	3.76	16.84	0.0
THC run2	3/22/2017	18:21:15	3.75	16.86	0.0
THC run2	3/22/2017	18:21:30	3.77	16.88	0.0
THC run2	3/22/2017	18:21:45	3.80	16.86	0.0
THC run2	3/22/2017	18:22:00	3.85	16.83	0.0
THC run2	3/22/2017	18:22:15	3.88	16.78	0.0
THC run2	3/22/2017	18:22:30	3.82	16.75	0.0
THC run2	3/22/2017	18:22:45	3.73	16.81	0.0
THC run2	3/22/2017	18:23:00	3.74	16.88	0.0
THC run2	3/22/2017	18:23:15	3.79	16.85	0.0
THC run2	3/22/2017	18:23:30	3.80	16.82	0.0
THC run2	3/22/2017	18:23:45	3.81	16.83	0.0
THC run2	3/22/2017	18:24:00	3.84	16.81	0.0
THC run2	3/22/2017	18:24:15	3.83	16.79	0.0
THC run2	3/22/2017	18:24:30	3.79	16.82	0.0
THC run2	3/22/2017	18:24:45	3.78	16.85	0.0
THC run2	3/22/2017	18:25:00	3.77	16.83	0.0
THC run2	3/22/2017	18:25:15	3.73	16.85	0.0
THC run2	3/22/2017	18:25:30	3.72	16.88	0.0
THC run2	3/22/2017	18:25:45	3.78	16.86	0.0
THC run2	3/22/2017	18:26:00	3.79	16.84	0.0
THC run2	3/22/2017	18:26:15	3.82	16.83	0.0
THC run2	3/22/2017	18:26:30	3.88	16.77	0.0
THC run2	3/22/2017	18:26:45	3.91	16.74	0.0
THC run2	3/22/2017	18:27:00	3.91	16.70	0.0
THC run2	3/22/2017	18:27:15	3.88	16.70	0.0
THC run2	3/22/2017	18:27:30	3.81	16.74	0.0
THC run2	3/22/2017	18:27:45	3.86	16.77	0.0
THC run2	3/22/2017	18:28:00	3.97	16.69	0.0
THC run2	3/22/2017	18:28:15	4.06	16.58	0.0
THC run2	3/22/2017	18:28:30	4.08	16.51	0.0
THC run2	3/22/2017	18:28:45	4.04	16.52	0.0
THC run2	3/22/2017	18:29:00	4.00	16.59	0.0
THC run2	3/22/2017	18:29:15	3.66	16.58	0.0
THC run2	3/22/2017	18:29:30	3.64	16.55	0.0
THC run2	3/22/2017	18:29:45	3.70	16.60	0.0
THC run2	3/22/2017	18:30:00	3.45	16.69	-0.1
THC run2	3/22/2017	18:30:15	3.52	16.72	0.0
THC run2	3/22/2017	18:30:30	3.81	16.79	0.0
THC run2	3/22/2017	18:30:45	3.77	16.81	0.0
THC run2	3/22/2017	18:31:00	3.79	16.86	0.0
THC run2	3/22/2017	18:31:15	3.82	16.85	0.0
THC run2	3/22/2017	18:31:30	3.77	16.82	0.0
THC run2	3/22/2017	18:31:45	3.73	16.88	0.0
THC run2	3/22/2017	18:32:00	3.69	16.91	0.0
THC run2	3/22/2017	18:32:15	3.67	16.89	0.0
THC run2	3/22/2017	18:32:30	3.66	16.91	0.0
THC run2	3/22/2017	18:32:45	3.71	16.92	0.0
THC run2	3/22/2017	18:33:00	3.78	16.86	0.0
THC run2	3/22/2017	18:33:15	3.78	16.81	0.0
THC run2	3/22/2017	18:33:30	3.83	16.79	0.0
THC run2	3/22/2017	18:33:45	3.86	16.79	0.0
THC run2	3/22/2017	18:34:00	3.90	16.78	0.0
THC run2	3/22/2017	18:34:15	3.82	16.77	0.0
THC run2	3/22/2017	18:34:30	3.75	16.80	0.0
THC run2	3/22/2017	18:34:45	3.70	16.85	0.0
THC run2	3/22/2017	18:35:00	3.73	16.89	0.0
THC run2	3/22/2017	18:35:15	3.75	16.88	0.0
THC run2	3/22/2017	18:35:30	3.68	16.89	0.0
THC run2	3/22/2017	18:35:45	3.65	16.94	0.0
THC run2	3/22/2017	18:36:00	3.61	16.98	0.0
THC run2	3/22/2017	18:36:15	3.57	17.02	0.0
THC run2	3/22/2017	18:36:30	3.57	17.05	0.0
THC run2	3/22/2017	18:36:45	3.56	17.03	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run2	3/22/2017	18:37:00	3.56	17.04	0.0
THC run2	3/22/2017	18:37:15	3.54	17.07	0.0
THC run2	3/22/2017	18:37:30	3.50	17.09	0.0
THC run2	3/22/2017	18:37:45	3.48	17.13	0.0
THC run2	3/22/2017	18:38:00	3.49	17.16	0.0
THC run2	3/22/2017	18:38:15	3.53	17.14	0.0
THC run2	3/22/2017	18:38:30	3.57	17.10	0.0
THC run2	3/22/2017	18:38:45	3.61	17.04	0.0
THC run2	3/22/2017	18:39:00	3.62	16.96	0.0
THC run2	3/22/2017	18:39:15	3.59	16.99	0.0
THC run2	3/22/2017	18:39:30	3.52	17.05	0.0
THC run2	3/22/2017	18:39:45	3.54	17.09	0.0
THC run2	3/22/2017	18:40:00	3.60	17.05	0.0
THC run2	3/22/2017	18:40:15	3.62	17.00	0.0
THC run2	3/22/2017	18:40:30	3.60	17.01	0.0
THC run2	3/22/2017	18:40:45	3.60	17.04	0.0
THC run2	3/22/2017	18:41:00	3.68	16.99	0.0
THC run2	3/22/2017	18:41:15	3.68	16.91	0.0
THC run2	3/22/2017	18:41:30	3.57	16.94	0.0
THC run2	3/22/2017	18:41:45	3.53	17.05	0.0
THC run2	3/22/2017	18:42:00	3.56	17.08	0.0
THC run2	3/22/2017	18:42:15	3.61	17.04	0.0
THC run2	3/22/2017	18:42:30	3.67	16.99	0.0
THC run2	3/22/2017	18:42:45	3.69	16.94	0.0
THC run2	3/22/2017	18:43:00	3.71	16.93	0.0
THC run2	3/22/2017	18:43:15	3.67	16.95	0.0
THC run2	3/22/2017	18:43:30	3.67	16.97	0.0
THC run2	3/22/2017	18:43:45	3.77	16.90	0.0
THC run2	3/22/2017	18:44:00	3.77	16.82	0.0
THC run2	3/22/2017	18:44:15	3.72	16.85	0.0
THC run2	3/22/2017	18:44:30	3.71	16.90	0.0
THC run2	3/22/2017	18:44:45	3.68	16.89	0.1
THC run2	3/22/2017	18:45:00	3.66	16.95	0.4
THC run2	3/22/2017	18:45:15	3.67	16.97	1.6
THC run2	3/22/2017	18:45:30	3.73	16.93	2.4
THC run2	3/22/2017	18:45:45	3.71	16.90	4.2
THC run2	3/22/2017	18:46:00	3.67	16.92	5.3
THC run2	3/22/2017	18:46:15	3.66	16.92	4.7
THC run2	3/22/2017	18:46:30	3.62	16.96	4.3
THC run2	3/22/2017	18:46:45	3.67	16.98	3.9
THC run2	3/22/2017	18:47:00	3.82	16.88	3.5
THC run2	3/22/2017	18:47:15	3.90	16.77	3.0
THC run2	3/22/2017	18:47:30	3.94	16.68	2.6
THC run2	3/22/2017	18:47:45	3.97	16.65	2.4
THC run2	3/22/2017	18:48:00	3.94	16.65	2.4
THC run2	3/22/2017	18:48:15	3.95	16.67	2.7
THC run2	3/22/2017	18:48:30	3.99	16.60	2.8
THC run2	3/22/2017	18:48:45	4.04	16.55	3.0
THC run2	3/22/2017	18:49:00	4.08	16.52	2.6
THC run2	3/22/2017	18:49:15	4.09	16.52	2.4
THC run2	3/22/2017	18:49:30	3.99	16.57	2.4
THC run2	3/22/2017	18:49:45	3.99	16.60	2.2
THC run2	3/22/2017	18:50:00	3.95	16.62	2.0
THC run2	3/22/2017	18:50:15	3.91	16.65	1.8
THC run2	3/22/2017	18:50:30	3.93	16.70	1.7
THC run2	3/22/2017	18:50:45	3.99	16.66	1.6
THC run2	3/22/2017	18:51:00	4.03	16.57	1.6
THC run2	3/22/2017	18:51:15	4.06	16.54	1.6
THC run2	3/22/2017	18:51:30	4.00	16.56	1.5
THC run2	3/22/2017	18:51:45	3.91	16.63	1.4
THC run2	3/22/2017	18:52:00	3.88	16.71	1.3
THC run2	3/22/2017	18:52:15	3.89	16.72	1.4
THC run2	3/22/2017	18:52:30	3.93	16.71	1.3
THC run2	3/22/2017	18:52:45	3.94	16.68	1.3
THC run2	3/22/2017	18:53:00	3.90	16.68	1.3
THC run2	3/22/2017	18:53:15	3.83	16.75	1.2
THC run2	3/22/2017	18:53:30	3.80	16.81	1.3
THC run2	3/22/2017	18:53:45	3.85	16.78	1.6
THC run2	3/22/2017	18:54:00	3.88	16.75	1.6
THC run2	3/22/2017	18:54:15	3.85	16.72	1.4
THC run2	3/22/2017	18:54:30	3.76	16.80	1.3
THC run2	3/22/2017	18:54:45	3.68	16.88	1.2
THC run2	3/22/2017	18:55:00	3.65	16.94	1.1
THC run2	3/22/2017	18:55:15	3.65	16.97	1.2
THC run2	3/22/2017	18:55:30	3.65	16.97	1.2
THC run2	3/22/2017	18:55:45	3.66	16.95	1.3
THC run2	3/22/2017	18:56:00	3.73	16.89	1.3
THC run2	3/22/2017	18:56:15	3.80	16.84	1.3
THC run2	3/22/2017	18:56:30	3.80	16.80	1.3
THC run2	3/22/2017	18:56:45	3.79	16.82	1.1
THC run2	3/22/2017	18:57:00	3.82	16.81	0.9
THC run2	3/22/2017	18:57:15	3.80	16.80	0.6
THC run2	3/22/2017	18:57:30	3.76	16.84	0.3
THC run2	3/22/2017	18:57:45	3.79	16.88	0.3
THC run2	3/22/2017	18:58:00	3.83	16.85	0.3
THC run2	3/22/2017	18:58:15	3.86	16.77	0.2
THC run2	3/22/2017	18:58:30	3.86	16.73	0.2
THC run2	3/22/2017	18:58:45	3.90	16.74	0.2
THC run2	3/22/2017	18:59:00	3.96	16.69	0.1
THC run2	3/22/2017	18:59:15	3.94	16.65	0.2
THC run2	3/22/2017	18:59:30	3.93	16.65	0.2
THC run2	3/22/2017	18:59:45	3.91	16.68	0.1
THC run2	3/22/2017	19:00:00	3.83	16.73	0.1
THC run2	3/22/2017	19:00:15	3.82	16.79	0.2
THC run2	3/22/2017	19:00:30	3.81	16.83	0.3
THC run2	3/22/2017	19:00:45	3.83	16.79	0.4
THC run2	3/22/2017	19:01:00	3.79	16.78	0.5
THC run2	3/22/2017	19:01:15	3.72	16.84	0.6

name			FE O2	FE CO2	A THC														
sn			1151210012	1151210012	1106047146														
offset			0	0	0														
fullscale			100	20	30														
train			1	1	1														
gastype			o2 3a	co2 3a	thc 25a														
THC run2	3/22/2017	19:01:30	3.65	16.92	0.6														
THC run2	3/22/2017	19:01:45	3.58	16.99	0.5														
THC run2	3/22/2017	19:02:00	3.55	17.06	0.4														
THC run2	3/22/2017	19:02:15	3.52	17.12	0.5														
THC run2	3/22/2017	19:02:30	3.50	17.15	0.7														
THC run2	3/22/2017	19:02:45	3.54	17.13	0.6														
THC run2	3/22/2017	19:03:00	3.56	17.09	0.5														
THC run2	3/22/2017	19:03:15	3.57	17.05	0.5														
THC run2	3/22/2017	19:03:30	3.69	17.01	0.4														
THC run2	3/22/2017	19:03:45	3.70	16.97	0.4														
THC run2	3/22/2017	19:04:00	3.76	16.89	0.4														
THC run2	3/22/2017	19:04:15	3.75	16.86	0.2														
THC run2	3/22/2017	19:04:30	3.70	16.89	0.1														
THC run2	3/22/2017	19:04:45	3.67	16.93	0.2														
THC run2	3/22/2017	19:05:00	3.66	16.98	0.2														
THC run2	3/22/2017	19:05:15	3.73	16.97	0.1														
THC run2	3/22/2017	19:05:30	3.85	16.85	0.2														
THC run2	3/22/2017	19:05:45	3.92	16.72	0.4														
THC run2	3/22/2017	19:06:00	3.97	16.64	0.6														
THC run2	3/22/2017	19:06:15	3.95	16.64	0.7														
THC run2	3/22/2017	19:06:30	3.90	16.68	0.7														
THC run2	3/22/2017	19:06:45	3.87	16.72	0.6														
THC run2	3/22/2017	19:07:00	3.86	16.76	0.5														
THC run2	3/22/2017	19:07:15	3.85	16.77	0.5														
THC run2	3/22/2017	19:07:30	3.80	16.79	0.4														
THC run2	3/22/2017	19:07:45	3.77	16.85	0.5														
THC run2	3/22/2017	19:08:00	3.81	16.87	0.7														
THC run2	3/22/2017	19:08:15	3.85	16.80	1.0														
THC run2	3/22/2017	19:08:30	3.90	16.71	1.2														
THC run2	3/22/2017	19:08:45	3.96	16.67	1.2														
THC run2	3/22/2017	19:09:00	3.97	16.63	0.9														
THC run2	3/22/2017	19:09:15	3.87	16.67	0.4														
THC run2	3/22/2017	19:09:30	3.77	16.79	0.2														
THC run2	3/22/2017	19:09:45	3.73	16.88	0.1														
THC run2	3/22/2017	19:10:00	3.81	16.89	0.0														
THC run2	3/22/2017	19:10:15	3.86	16.82	0.0														
THC run2	3/22/2017	19:10:30	3.84	16.80	0.0														
THC run2	3/22/2017	19:10:45	3.86	16.76	0.0														
THC run2	3/22/2017	19:11:00	3.86	16.75	0.0														
THC run2	3/22/2017	19:11:15	3.86	16.75	0.0														
THC run2	3/22/2017	19:11:30	3.87	16.75	0.0														
THC run2	3/22/2017	19:11:45	3.86	16.76	0.0														
THC run2	3/22/2017	19:12:00	3.71	16.74	-0.1														
THC run2	3/22/2017	19:12:15	3.80	16.81	0.0														
THC run2	3/22/2017	19:12:30	3.78	16.87	0.0														
THC run2	3/22/2017	19:12:45	3.42	16.85	-0.2														
THC run2	3/22/2017	19:13:00	3.04	16.80	-0.3														
THC run2	3/22/2017	19:13:15	3.75	16.84	0.0														
THC run2	3/22/2017	19:13:30	3.79	16.85	0.0														
THC run2	3/22/2017	19:13:45	3.79	16.84	0.0														
THC run2	3/22/2017	19:14:00	3.82	16.82	0.0														
THC run2	3/22/2017	19:14:15	3.84	16.80	0.0														
THC run2	3/22/2017	19:14:30	3.83	16.79	0.0														
THC run2	3/22/2017	19:14:45	3.85	16.81	0.0														
THC run2	3/22/2017	19:15:00	3.81	16.81	0.0														
THC run2	3/22/2017	19:15:15	3.73	16.73	-0.2														
THC run2	3/22/2017	19:15:30	3.78	16.73	-0.2														
THC run2	3/22/2017	19:15:45	3.82	16.77	-0.1														
THC run2	3/22/2017	19:16:00	3.78	16.80	0.0														
THC run2	3/22/2017	19:16:15	3.69	16.87	0.0														
THC run2	3/22/2017	19:16:30	3.65	16.96	0.0														
THC run2	3/22/2017	19:16:45	3.72	16.96	0.0														
THC run2	3/22/2017	19:17:00	3.77	16.90	0.0														
THC run2	3/22/2017	19:17:15	3.82	16.88	0.0														
THC run2	3/22/2017	19:17:30	3.81	16.87	0.0														
THC run2	3/22/2017	19:17:45	3.83	16.84	0.0														
THC run2	3/22/2017	19:18:00	3.85	16.78	0.0														
THC run2	3/22/2017	19:18:15	3.88	16.76	0.0														
THC run2	3/22/2017	19:18:30	3.87	16.76	0.0														
THC run2	3/22/2017	19:18:45	3.77	16.79	0.0														
THC run2	3/22/2017	19:19:00	3.68	16.90	0.0														
THC run2	3/22/2017	19:19:15	3.71	16.96	0.0														
aveTHC run	3/22/2017	18:18:00	3.76	16.84	0.5	60													
scg1	3/22/2017	19:19:30	3.77	16.92	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:19:45	3.79	16.90	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:20:00	3.81	16.87	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:20:15	3.79	16.84	0.1	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:20:30	3.78	16.81	0.1	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:20:45	3.80	16.83	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:21:00	3.76	16.86	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:21:15	3.62	15.98	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:21:30	2.44	10.57	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:21:45	1.39	5.63	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:22:00	0.86	2.64	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:22:15	0.59	1.21	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:22:30	0.50	0.28	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg1	3/22/2017	19:22:45	0.48	0.04	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
o2zero1	3/22/2017	19:22:45	0.48	0.04	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
co2zero1	3/22/2017	19:22:45	0.48	0.04	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0					
scg2	3/22/2017	19:23:00	0.47	-0.05	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:23:15	0.46	-0.08	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:23:30	0.46	-0.10	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:23:45	0.45	-0.11	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:24:00	0.46	-0.11	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:24:15	0.44	-0.12	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:24:30	0.46	-0.13	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:24:45	2.11	0.05	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					
scg2	3/22/2017	19:25:00	6.70	2.45	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0					

name			FE O2	FE CO2	A THC										
sn			1151210012	1151210012	1106047146										
offset			0	0	0										
fullscale			100	20	30										
train			1	1	1										
gastype			o2 3a	co2 3a	thc 25a										
scg2	3/22/2017	19:25:15	9.27	6.00	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:25:30	10.14	8.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:25:45	10.36	8.87	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:26:00	10.42	9.09	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:26:15	10.44	9.15	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:26:30	10.44	9.18	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:26:45	10.45	9.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:27:00	10.45	9.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:27:15	10.50	9.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:27:30	10.46	9.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:27:45	10.45	9.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:28:00	10.47	9.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:28:15	10.47	9.22	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg2	3/22/2017	19:28:30	10.46	9.23	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
o2span1	3/22/2017	19:28:30	10.46	9.23	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
co2span1	3/22/2017	19:28:30	10.46	9.23	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
scg14	3/22/2017	19:29:00	10.46	9.24	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:29:15	10.47	9.24	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:29:30	10.47	9.23	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:29:45	10.47	9.22	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:30:00	10.48	9.23	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:30:15	10.48	9.23	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:30:30	10.56	9.22	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:30:45	12.82	8.70	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:31:00	17.07	5.48	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:31:15	19.44	2.53	-0.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:31:30	20.29	0.60	-0.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:31:45	20.62	0.13	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:32:00	20.71	-0.04	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:32:15	20.58	-0.13	-0.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:32:30	20.66	-0.13	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:32:45	20.76	-0.11	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg14	3/22/2017	19:33:00	20.76	-0.12	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
thczero1	3/22/2017	19:33:00	20.76	-0.12	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
scg12	3/22/2017	19:33:15	20.77	-0.13	0.0	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:33:30	20.81	-0.14	0.0	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:33:45	20.77	-0.14	0.0	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:34:00	20.78	-0.15	0.9	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:34:15	20.78	-0.15	8.7	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:34:30	20.78	-0.16	14.6	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:34:45	20.79	-0.16	15.2	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:35:00	20.79	-0.15	15.3	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:35:15	20.97	-0.15	15.3	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:35:30	21.15	-0.14	15.3	CC454100/cg12	THC	15.2		0		0		0	
scg12	3/22/2017	19:35:45	21.20	-0.18	15.3	CC454100/cg12	THC	15.2		0		0		0	
thcspan1	3/22/2017	19:35:45	21.20	-0.18	15.3	CC454100/cg12	THC	15.2		0		0		0	
so2zero															
so2span															
noxzero															
noxspan															
co2zero															
co2span															
o2zero															
o2span															
thczero															
thcspan															
cozero															
cospan															

so2ezero	Parameter Not Found
so2mid	Parameter Not Found
so2high	Parameter Not Found
noxezero	Parameter Not Found
noxlow	Parameter Not Found
noxmid	Parameter Not Found
noxhigh	Parameter Not Found
co2ezero	Parameter Not Found
co2mid	Parameter Not Found
co2high	Parameter Not Found
o2ezero	Parameter Not Found
o2mid	Parameter Not Found
o2high	Parameter Not Found
thcezero	Parameter Not Found
thclow	Parameter Not Found
thcmid	Parameter Not Found
thchigh	Parameter Not Found
coezero	Parameter Not Found
colow	Parameter Not Found
comid	Parameter Not Found
cohigh	Parameter Not Found

End

filename		3/23/2017	6:45:06															
testby1	C.E.M. Solutions, Inc.																	
testby2	1183 E. Overdrive Circle																	
testby3	Hernando, FL 34442																	
testby4	(352) 489-4337																	
testfor1	GREC																	
testfor2	Gainesville																	
testfor3	Boiler 1																	
testfor4	Compliance																	
name				FE O2		FE CO2		A THC										
sn				1151210012		1151210012		1106047146										
offset				0		0		0										
fullscale				100		20		30										
train				1		1		1										
gastype				o2 3a		co2 3a		thc 25a										
dcg1		3/23/2017	6:45:30	1.25		-0.22		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:45:45	1.09		0.01		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:46:00	0.25		0.04		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:46:15	0.11		-0.17		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:46:30	0.10		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:46:45	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:47:00	0.10		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:47:15	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:47:30	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:47:45	0.10		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:48:00	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:48:15	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:48:30	0.10		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg1		3/23/2017	6:48:45	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
o2ezero1		3/23/2017	6:48:15	0.09		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
co2ezero1		3/23/2017	6:48:30	0.10		-0.21		0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0	
dcg3		3/23/2017	6:49:00	0.10		-0.21		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:49:15	2.96		-0.11		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:49:30	14.92		3.20		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:49:45	19.22		9.99		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:50:00	20.44		15.43		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:50:15	20.64		18.62		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:50:30	20.68		19.26		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:50:45	20.69		19.38		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:51:00	20.72		19.39		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg3		3/23/2017	6:51:15	20.73		19.42		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
o2high1		3/23/2017	6:51:00	20.72		19.39		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
co2high1		3/23/2017	6:51:00	20.72		19.39		0.0	CC221880/cg3	O2	20.61	CO2	19.26		0		0	
dcg2		3/23/2017	6:51:30	20.73		19.44		0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:51:45	17.56		18.58		0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:52:00	11.44		13.67		0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:52:15	10.43		9.90		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:52:30	10.34		9.47		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:52:45	10.26		9.46		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:53:00	10.29		9.46		-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:53:15	10.32		9.47		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg2		3/23/2017	6:53:30	10.31		9.45		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
o2mid1		3/23/2017	6:53:30	10.31		9.45		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
co2mid1		3/23/2017	6:53:30	10.31		9.45		0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0	
dcg14		3/23/2017	6:53:45	10.32		9.45		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:54:00	10.32		9.67		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:54:15	9.56		9.99		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:54:30	6.24		12.17		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:54:45	5.33		14.36		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:55:00	4.31		14.74		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:55:15	3.94		16.33		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:55:30	3.94		16.77		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:55:45	4.22		16.75		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:56:00	9.49		14.54		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:56:15	16.40		8.14		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg14		3/23/2017	6:56:30	18.62		3.24		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
thcezero1		3/23/2017	6:56:15	16.40		8.14		0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0	
dcg13		3/23/2017	6:56:45	19.62		1.45		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:57:00	20.16		0.52		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:57:15	20.32		0.10		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:57:30	20.38		-0.03		0.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:57:45	20.46		-0.08		3.4	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:58:00	20.41		-0.10		13.0	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:58:15	20.42		-0.11		16.6	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:58:30	19.34		0.11		16.8	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:58:45	16.42		1.83		16.7	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:59:00	15.06		4.27		24.2	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:59:15	14.79		5.54		26.4	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:59:30	14.65		5.87		26.2	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	6:59:45	14.53		6.06		26.3	CC458494/cg13	THC	25.53		0		0		0	
thchigh1		3/23/2017	6:59:45	14.53		6.06		26.3	CC458494/cg13	THC	25.53		0		0		0	
dcg11		3/23/2017	7:00:00	14.44		6.20		26.4	CC453989/cg11	THC	8.926		0		0		0	
dcg13		3/23/2017	7:00:15	14.34		6.29		26.2	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:00:30	14.27		6.39		26.3	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:00:45	14.25		6.43		29.5	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:01:00	14.26		6.44		29.7	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:01:15	14.23		6.46		30.5	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:01:30	14.46		6.44		30.5	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:01:45	16.72		5.60		30.5	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:02:00	19.34		3.03		28.1	CC458494/cg13	THC	25.53		0		0		0	
dcg13		3/23/2017	7:02:15	20.54		0.95		26.6	CC458494/cg13	THC	25.53		0		0		0	
thchigh1		3/23/2017	7:02:15	20.54		0.95		26.6	CC458494/cg13	THC	25.53		0		0		0	
dcg11		3/23/2017	7:02:30	20.89		0.17		26.6	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:02:45	20.97		-0.06		26.6	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:03:00	21.00		-0.11		26.6	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:03:15	21.00		-0.13		25.6	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:03:30	21.01		-0.15		16.3	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:03:45	21.02		-0.15		9.5	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:04:00	21.01		-0.16		8.7	CC453989/cg11	THC	8.926		0		0		0	
dcg11		3/23/2017	7:04:15	21.01		-0.16		8.7	CC453989/cg11	THC	8.926		0		0		0	
thclow1		3/23/2017	7:04:15	21.01		-0.16		8.7	CC453989/cg11	THC	8.926		0		0		0	
dcg12		3/23/2017	7:04:30	19.52		-0.37		8.5	CC454100/cg12	THC	15.2		0		0		0	
dcg12		3/23/2017	7:04:45	20.77		-0.18		8.6	CC454100/cg12	THC	15.2		0		0		0	
dcg12		3/23/2017	7:05:00	21.04		-0.17		8.7	CC454100/cg12	THC	15.2		0		0		0	

name			FE O2	FE CO2	A THC									
sn			1151210012	1151210012	1106047146									
offset			0	0	0									
fullscale			100	20	30									
train			1	1	1									
gastype			o2 3a	co2 3a	thc 25a									
dcg12	3/23/2017	7:05:15	21.01	-0.19	9.7	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:05:30	20.40	-0.23	13.5	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:05:45	20.80	-0.22	15.1	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:06:00	20.42	-0.35	15.2	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:06:15	20.90	-0.36	15.2	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:06:30	19.83	-0.51	15.0	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:06:45	20.41	-0.40	15.1	CC454100/cg12	THC	15.2		0		0		0
dcg12	3/23/2017	7:07:00	20.19	-0.37	15.0	CC454100/cg12	THC	15.2		0		0		0
thcmid1	3/23/2017	7:07:00	20.19	-0.37	15.0	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:07:30	20.93	-0.24	15.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:07:45	21.06	-0.19	15.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:08:00	20.93	-0.23	12.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:08:15	21.00	-0.20	7.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:08:30	20.91	-0.23	12.9	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:08:45	20.97	-0.18	15.1	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:09:00	17.48	0.69	15.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:09:15	14.87	4.14	15.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:09:30	17.93	4.47	15.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:09:45	20.03	1.97	15.3	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:10:00	20.15	0.47	15.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:10:15	20.49	-0.03	15.2	CC454100/cg12	THC	15.2		0		0		0
scg12	3/23/2017	7:10:30	19.80	-0.31	15.2	CC454100/cg12	THC	15.2		0		0		0
thcspan1	3/23/2017	7:10:30	19.80	-0.31	15.2	CC454100/cg12	THC	15.2		0		0		0
scg14	3/23/2017	7:10:45	21.05	-0.17	15.3	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:11:00	21.05	-0.18	15.4	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:11:15	21.05	-0.17	15.4	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:11:30	21.06	-0.19	14.4	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:11:45	20.82	-0.23	5.8	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:12:00	20.82	-0.31	0.2	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:12:15	20.85	-0.26	-0.1	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg14	3/23/2017	7:12:30	20.97	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
thczero1	3/23/2017	7:12:30	20.97	-0.19	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0
scg1	3/23/2017	7:12:45	20.72	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:13:00	20.60	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:13:15	20.50	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:13:30	20.49	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:13:45	20.50	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:14:00	20.49	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:14:15	20.35	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:14:30	15.54	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:14:45	6.88	-0.19	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:15:00	2.19	-0.19	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:15:15	0.76	-0.20	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:15:30	0.39	-0.24	-0.1	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:15:45	0.22	-0.22	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:16:00	0.26	-0.44	-0.3	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:16:15	0.23	-0.32	-0.2	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg1	3/23/2017	7:16:30	0.19	-0.35	-0.2	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
o2zero1	3/23/2017	7:16:15	0.23	-0.32	-0.2	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
co2zero1	3/23/2017	7:16:15	0.23	-0.32	-0.2	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0
scg2	3/23/2017	7:16:45	0.27	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:17:00	0.26	-0.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:17:15	0.25	-0.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:17:30	0.25	-0.20	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:17:45	0.24	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:18:00	0.23	-0.21	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:18:15	0.55	-0.18	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:18:30	4.16	0.80	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:18:45	8.16	4.28	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:19:00	9.37	7.44	-0.1	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:19:15	9.98	8.62	-0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:19:30	9.85	8.68	-0.2	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:19:45	10.15	9.16	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
scg2	3/23/2017	7:20:00	10.23	9.24	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
o2span1	3/23/2017	7:20:00	10.23	9.24	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
co2span1	3/23/2017	7:20:00	10.23	9.24	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0
THC run3	3/23/2017	7:22:30	3.98	15.16	0.0									
THC run3	3/23/2017	7:22:45	3.40	16.63	0.0									
THC run3	3/23/2017	7:23:00	3.55	17.02	0.0									
THC run3	3/23/2017	7:23:15	3.53	17.08	0.0									
THC run3	3/23/2017	7:23:30	3.49	17.15	0.0									
THC run3	3/23/2017	7:23:45	3.52	17.21	0.0									
THC run3	3/23/2017	7:24:00	3.56	17.18	0.0									
THC run3	3/23/2017	7:24:15	3.58	17.13	0.0									
THC run3	3/23/2017	7:24:30	3.57	17.10	0.0									
THC run3	3/23/2017	7:24:45	3.66	17.13	0.0									
THC run3	3/23/2017	7:25:00	3.78	17.06	0.0									
THC run3	3/23/2017	7:25:15	3.82	16.97	0.0									
THC run3	3/23/2017	7:25:30	3.88	16.89	0.0									
THC run3	3/23/2017	7:25:45	3.97	16.78	0.0									
THC run3	3/23/2017	7:26:00	3.98	16.71	0.0									
THC run3	3/23/2017	7:26:15	3.93	16.75	0.0									
THC run3	3/23/2017	7:26:30	3.86	16.83	0.0									
THC run3	3/23/2017	7:26:45	3.86	16.87	0.0									
THC run3	3/23/2017	7:27:00	3.88	16.84	0.0									
THC run3	3/23/2017	7:27:15	3.91	16.82	0.0									
THC run3	3/23/2017	7:27:30	3.98	16.79	0.0									
THC run3	3/23/2017	7:27:45	3.99	16.75	0.0									
THC run3	3/23/2017	7:28:00	3.98	16.73	0.0									
THC run3	3/23/2017	7:28:15	4.04	16.68	0.0									
THC run3	3/23/2017	7:28:30	4.04	16.65	0.0									
THC run3	3/23/2017	7:28:45	3.89	16.71	0.0									
THC run3	3/23/2017	7:29:00	3.75	16.91	0.0									
THC run3	3/23/2017	7:29:15	3.57	17.08	0.0									
THC run3	3/23/2017	7:29:30	3.58	17.14	0.0									
THC run3	3/23/2017	7:29:45	3.65	17.14	0.0									
THC run3	3/23/2017	7:30:00	3.69	17.09	0.0									
THC run3	3/23/2017	7:30:15	3.64	17.10	0.0									

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run3	3/23/2017	7:30:30	3.53	17.14	0.0
THC run3	3/23/2017	7:30:45	3.46	17.21	0.0
THC run3	3/23/2017	7:31:00	3.44	17.30	0.0
THC run3	3/23/2017	7:31:15	3.40	17.34	0.0
THC run3	3/23/2017	7:31:30	3.35	17.39	0.0
THC run3	3/23/2017	7:31:45	3.34	17.40	0.0
THC run3	3/23/2017	7:32:00	3.43	17.34	0.0
THC run3	3/23/2017	7:32:15	3.56	17.27	0.0
THC run3	3/23/2017	7:32:30	3.63	17.16	0.0
THC run3	3/23/2017	7:32:45	3.61	17.13	0.0
THC run3	3/23/2017	7:33:00	3.57	17.13	0.0
THC run3	3/23/2017	7:33:15	3.56	17.14	0.0
THC run3	3/23/2017	7:33:30	3.58	17.18	0.0
THC run3	3/23/2017	7:33:45	3.58	17.18	0.0
THC run3	3/23/2017	7:34:00	3.61	17.17	0.0
THC run3	3/23/2017	7:34:15	3.58	17.12	0.0
THC run3	3/23/2017	7:34:30	3.56	17.14	0.0
THC run3	3/23/2017	7:34:45	3.63	17.16	0.0
THC run3	3/23/2017	7:35:00	3.64	17.12	0.0
THC run3	3/23/2017	7:35:15	3.57	17.14	0.0
THC run3	3/23/2017	7:35:30	3.55	17.17	0.0
THC run3	3/23/2017	7:35:45	3.57	17.16	0.0
THC run3	3/23/2017	7:36:00	3.61	17.14	0.0
THC run3	3/23/2017	7:36:15	3.57	17.16	0.0
THC run3	3/23/2017	7:36:30	3.54	17.20	0.0
THC run3	3/23/2017	7:36:45	3.54	17.19	0.0
THC run3	3/23/2017	7:37:00	3.47	17.22	0.0
THC run3	3/23/2017	7:37:15	3.36	17.31	0.0
THC run3	3/23/2017	7:37:30	3.21	17.45	0.0
THC run3	3/23/2017	7:37:45	3.12	17.60	0.0
THC run3	3/23/2017	7:38:00	3.17	17.61	0.0
THC run3	3/23/2017	7:38:15	3.20	17.55	0.0
THC run3	3/23/2017	7:38:30	3.21	17.55	0.0
THC run3	3/23/2017	7:38:45	3.25	17.54	0.0
THC run3	3/23/2017	7:39:00	3.28	17.52	0.0
THC run3	3/23/2017	7:39:15	3.34	17.44	0.0
THC run3	3/23/2017	7:39:30	3.38	17.37	0.0
THC run3	3/23/2017	7:39:45	3.38	17.37	0.0
THC run3	3/23/2017	7:40:00	3.47	17.36	0.0
THC run3	3/23/2017	7:40:15	3.63	17.24	0.0
THC run3	3/23/2017	7:40:30	3.76	17.04	0.0
THC run3	3/23/2017	7:40:45	3.77	16.95	0.0
THC run3	3/23/2017	7:41:00	3.65	17.02	0.0
THC run3	3/23/2017	7:41:15	3.56	17.13	0.0
THC run3	3/23/2017	7:41:30	3.58	17.21	0.0
THC run3	3/23/2017	7:41:45	3.56	17.18	0.0
THC run3	3/23/2017	7:42:00	3.61	17.15	0.0
THC run3	3/23/2017	7:42:15	3.56	17.17	0.0
THC run3	3/23/2017	7:42:30	3.53	17.22	0.0
THC run3	3/23/2017	7:42:45	3.53	17.23	0.0
THC run3	3/23/2017	7:43:00	3.51	17.21	0.0
THC run3	3/23/2017	7:43:15	3.48	17.23	0.0
THC run3	3/23/2017	7:43:30	3.45	17.31	0.0
THC run3	3/23/2017	7:43:45	3.43	17.34	0.0
THC run3	3/23/2017	7:44:00	3.38	17.36	0.0
THC run3	3/23/2017	7:44:15	3.27	17.40	0.0
THC run3	3/23/2017	7:44:30	3.21	17.49	0.0
THC run3	3/23/2017	7:44:45	3.29	17.53	0.0
THC run3	3/23/2017	7:45:00	3.39	17.45	0.0
THC run3	3/23/2017	7:45:15	3.44	17.37	0.0
THC run3	3/23/2017	7:45:30	3.45	17.33	0.0
THC run3	3/23/2017	7:45:45	3.22	17.22	0.0
THC run3	3/23/2017	7:46:00	3.42	17.15	0.0
THC run3	3/23/2017	7:46:15	3.50	17.09	0.0
THC run3	3/23/2017	7:46:30	3.77	17.07	0.0
THC run3	3/23/2017	7:46:45	3.70	17.02	0.0
THC run3	3/23/2017	7:47:00	3.00	16.92	-0.2
THC run3	3/23/2017	7:47:15	2.13	16.85	-0.4
THC run3	3/23/2017	7:47:30	3.56	17.26	0.0
THC run3	3/23/2017	7:47:45	2.15	17.02	-0.4
THC run3	3/23/2017	7:48:00	0.48	16.65	-0.8
THC run3	3/23/2017	7:48:15	3.59	17.15	0.0
THC run3	3/23/2017	7:48:30	3.50	17.22	0.0
THC run3	3/23/2017	7:48:45	3.47	17.28	0.0
THC run3	3/23/2017	7:49:00	3.45	17.32	0.0
THC run3	3/23/2017	7:49:15	3.50	17.32	0.0
THC run3	3/23/2017	7:49:30	3.59	17.20	0.0
THC run3	3/23/2017	7:49:45	3.59	17.15	0.0
THC run3	3/23/2017	7:50:00	3.57	17.19	0.0
THC run3	3/23/2017	7:50:15	3.61	17.21	0.0
THC run3	3/23/2017	7:50:30	3.74	17.10	0.0
THC run3	3/23/2017	7:50:45	3.83	16.96	0.0
THC run3	3/23/2017	7:51:00	3.79	16.92	0.0
THC run3	3/23/2017	7:51:15	3.73	16.99	0.0
THC run3	3/23/2017	7:51:30	3.67	17.08	0.0
THC run3	3/23/2017	7:51:45	3.69	17.07	0.0
THC run3	3/23/2017	7:52:00	3.79	17.00	0.0
THC run3	3/23/2017	7:52:15	3.79	16.96	0.0
THC run3	3/23/2017	7:52:30	3.75	17.00	0.0
THC run3	3/23/2017	7:52:45	3.69	17.05	0.0
THC run3	3/23/2017	7:53:00	3.62	17.07	0.0
THC run3	3/23/2017	7:53:15	3.59	17.12	0.0
THC run3	3/23/2017	7:53:30	3.56	17.18	0.0
THC run3	3/23/2017	7:53:45	3.55	17.22	0.0
THC run3	3/23/2017	7:54:00	3.52	17.24	0.0
THC run3	3/23/2017	7:54:15	3.50	17.24	0.0
THC run3	3/23/2017	7:54:30	3.58	17.21	0.0
THC run3	3/23/2017	7:54:45	3.70	17.14	0.0

name			FE O2	FE CO2	A THC
sn			1151210012	1151210012	1106047146
offset			0	0	0
fullscale			100	20	30
train			1	1	1
gastype			o2 3a	co2 3a	thc 25a
THC run3	3/23/2017	7:55:00	3.75	17.07	0.0
THC run3	3/23/2017	7:55:15	3.76	17.02	0.0
THC run3	3/23/2017	7:55:30	3.69	17.01	0.0
THC run3	3/23/2017	7:55:45	3.66	17.03	0.0
THC run3	3/23/2017	7:56:00	3.63	17.10	0.0
THC run3	3/23/2017	7:56:15	3.65	17.14	0.0
THC run3	3/23/2017	7:56:30	3.75	17.09	0.0
THC run3	3/23/2017	7:56:45	3.60	17.06	0.0
THC run3	3/23/2017	7:57:00	3.49	17.17	0.0
THC run3	3/23/2017	7:57:15	3.39	17.31	0.0
THC run3	3/23/2017	7:57:30	3.23	17.43	0.0
THC run3	3/23/2017	7:57:45	3.23	17.51	0.0
THC run3	3/23/2017	7:58:00	3.26	17.51	0.0
THC run3	3/23/2017	7:58:15	3.36	17.45	0.0
THC run3	3/23/2017	7:58:30	3.51	17.37	0.0
THC run3	3/23/2017	7:58:45	3.41	17.35	0.0
THC run3	3/23/2017	7:59:00	3.32	17.38	0.0
THC run3	3/23/2017	7:59:15	3.38	17.39	0.0
THC run3	3/23/2017	7:59:30	3.47	17.34	0.0
THC run3	3/23/2017	7:59:45	3.49	17.29	0.0
THC run3	3/23/2017	8:00:00	3.43	17.30	0.0
THC run3	3/23/2017	8:00:15	3.33	17.37	0.0
THC run3	3/23/2017	8:00:30	3.36	17.39	0.0
THC run3	3/23/2017	8:00:45	3.39	17.37	0.0
THC run3	3/23/2017	8:01:00	3.38	17.38	0.0
THC run3	3/23/2017	8:01:15	3.39	17.41	0.0
THC run3	3/23/2017	8:01:30	3.46	17.36	0.0
THC run3	3/23/2017	8:01:45	3.51	17.25	0.0
THC run3	3/23/2017	8:02:00	3.52	17.23	0.0
THC run3	3/23/2017	8:02:15	3.47	17.27	0.0
THC run3	3/23/2017	8:02:30	3.39	17.34	0.0
THC run3	3/23/2017	8:02:45	3.33	17.41	0.0
THC run3	3/23/2017	8:03:00	3.37	17.38	0.0
THC run3	3/23/2017	8:03:15	3.45	17.33	0.0
THC run3	3/23/2017	8:03:30	3.47	17.30	0.0
THC run3	3/23/2017	8:03:45	3.51	17.31	0.0
THC run3	3/23/2017	8:04:00	3.54	17.29	0.0
THC run3	3/23/2017	8:04:15	3.64	17.16	0.0
THC run3	3/23/2017	8:04:30	3.70	17.08	0.0
THC run3	3/23/2017	8:04:45	3.57	17.13	0.0
THC run3	3/23/2017	8:05:00	3.54	17.23	0.0
THC run3	3/23/2017	8:05:15	3.61	17.21	0.0
THC run3	3/23/2017	8:05:30	3.62	17.12	0.0
THC run3	3/23/2017	8:05:45	3.51	17.16	0.0
THC run3	3/23/2017	8:06:00	3.40	17.29	0.0
THC run3	3/23/2017	8:06:15	3.38	17.40	0.0
THC run3	3/23/2017	8:06:30	3.32	17.43	0.0
THC run3	3/23/2017	8:06:45	3.30	17.43	0.0
THC run3	3/23/2017	8:07:00	3.41	17.41	0.0
THC run3	3/23/2017	8:07:15	3.61	17.29	0.0
THC run3	3/23/2017	8:07:30	3.74	17.13	0.0
THC run3	3/23/2017	8:07:45	3.82	16.99	0.0
THC run3	3/23/2017	8:08:00	3.84	16.91	0.0
THC run3	3/23/2017	8:08:15	3.72	16.97	0.0
THC run3	3/23/2017	8:08:30	3.65	17.07	0.0
THC run3	3/23/2017	8:08:45	3.69	17.12	0.0
THC run3	3/23/2017	8:09:00	3.84	17.01	0.0
THC run3	3/23/2017	8:09:15	3.93	16.84	0.0
THC run3	3/23/2017	8:09:30	3.96	16.78	0.0
THC run3	3/23/2017	8:09:45	3.96	16.77	0.0
THC run3	3/23/2017	8:10:00	3.95	16.80	0.0
THC run3	3/23/2017	8:10:15	3.94	16.79	0.0
THC run3	3/23/2017	8:10:30	3.94	16.77	0.0
THC run3	3/23/2017	8:10:45	4.05	16.77	0.0
THC run3	3/23/2017	8:11:00	4.02	16.72	0.0
THC run3	3/23/2017	8:11:15	3.95	16.75	0.0
THC run3	3/23/2017	8:11:30	3.87	16.81	0.0
THC run3	3/23/2017	8:11:45	3.83	16.85	0.0
THC run3	3/23/2017	8:12:00	3.80	16.92	0.0
THC run3	3/23/2017	8:12:15	3.76	16.99	0.0
THC run3	3/23/2017	8:12:30	3.71	17.04	0.0
THC run3	3/23/2017	8:12:45	3.66	17.07	0.0
THC run3	3/23/2017	8:13:00	3.68	17.06	0.0
THC run3	3/23/2017	8:13:15	3.70	17.07	0.0
THC run3	3/23/2017	8:13:30	3.65	17.08	0.0
THC run3	3/23/2017	8:13:45	3.56	17.16	0.0
THC run3	3/23/2017	8:14:00	3.45	17.26	0.0
THC run3	3/23/2017	8:14:15	3.44	17.30	0.0
THC run3	3/23/2017	8:14:30	3.58	17.25	0.0
THC run3	3/23/2017	8:14:45	3.68	17.14	0.0
THC run3	3/23/2017	8:15:00	3.71	17.09	0.0
THC run3	3/23/2017	8:15:15	3.74	17.07	0.0
THC run3	3/23/2017	8:15:30	3.71	17.02	0.0
THC run3	3/23/2017	8:15:45	3.74	17.02	0.0
THC run3	3/23/2017	8:16:00	3.80	17.02	0.0
THC run3	3/23/2017	8:16:15	3.82	16.97	0.0
THC run3	3/23/2017	8:16:30	3.73	16.99	0.0
THC run3	3/23/2017	8:16:45	3.64	17.04	0.0
THC run3	3/23/2017	8:17:00	3.62	17.10	0.0
THC run3	3/23/2017	8:17:15	3.54	17.16	0.0
THC run3	3/23/2017	8:17:30	3.41	17.28	0.0
THC run3	3/23/2017	8:17:45	3.34	17.38	0.0
THC run3	3/23/2017	8:18:00	3.27	17.42	0.0
THC run3	3/23/2017	8:18:15	3.26	17.48	0.0
THC run3	3/23/2017	8:18:30	3.35	17.47	0.0
THC run3	3/23/2017	8:18:45	3.32	17.43	0.0
THC run3	3/23/2017	8:19:00	3.30	17.45	0.0
THC run3	3/23/2017	8:19:15	3.32	17.42	0.0

name			FE O2	FE CO2	A THC													
sn			1151210012	1151210012	1106047146													
offset			0	0	0													
fullscale			100	20	30													
train			1	1	1													
gastype			o2 3a	co2 3a	thc 25a													
THC run3	3/23/2017	8:19:30	3.31	17.43	0.0													
THC run3	3/23/2017	8:19:45	3.36	17.44	0.0													
THC run3	3/23/2017	8:20:00	3.35	17.42	0.0													
THC run3	3/23/2017	8:20:15	3.00	17.40	-0.2													
THC run3	3/23/2017	8:20:30	3.34	17.43	0.0													
THC run3	3/23/2017	8:20:45	3.53	17.34	0.0													
THC run3	3/23/2017	8:21:00	3.63	17.20	0.0													
THC run3	3/23/2017	8:21:15	3.60	17.14	0.0													
THC run3	3/23/2017	8:21:30	3.60	17.15	0.0													
THC run3	3/23/2017	8:21:45	3.71	17.09	0.0													
THC run3	3/23/2017	8:22:00	3.75	17.02	0.0													
THC run3	3/23/2017	8:22:15	3.67	17.02	0.0													
THC run3	3/23/2017	8:22:30	3.48	17.16	0.0													
THC run3	3/23/2017	8:22:45	3.34	17.34	0.0													
THC run3	3/23/2017	8:23:00	3.43	17.37	0.0													
THC run3	3/23/2017	8:23:15	3.52	17.28	0.0													
THC run3	3/23/2017	8:23:30	3.46	17.27	0.0													
THC run3	3/23/2017	8:23:45	3.40	17.35	0.0													
THC run3	3/23/2017	8:24:00	3.33	17.39	0.0													
aveTHC run	3/23/2017	7:23:00	3.55	17.16	0.0	60												
scg2	3/23/2017	8:25:45	3.18	17.59	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:26:00	3.19	17.60	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:26:15	3.25	17.57	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:26:30	3.29	17.51	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:26:45	3.26	17.44	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:27:00	3.24	17.46	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:27:15	3.90	17.35	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:27:30	6.68	15.68	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:27:45	8.92	12.37	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:28:00	9.84	10.44	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:28:15	10.14	9.70	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:28:30	10.20	9.51	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:28:45	10.21	9.45	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:29:00	10.23	9.44	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:29:15	10.23	9.41	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:29:30	10.23	9.39	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:29:45	10.24	9.40	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg2	3/23/2017	8:30:00	10.23	9.40	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
o2span1	3/23/2017	8:30:00	10.23	9.40	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
co2span1	3/23/2017	8:30:00	10.23	9.40	0.0	EB0070863/cg2	O2	10.11	CO2	9.437		0		0				
scg1	3/23/2017	8:30:15	10.24	9.40	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:30:30	10.25	9.39	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:30:45	10.24	9.38	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:31:00	10.26	9.39	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:31:15	10.25	9.39	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:31:30	10.25	9.39	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:31:45	10.26	9.38	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:32:00	9.84	9.28	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:32:15	6.62	8.02	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:32:30	2.82	4.73	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:32:45	1.02	1.83	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:33:00	0.44	0.57	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:33:15	0.28	0.09	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:33:30	0.24	-0.02	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:33:45	0.23	-0.07	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:34:00	0.22	-0.09	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:34:15	0.21	-0.10	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:34:30	0.21	-0.11	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:34:45	0.19	-0.12	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:35:00	0.21	-0.12	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg1	3/23/2017	8:35:15	0.18	-0.13	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
o2zero1	3/23/2017	8:35:15	0.18	-0.13	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
co2zero1	3/23/2017	8:35:15	0.18	-0.13	0.0	CC263051/cg1	SO2	0	NOx	0	CO2	0	O2	0				
scg14	3/23/2017	8:35:30	0.19	-0.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0				
scg14	3/23/2017	8:35:45	0.19	-0.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0				
thczero1	3/23/2017	8:35:45	0.19	-0.14	0.0	CC281749/cg14	NOx	0	CO2	0	THC	0	SO2	0				
scg12	3/23/2017	8:36:00	0.17	-0.14	0.0	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:36:15	0.18	-0.15	0.0	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:36:30	0.18	-0.15	0.0	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:36:45	0.17	-0.15	0.0	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:37:00	0.17	-0.16	5.1	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:37:15	0.20	-0.14	13.6	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:37:30	1.62	0.53	15.3	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:37:45	8.14	2.72	15.5	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:38:00	15.36	3.31	15.5	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:38:15	19.19	1.73	15.5	CC454100/cg12	THC	15.2		0		0		0				
scg12	3/23/2017	8:38:30	20.45	0.52	15.4	CC454100/cg12	THC	15.2		0		0		0				
thcspan1	3/23/2017	8:38:30	20.45	0.52	15.4	CC454100/cg12	THC	15.2		0		0		0				

Appendix E-2: Particulate Matter Test Data

Summaries
Method 5 Isokinetic Field Data Sheets
Method 4 Field Data Sheets
PM Analytical Results

Method 5 RESULTS SUMMARY

	Units	Run 1	Run 2	Run 3	Average	Limit
Date	mm/dd/yy	3/22/2017	3/23/2017	3/23/2017		
Run Start Time	hh:mm	12:35	7:23	12:45		
Run Stop Time	hh:mm	16:56	11:07	16:15		
Meter Calibration Factor		1.012	1.012	1.012		
Meter Calibration Verification		1.006	1.060	1.014		
DH @ 0.75 SCFM		1.944	1.944	1.944		
Pitot Tube Coefficient		0.840	0.840	0.840		
Actual Nozzle Diameter	in	0.257	0.253	0.257		
Stack Test Data						
Initial Meter Volume	ft^3	763.739	899.859	28.180		
Final Meter Volume	ft^3	898.882	1020.070	164.056		
Leak Check Volume	ft^3	0.661	0.719	0.495		
Total Meter Volume	ft^3	134.482	119.492	135.381	129.785	
Standard Meter Volume	dscf	131.776	122.376	136.787	130.313	
Total Sampling Time	min	180.0	180.0	180.0	180.0	
Average Meter Temperature	^oF	88.2	63.1	70.6	73.9	
Average Stack Temperature	^oF	334.4	331.6	332.3	332.8	
Barometric Pressure	in Hg	29.93	29.86	29.86	29.88	
Stack Static Pressure	in H_2O	-0.54	-0.54	-0.54	-0.54	
Absolute Stack Pressure	in Hg	29.89	29.82	29.82	29.84	
Average Orifice Pressure Drop	in H_2O	2.01	1.84	2.14	2.00	
Absolute Meter Pressure	in Hg	30.08	30.00	30.02	30.03	
Avg Square Root Pitot Pressure	$(in\ H_2O)^{1/2}$	0.94	0.94	0.97	0.95	
Moisture Content Data						
Impinger Water Volume Gain	ml	0.0	39.7	47.5	29.1	
Impinger Water Weight Gain	g	717.5	737.9	932.8	796.1	
Standard Water Vapor Volume	scf	33.830	36.661	46.217	38.903	
Calculated Stack Moisture	%	20.4	23.1	25.3	22.9	
Saturated Stack Moisture	%	100.00	100.0	100.0	100.0	
Reported Stack Moisture Content	%	20.4	23.1	25.3	22.9	
Gas Analysis Data						
Carbon Dioxide Percentage	%	17.3	17.3	17.3	17.3	
Oxygen Percentage	%	3.3	3.3	3.3	3.3	
Carbon Monoxide Percentage	%	0.0	0.0	0.0	0.0	
Nitrogen Percentage	%	79.4	79.4	79.4	79.4	
Dry Gas Molecular Weight	lb/lb-mole	30.90	30.90	30.90	30.90	
Wet Stack Gas Molecular Weight	lb/lb-mole	28.26	27.93	27.64	27.94	
Calculated Fuel Factor		1.017	1.017	1.017	1.017	
Fuel F-Factor	dscf/mmBtu	9240	9240	9240	9240	
Percent Excess Air	%	18.7	18.7	18.7	18.7	
Volumetric Flow Rate Data						
Average Stack Gas Velocity	ft/sec	65.36	65.84	68.34	66.51	
Stack Cross-Sectional Area	ft^2	112.31	112.31	112.31		
Actual Stack Flow Rate	acfm	440452	443672	460519	448214	
Wet Standard Stack Flow Rate	wkscfh	17547	17696	18354	17865	
Dry Standard Stack Flow Rate	dscfm	232703	226948	228640	229430	
Percent of Isokinetic Rate	%	98.1	96.4	103.6	99.4	
Emission Rate Data						
Mass of Particulate on Filter	mg	0.0	0.0	0.0	0.0	
Mass of Particulate in Acetone	mg	4.8	4.8	6.3	5.3	
Mass due to Acetone Blank	mg	0.0	0.0	0.0	0.0	
Total Mass of Particulates	mg	4.8	4.8	6.3	5.3	
Stack Particulate Concentration	mg/dscf	0.000	0.000	0.000	0.000	
	g/dscf	0.000	0.000	0.000	0.000	
	gr/dscf	0.001	0.001	0.001	0.001	
Particulate Emission Rate	kg/hr	0.51	0.53	0.63	0.56	
	lb/hr	1.1	1.2	1.4	1.2	
	lb/mmBtu, O_2	0.0009	0.0009	0.0011	0.0010	0.0098

Spreadsheet for U.S. EPA Method 201A - Determination of PM10 and PM2.5 Emissions

TEST RESULTS and DATA ANALYSIS SHEET

Location:	GREC Gainesville unit 1	**Start Time:**	8:20:00	**RUN No.**	1
Date:	23-Mar-2017	**End Time:**	11:44:00	**JOB No.**	11542

STACK DATA			ORSAT			EQUIPMENT				AVERAGE TEST DATA		
% Moisture:	22	% est.	%CO2:	17.30	%	METER BOX:	-			Average ΔP:	1.03	in H_2O
Barometric:	29.86	in Hg	%O2:	3.30	%	Y:	0.965			Average T_m:	525.2	°R
Static Press:	-0.54	in H_2O	%N2/CO:	79.40	%	ΔH@:	1.920	in H_2O		Average T_s:	791.8	°R
Stack Press:	29.82	in Hg	Md:	30.90	lb/lb-mole	Cp':	0.840	S/N	PT-04	Average ΔH:	0.33	in H_2O
Stack Area:	112.3	ft^2	Actual Mw:	27.93	lb/lb-mole	Cp:	0.840	S/N	PT-04	T_{std}:	528.00	°R
# of Points:	12	points	Run Time:	121.25	min	Nozzle Dia:	0.1580	inches		P_{std}:	29.92	in Hg

Filter Analysis			<$PM_{2.5}$ Recovery Analysis			Moisture Analysis		
Container 1:	120.8	mg	Container 4:	4962.8	mg	Silica Gel Final:	864.7	g
Filter Tare:	120.8	mg	Cont. 4 Tare:	4960.7	mg	Silica Gel Initial:	852.6	g
Acetone V_{aw1}:	0	ml	Acetone V_{aw4}:	50	ml	M_{sg}:	12.1	g
Acetone W_{a1}:	0	mg	Acetone W_{a4}:	0	mg	$V_{wsg(std)}$:	0.570	scf
(Filter) M_1:	0.000	mg	($PM_{2.5}$) M_4:	2.100	mg	Total Water Gain:	226.8	ml
>PM_{10} Recovery Analysis			$PM_{2.5-10}$ Recovery Analysis			$V_{wc(std)}$:	10.675	scf
Container 2:	-	mg	Container 3:	-	mg			
Cont. 2 Tare:	-	mg	Cont. 3 Tare:	-	mg	V_{ws}:	11.245	scf
Acetone V_{aw2}:	-	ml	Acetone V_{aw3}:	-	ml	B_{ws}:	0.230	H_20
Acetone W_{a2}:	-	mg	Acetone W_{a3}:	-	mg	Actual % H_2O:	23.0	%
($PM_{2.5}$) M_2:	-	mg	(PM_{10}-$_{2.5}$) M_3:	-	mg			

Acetone Blank Analysis		
Container 7:	0	mg
Container 7 Tare:	0	mg
Acetone Density ρ_a:	0.79	mg/ml
Blank Volume V_{aw}:	200	ml
Blank Conc.C_a:	0	mg_r/mg_v

CALCULATIONS AND DATA ANALYSIS

V_m:	38.7760	acf - [Actual Sample Volume]	μ:	217.153	mpoise - [Actual Gas Viscosity]
V_{ms}:	37.5755	dscf - [Corrected Sample Volume (std)]			
V_{ws}:	11.2450	scf - [Volume of Water Vapor]	C:	1.0962	[Cunningham Correction Factor]
Q_{Sst}:	0.30990	dscfm - [Corrected Dry Sampling Rate (std)]	D_{50}:	10.013	μmeter - D50 for Cyclone 1
Q_s:	0.60580	acfm - [Actual Final Sampling Rate]	D_{50IV}:	2.305	μmeter - D50 for Cyclone IV
I:	104.784	% - [Percent Isokinetic Sampling]	$Q_{sd(stack)}$:	14,637,113.41	dscf/hr - [Dry Stack Flow Rate (std)]
N_{re}:	2535	[Actual Reynolds Number]	$Q_{sw(stack)}$:	19,017,480.09	scf/hr - [Wet Stack Flow Rate (std)]
$V_{s(avg)}$:	70.77	fps - [Avgerage Stack Velocity]			
F_c:	1830				
F_d:	9240				

Concentrations			Emission Rates			
$PM_{2.5}$:	0.00086	gr/dscf	$PM_{2.5}$:	1.8034	lb/hr	0.0014 lb/mmbtu, O2

Spreadsheet for U.S. EPA Method 201A - Determination of PM10 and PM2.5 Emissions

TEST RESULTS and DATA ANALYSIS SHEET

Location:	GREC Gainesville unit 1	**Start Time:**	12:46:00	**RUN No.**	2
Date:	23-Mar-2017	**End Time:**	15:30:00	**JOB No.**	11542

STACK DATA			ORSAT			EQUIPMENT			AVERAGE TEST DATA		
% Moisture:	22	% est.	%CO2:	17.30	%	METER BOX:	-		Average ΔP:	0.94	in H_2O
Barometric:	29.86	in Hg	%O2:	3.30	%	Y:	0.965		Average T_m:	529.5	°R
Static Press:	-0.54	in H_2O	%N2/CO:	79.40	%	ΔH@:	1.920	in H_2O	Average T_s:	798.0	°R
Stack Press:	29.82	in Hg	Md:	30.90	lb/lb-mole	Cp': 0.840	S/N	PT-04	Average ΔH:	0.33	in H_2O
Stack Area:	112.3	ft^2	Actual Mw:	27.64	lb/lb-mole	Cp: 0.840	S/N	PT-04	T_{std}:	528.00	°R
# of Points:	12	points	Run Time:	110.50	min	Nozzle Dia:	0.1580	inches	P_{std}:	29.92	in Hg

Filter Analysis			<$PM_{2.5}$ Recovery Analysis			Moisture Analysis		
Container 1:	118.9	mg	Container 4:	4966.7	mg	Silica Gel Final:	878.7	g
Filter Tare:	118.9	mg	Cont. 4 Tare:	4963.9	mg	Silica Gel Initial:	864.7	g
Acetone V_{aw1}:	0	ml	Acetone V_{aw4}:	0	ml	M_{sg}:	14	g
Acetone W_{a1}:	0	mg	Acetone W_{a4}:	0	mg	$V_{wsg(std)}$:	0.659	scf
(Filter) M_1:	0.000	mg	($PM_{2.5}$) M_4:	2.800	mg	Total Water Gain:	225.6	ml
>PM_{10} Recovery Analysis			$PM_{2.5-10}$ Recovery Analysis			$V_{wc(std)}$:	10.619	scf
Container 2:	-	mg	Container 3:	-	mg			
Cont. 2 Tare:	-	mg	Cont. 3 Tare:	-	mg	V_{ws}:	11.278	scf
Acetone V_{aw2}:	-	ml	Acetone V_{aw3}:	-	ml	B_{ws}:	0.253	H_20
Acetone W_{a2}:	-	mg	Acetone W_{a3}:	-	mg	Actual % H_2O:	25.3	%
($PM_{2.5}$) M_2:	-	mg	(PM_{10}-$_{2.5}$) M_3:	-	mg	Acetone Blank Analysis		
						Container 7:	0	mg
						Container 7 Tare:	0	mg
						Acetone Density ρ_a:	0.79	mg/ml
						Blank Volume V_{aw}:	200	ml
						Blank Conc.C_a:	0	mg_r/mg_v

CALCULATIONS AND DATA ANALYSIS

V_m:	34.6910	acf - [Actual Sample Volume]	μ:	216.694	mpoise - [Actual Gas Viscosity]
V_{ms}:	33.3419	dscf - [Corrected Sample Volume (std)]			
V_{ws}:	11.2780	scf - [Volume of Water Vapor]	C:	1.0972	[Cunningham Correction Factor]
Q_{Sst}:	0.30174	dscfm - [Corrected Dry Sampling Rate (std)]	D_{50}:	9.961	μmeter - D50 for Cyclone 1
Q_s:	0.61233	acfm - [Actual Final Sampling Rate]	D_{50IV}:	2.298	μmeter - D50 for Cyclone IV
I:	109.851	% - [Percent Isokinetic Sampling]	$Q_{sd(stack)}$:	13,594,140.89	dscf/hr - [Dry Stack Flow Rate (std)]
N_{re}:	2522	[Actual Reynolds Number]	$Q_{sw(stack)}$:	18,192,389.38	scf/hr - [Wet Stack Flow Rate (std)]
$V_{s(avg)}$:	68.23	fps - [Avgerage Stack Velocity]			
F_c:	1830				
F_d:	9240				

Concentrations			Emission Rates			
$PM_{2.5}$:	0.00130	gr/dscf	$PM_{2.5}$:	2.5168	lb/hr	0.0020 lb/mmbtu, O2

Spreadsheet for U.S. EPA M201A - Determination of PM10 and PM2.5 Emissions

TEST RESULTS and DATA ANALYSIS SHEET

Location:	GREC Gainesville unit 1	**Start Time:**	16:25:00	**RUN No.**	3
Date:	23-Mar-2017	**End Time:**	18:47:00	**JOB No.**	11542

STACK DATA			ORSAT			EQUIPMENT			AVERAGE TEST DATA		
% Moisture:	22	% est.	%CO2:	17.30	%	METER BOX:	CEMS7MB		Average ΔP:	0.93	in H_2O
Barometric:	29.86	in Hg	%O2:	3.30	%	Y:	0.965		Average T_m:	528.2	°R
Static Press:	-0.54	in H_2O	%N2/CO:	79.40	%	ΔH@:	1.920	in H_2O	Average T_s:	797.8	°R
Stack Press:	29.82	in Hg	Md:	30.90	lb/lb-mole	Cp': 0.840	S/N	PT-04	Average ΔH:	0.33	in H_2O
Stack Area:	112.3	ft^2	Actual Mw:	28.04	lb/lb-mole	Cp: 0.840	S/N	PT-04	T_{std}:	528.00	°R
# of Points:	12	points	Run Time:	109.50	min	Nozzle Dia:	0.1580	inches	P_{std}:	29.92	in Hg

Filter Analysis			<$PM_{2.5}$ Recovery Analysis		
Container 1:	119.4	mg	Container 4:	4940.8	mg
Filter Tare:	119.4	mg	Cont. 4 Tare:	4936.9	mg
Acetone V_{aw1}:	0	ml	Acetone V_{aw4}:	0	ml
Acetone W_{a1}:	0	mg	Acetone W_{a4}:	0	mg
(Filter) M_1:	0.000	mg	($PM_{2.5}$) M_4:	3.900	mg
>PM_{10} Recovery Analysis			**$PM_{2.5-10}$ Recovery Analysis**		
Container 2:	-	mg	Container 3:	-	mg
Cont. 2 Tare:	-	mg	Cont. 3 Tare:	-	mg
Acetone V_{aw2}:	-	ml	Acetone V_{aw3}:	-	ml
Acetone W_{a2}:	-	mg	Acetone W_{a3}:	-	mg
($PM_{2.5}$) M_2:	-	mg	($PM_{10-2.5}$) M_3:	-	mg

Moisture Analysis		
Silica Gel Final:	888.3	g
Silica Gel Initial:	878.7	g
M_{sg}:	9.6	g
$V_{wsg(std)}$:	0.452	scf
Total Water Gain:	190.7	ml
$V_{wc(std)}$:	8.976	scf
V_{ws}:	9.428	scf
B_{ws}:	0.222	H_20
Actual % H_2O:	22.2	%

Acetone Blank Analysis		
Container 7:	0	mg
Container 7 Tare:	0	mg
Acetone Density ρ_a:	0.79	mg/ml
Blank Volume V_{aw}:	200	ml
Blank Conc.C_a:	0	mg_r/mg_v

CALCULATIONS AND DATA ANALYSIS

V_m:	34.3860	acf - [Actual Sample Volume]	μ:	219.288	mpoise - [Actual Gas Viscosity]
V_{ms}:	33.1322	dscf - [Corrected Sample Volume (std)]			
V_{ws}:	9.4281	scf - [Volume of Water Vapor]	C:	1.0927	[Cunningham Correction Factor]
Q_{Sst}:	0.30258	dscfm - [Corrected Dry Sampling Rate (std)]	D_{50}:	10.290	μmeter - D50 for Cyclone 1
Q_s:	0.58928	acfm - [Actual Final Sampling Rate]	D_{50IV}:	2.419	μmeter - D50 for Cyclone IV
I:	107.138	% - [Percent Isokinetic Sampling]	$Q_{sd(stack)}$:	13,977,163.65	dscf/hr - [Dry Stack Flow Rate (std)]
N_{re}:	2434	[Actual Reynolds Number]	$Q_{sw(stack)}$:	17,954,515.82	scf/hr - [Wet Stack Flow Rate (std)]
$V_{s(avg)}$:	67.33	fps - [Avgerage Stack Velocity]			
F_c:	1830				
F_d:	9240				

Concentrations			Emission Rates			
$PM_{2.5}$:	0.00182	gr/dscf	$PM_{2.5}$:	3.6272	lb/hr	0.0028 lb/mmbtu, O2

Method 5/CTM-027 Isokinetic Field Data Sheets

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/22/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	TC	**Run #**	1
# Traverse Points	16	**Test Method**	5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	75	°F
DH @ 0.75 SCFM	(ΔH@)	1.94	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.84	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	2.29	

Sampling Equipment			
Meter #	CEMS5MB		
Meterbox Cal. Factor	(Y)	1.012	
Nozzle #	G250-15		
Actual Nozzle Diameter	(D_{na})	0.2570	in
Req. Nozzle Diameter	(D_{ni})	0.2502	in
Probe # / Length	P6-02	7.00	ft
Liner Material	Glass		
Thermocouple ID #	TC6-02		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.93	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.89	in Hg
Absolute Meter Pressure	(P_m)	30.07	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	12	in Hg
Leak Check Total Volume (ft3):				0.661	ft^3
Post	0	ft^3/min	@	16	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	12:35:00	763.739	1.000	2.292	2.300	330	299	82	323	63	8.0
A-2	11.3	12:46:15	771.640	0.950	2.178	2.200	336	301	82	331	67	11.0
A-3	22.5	12:57:30	780.150	0.900	2.063	2.100	333	309	82	324	66	11.0
A-4	33.8	13:08:45	788.450	0.840	1.926	1.900	333	311	84	318	66	10.5
B-1	45.0	14:12:00	797.174	0.840	1.926	1.900	331	296	83	336	63	11.0
B-2	56.3	14:23:15	805.930	0.840	1.926	1.900	334	298	85	341	66	11.0
B-3	67.5	14:34:30	815.470	0.750	1.719	1.500	335	313	88	341	67	10.0
B-4	78.8	14:45:45	822.820	0.700	1.605	1.600	335	318	89	340	65	9.0
C-1	90.0	15:15:00	831.182	0.900	2.063	2.100	335	318	90	297	66	10.0
C-2	101.3	15:26:15	839.640	0.840	1.926	1.900	335	320	91	342	64	10.0
C-3	112.5	15:37:30	846.920	0.930	2.132	2.100	336	321	91	340	65	10.0
C-4	123.8	15:48:45	855.170	0.660	1.513	1.500	335	314	93	341	66	9.0
D-1	135.0	16:11:00	864.239	1.000	2.292	2.300	335	316	91	337	66	12.0
D-2	146.3	16:22:15	872.760	1.000	2.292	2.300	336	322	91	340	65	12.0
D-3	157.5	16:33:30	881.870	1.000	2.292	2.300	336	321	97	334	66	12.0
D-4	168.8	16:44:45	890.720	1.000	2.292	2.300	336	323	92	330	67	12.0
Last Pt	180.0	16:56:00	898.882									
Last Pt	180.0	16:56:00	898.882						**Maximum Vacuum**			12.0
Average Values				0.88		2.01	334	313	88	332	66	

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/23/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	TC	**Run #**	2
# Traverse Points	16	**Test Method**	5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	60	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.94	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	2.09	

Sampling Equipment			
Meter #	CEMS5MB		
Meterbox Cal. Factor	(Y)	1.012	
Nozzle #	G250-11		
Actual Nozzle Diameter	(D_{na})	0.2530	in
Req. Nozzle Diameter	(D_{ni})	0.2537	in
Probe # / Length	P6-02	7.00	ft
Liner Material	Glass		
Thermocouple ID #	TC6-02		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.82	in Hg
Absolute Meter Pressure	(P_m)	30.00	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	12	in Hg
Leak Check Total Volume (ft3):				0.719	ft^3
Post	0.001	ft^3/min	@	17	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	7:23:00	899.859	1.000	2.093	2.100	329	319	59	316	52	7.0
A-2	11.3	7:34:15	909.040	0.840	1.758	1.800	331	319	59	331	54	11.0
A-3	22.5	7:45:30	916.770	0.800	1.675	1.700	331	319	60	325	61	10.0
A-4	33.8	7:56:45	924.440	0.730	1.528	1.500	330	319	61	317	63	9.0
B-1	45.0	8:22:00	932.384	0.940	1.968	2.000	332	322	50	273	57	10.0
B-2	56.3	8:33:15	940.860	1.000	2.093	2.100	333	320	61	308	58	11.0
B-3	67.5	8:44:30	947.420	0.840	1.758	1.800	332	323	62	307	64	11.0
B-4	78.8	8:55:45	955.640	0.940	1.968	2.000	332	320	62	299	54	10.0
C-1	90.0	9:27:00	964.149	0.840	1.758	1.800	332	303	64	302	49	10.0
C-2	101.3	9:38:15	972.670	0.940	1.968	2.000	332	321	65	316	47	11.0
C-3	112.5	9:49:30	980.450	0.840	1.758	1.800	332	320	66	319	52	11.0
C-4	123.8	10:00:45	988.020	0.730	1.528	1.500	331	303	68	311	52	10.0
D-1	135.0	10:22:00	996.261	0.920	1.926	1.900	332	297	69	303	60	11.0
D-2	146.3	10:33:15	1003.340	0.920	1.926	1.900	332	296	63	301	55	11.0
D-3	157.5	10:44:30	1013.330	0.940	1.968	2.000	332	247	69	310	53	11.0
D-4	168.8	10:55:45	1020.070	0.960	2.009	1.600	333	301	71	297	60	10.0
Last Pt	180.0	11:07:00										
Final Value	180.0	11:07:00	1020.070						**Maximum Vacuum**			11.0
Average Values				0.89		1.84	332	309	63	308	56	
								186				

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/23/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	TC	**Run #**	3
# Traverse Points	16	**Test Method**	5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	65	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.94	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	2.25	

Sampling Equipment			
Meter #	CEMS5MB		
Meterbox Cal. Factor	(Y)	1.012	
Nozzle #	G250-15		
Actual Nozzle Diameter	(D_{na})	0.2570	in
Req. Nozzle Diameter	(D_{ni})	0.2525	in
Probe # / Length	P6-02	7.00	ft
Liner Material	Glass		
Thermocouple ID #	TC6-02		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.82	in Hg
Absolute Meter Pressure	(P_m)	30.00	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	15	in Hg
Leak Check Total Volume (ft3):				0.495	ft^3
Post	0.001	ft^3/min	@	17	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	12:45:00	28.180	1.00	2.25	2.30	332	314	68	297	64	10.0
A-2	11.3	12:56:15	36.970	1.00	2.25	2.30	332	332	69	301	52	10.0
A-3	22.5	13:07:30	45.360	1.00	2.25	2.30	332	332	70	302	52	10.0
A-4	33.8	13:18:45	53.950	0.94	2.12	2.10	332	339	71	302	54	10.0
B-1	45.0	13:40:00	62.817	0.87	1.96	2.00	332	318	71	300	61	10.0
B-2	56.3	13:51:15	71.540	1.00	2.25	2.30	332	300	71	324	60	10.0
B-3	67.5	14:02:30	79.210	0.94	2.12	2.10	332	300	72	317	60	10.0
B-4	78.8	14:13:45	88.520	0.94	2.12	2.10	332	302	72	313	61	10.0
C-1	90.0	14:40:00	97.375	1.00	2.25	2.30	333	334	71	299	62	10.0
C-2	101.3	14:51:15	106.020	1.00	2.25	2.30	332	324	73	316	54	10.0
C-3	112.5	15:02:30	114.970	1.00	2.25	2.30	333	296	71	311	55	10.0
C-4	123.8	15:13:45	122.250	0.94	2.12	2.10	332	301	71	300	56	10.0
D-1	135.0	15:30:00	131.753	0.86	1.94	1.90	333	324	69	297	55	9.0
D-2	146.3	15:41:15	138.740	0.86	1.94	1.90	333	339	70	312	55	9.0
D-3	157.5	15:52:30	146.400	0.88	1.98	2.00	332	338	70	322	58	10.0
D-4	168.8	16:03:45	154.640	0.86	1.94	1.90	332	337	70	319	60	10.0
Last Pt	180.0	16:15:00	164.056									
Final Value	180.0	16:15:00	164.056						**Maximum Vacuum**			10.0
Average Values				0.94		2.14	332	321	71	308	57	
								196				

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	Circle	Date	3/22/17
Sampling Location	STACK	Project #	1154
Operators	TJC	Run #	1
Test Method	5	Sampling Type	Isokinetic ☑ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	75	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.944	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	2.28	
Pressures			
Barometric Pressure	(P_b)	29.93	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre Ⓨ / N	Post	Ⓨ / N
Orsat Leak	Pre Ⓨ / N	Post	Ⓨ / N
Nozzle in direction of flow?	☑		

Sampling Equipment			
Meter #	Cams 5mB		
Meterbox Cal. Factor	(Y)	1.012	
Filter / Nozzle #	6750-15 / 1MQ-323		
Actual Nozzle Diameter	(D_{na})	0.257	in
Req. Nozzle Diameter	(D_{ni})	0.249	in
Probe #	P6-02		
Liner Material	Glass		
Pitot #	A2421		
Thermocouple #	TC 6-02		

ΔV_m	Vacuum Leak Check				
Pre	.00	ft^3/min	@	12	in Hg
Post	.00	ft^3/min	@	16	in Hg
Pitot	Leak Checks				
Pre	.00	inches	@	48	in H_2O
Post	.00	inches	@	49	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0	1235	763.739	1.0	2.28	2.3	330	299	82	323	63	8
2	11.3	1246	791.64	.95	2.16	2.2	336	301	82	331	67	11
3	22.5	1258	780.15	.90	2.05	2.1	333	309	82	324	66	11
4	33.8	1309	788.45	.84	1.92	1.9	327	311	84	318	66	10.5
		1320	796.913									
1	45	1412	797.174	.84	1.92	1.9	331	296	83	336	63	11
2	56.3	1423	805.93	.84	1.92	1.9	334	298	85	341	66	11
3	67.5	1432	815.47	.75	1.459	1.5	335	312	88	341	67	10
4	78.8	1433	822.82	.70	1.596	1.6	335	318	84	340	65	9
			830.984									
1	90	1515	831.182	.90	2.05	2.1	335	318	90	297	66	10
2	101.3	1526	839.64	.84	1.92	1.9	265	320	91	342	64	10
3	112.5	1537	846.92	.93	2.1204	2.1	336	321	91	340	65	10
4	123.8	1549	855.17	.66	1.5048	1.5	335	314	93	341	66	10.9
			864.037									
1	135	1611	864.239	1.0	2.28	2.3	335	316	91	337	66	12
2	146.3	1626	872.76	1.0	2.28	2.3	336	322	91	340	65	12
3	157.3	1637	881.87	1.0	2.28	2.3	336	321	97	334	66	12
4	168.8	1648	890.72	1.0	2.28	2.3	336	323	97	330	67	12
		1700	898.882									

Operator Signature	

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GMC	Date	3/23/17
Sampling Location	STACK	Project #	11542
Operators	TJC	Run #	2
Test Method	5	Sampling Type	Isokinetic ☑ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	60	°F
DH @ 0.75 SCFM	(ΔH@)	1.944	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3.0	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	2.009	
Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	Ⓨ / N	Post Ⓨ / N
Orsat Leak	Pre	Ⓨ / N	Post Ⓨ / N
Nozzle in direction of flow?	☑		

Sampling Equipment			
Meter #	Cems SMR		
Meterbox Cal. Factor	(Y)	1.012	
Filter / Nozzle #	G250-11	MQ-281	
Actual Nozzle Diameter	(D_{na})	.253	in
Req. Nozzle Diameter	(D_{nl})	0.254	in
Probe #	P6-2		
Liner Material	Glass		
Pitot #	A3424		
Thermocouple #	TC 6-2		

ΔV_m	Vacuum Leak Check				
Pre	.00	ft^3/min	@	12	in Hg
Post	.001	ft^3/min	@	17	in Hg
Pitot	Leak Checks				
Pre	.00	inches	@	5.1	in H_2O
Post	.00	inches	@	4.5	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0	723	899.850	1.0	2.09	2.1	329	329	316	316	52	7
2	11.3	734	909.04	.84	1.76	1.8	331	329	59	331	54	11
3	22.5	735	916.77	.80	1.67	1.7	331	314	60	325	61	10
4	33.8	747	924.44	.73	1.53	1.5	330	314	61	317	63	9
	45		932.142									
1	45	822	932.384	.94	1.96	2.0	332	322	60	273	57	10
2	56.3	831	940.36	1.0	2.09	2.1	333	320	61	308	58	11
3	67.3	842	947.42	.84	1.76	1.8	332	323	62	307	64	11
4	78.8	855	955.64	.96	2.00	2.0	332	320	62	299	54	10
	90		963.904									
1	90	927	964.149	.84	1.76	1.8	332	303	64	302	49	10
2	101.5	938	972.67	.92	1.96	2.0	332	321	65	316	47	11
3	112.5	949	980.45	.84	1.76	1.8	333	320	66	319	52	11
4	123.5	1001	988.02	.73	1.53	1.5	331	303	68	311	52	10
	135		996.029									
1	135	1027	996.261	.92	1.92	1.9	332	297	69	303	60	11
2	144.5	1033	1003.34	.92	1.92	1.9	332	296	63	301	55	11
3	159.3	1044	1013.33	.94	1.96	2.0	332	297	54	310	59	11
4	166.8	1053	1020.07	.96	1.92	1.9	331	301	71	297	60	10
	180	1027.793										

Operator Signature

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	Coop	Date	3/23/17
Sampling Location	STACK	Project #	11546
Operators	TJC	Run #	3
Test Method	5	Sampling Type	Isokinetic ☑ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	65	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.944	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3.0	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	2.25	
Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre (Y) / N	Post	(Y) / N
Orsat Leak	Pre (Y) / N	Post	(Y) / N
Nozzle in direction of flow?	☑		

Sampling Equipment			
Meter #	Cems 5MB		
Meterbox Cal. Factor	(Y)	1.012	
Filter / Nozzle #	6250-13		
Actual Nozzle Diameter	(D_{na})	.257	in
Req. Nozzle Diameter	(D_{ni})	0.253	in
Probe #	P6-2		
Liner Material	Glass		
Pitot #	A3424		
Thermocouple #	TC6-2		

ΔV_m	Vacuum Leak Check				
Pre	.020	ft^3/min	@	15	in Hg
Post	.001	ft^3/min	@	17	in Hg
Pitot	**Leak Checks**				
Pre	.02	inches	@	5.1	in H_2O
Post	.00	inches	@	+.3	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0	1245	28.180	1.0	2.25	2.3	332	314	68	297	64	10
2	11.3	1256	36.97	1.0	2.25	2.3	332	332	69	301	52	10
3	22.5	1308	45.36	1.0	2.25	2.3	337	335	70	302	52	10
4	33.8	1319	53.95	.94	2.12	2.1	332	339	71	302	54	10
	45		62.691									
1	45	1340	62.817	.87	1.96	2.0	332	318	71	300	61	10
2	56.3	1352	71.54	1.0	2.25	2.3	332	300	71	324	56	10
3	67.3	1403	79.21	.94	2.12	2.1	332	300	72	317	60	10
4	78.8	1414	88.52	.94	2.12	2.1	332	302	72	313	61	10
	90		97.214									
1	90	1426	97.375	1.0	2.25	2.3	333	334	71	299	62	
2	101.5	1438	106.07	1.0	2.25	2.3	332	324	73	316	54	10
3	112.5	1459	114.97	1.0	2.25	2.3	333	296	77	311	55	10
4	123.5	1510	122.25	.94	2.12	2.1	332	301	71	302	58	10
	135		131.545									
1	135	1520	131.753	.86	1.935	1.9	333	294	69	297	53	9
2	144.5	1542	138.74	.88	1.935	1.9	333	339	70	313	55	9
3	154.3	1553	146.46	.88	1.98	2.0	332	338	70	322	58	10
4	166.8	1603	154.64	.88	1.94	1.9	332	337	70	319	60	10
	180	1614.056 →										
		1615										

Operator Signature

Spreadsheet for U.S. EPA Method 201A - Determination of PM10 and PM2.5 Emissions

TEST DATA SHEET

Location:	GREC Gainesville unit 1	**Start Time:**	8:20:00	**RUN No.**	1
Date:	23-Mar-2017	**End Time:**	11:44:00	**JOB No.**	11542

STACK DATA			EQUIPMENT			ESTIMATES			+/- 50°F ΔH			
% Moisture:	22	% est.	METER BOX:	CEMS7MB		Ts (°F):	333	Tm (°F): 80	Ts-50°	283	Ts+50°	383
Barometric:	29.86	in Hg	Y:	0.965		Est. Qs:	0.5735	acfm	Est. Qs:	0.5980	Est. Qs:	0.6207
Static Press:	-0.54	in H_2O	ΔH@:	1.920	in H_2O	Est. μ_s:	218.31	mpoise	Est. μ_s:	205.26	Est. μ_s:	228.14
Stack Press:	29.82	in Hg	Cp':	0.840	S/N PT-04	Est. ΔH:	0.329	("H_2O)	Est. ΔH:	0.375	Est. ΔH:	0.291
$\%CO_2$:	17.30	%	Cp:	0.840	S/N PT-04	LEAK CHECKS						
$\%O_2$:	3.30	%	Nozzle Dia:	0.1580	inches	DGM initial	0		0	cf		
$\%N_2/CO$:	79.40	%	Stack Area:	112.3	ft^2	DGM final	0		0	cf		
M_d:	30.90	lb/lb-mole	# of Points:	12	points	Time	1		1	min.		
Est. ΔP:	1	lb/lb-mole	Run Time:	120.00	min	Leak Rate	0.0000		0.0000	cfm		
T_{std}:	528	°R	P_{std}:	29.92	in Hg	Vacuum	10		10	in. Hg		

Sample Point	Clock Time (min)	Dry Gas Meter Reading (ft^3)	Pitot ΔP ("H_2O)	Gas Temperatures (°F) DGM Inlet	DGM Outlet	Stack	Orifice Press. ΔH (in H_20) Ideal	Actual	Pump Vac. (in Hg)	Gas Temps (°F) Probe	Filter	Imp. Exit	Qs (acfm)	D_{50} [10 µm]	D_{50} [2.5 µm]
1	10.00	740.1880	1.000	60.0	60.0	336	0.314	0.330	2	252	n/a	58	0.6020	10.12	2.35
2	21.00	743.3600	1.200	61.0	61.0	338	0.313	0.330	2	243	n/a	58	0.5904	10.28	2.41
3	31.50	746.7800	1.100	62.0	62.0	310	0.337	0.330	2	248	n/a	59	0.5873	10.03	2.29
4	41.50	750.1520	1.000	63.0	63.0	338	0.314	0.330	2	246	n/a	60	0.7298	**8.85**	**1.86**
5	53.75	754.0100	1.500	64.0	64.0	338	0.315	0.330	2	220	n/a	61	0.6027	10.13	2.35
6	65.50	757.9200	1.400	65.0	65.0	336	0.317	0.330	2	246	n/a	63	0.5897	10.27	2.41
7	74.25	761.6060	0.780	68.0	68.0	338	0.317	0.330	2	254	n/a	57	0.5962	10.21	2.39
8	83.25	764.3900	0.810	67.0	67.0	337	0.318	0.330	2	251	n/a	56	0.5771	10.44	2.48
9	92.50	767.1600	0.840	68.0	68.0	319	0.333	0.330	2	251	n/a	57	0.5652	10.40	2.45
10	101.75	770.0180	0.860	69.0	69.0	338	0.318	0.330	2	230	n/a	63	0.5807	10.40	2.46
11	111.50	772.8900	0.960	69.0	69.0	339	0.317	0.330	2	244	n/a	63	0.5800	10.42	2.47
12	121.25	775.9100	0.940	70.0	70.0	318	0.335	0.330	2	231	n/a	65	0.5701	10.33	2.42
13	-	778.9640		-			-						-	-	-
14	-			-			-						-	-	-
15	-			-			-						-	-	-
16	-			-			-						-	-	-
17	-			-			-						-	-	-
18	-			-			-						-	-	-
19	-			-			-						-	-	-
20	-			-			-						-	-	-
21	-			-			-						-	-	-
22	-			-			-						-	-	-
23	-			-			-						-	-	-
24	-			-			-						-	-	-

Actual Run Time	V_m	ΔP (avg)	$T_{m\ (avg)}$	$T_{s\ (avg)}$	Max Vac.	ΔH (avg)	$V_{s\ (avg)}$
121.25 min	38.776 cf	1.033 in H_2O	525.2 °R / 65.5 °F	791.8 °R / 332.1 °F	2	0.330 in H_2O	70.600 fps

Test Personnel (signature/date)

Project Leader (signature/date)

Spreadsheet for U.S. EPA Method 201A - Determination of PM10 and PM2.5 Emissions

TEST DATA SHEET

Location:	GREC Gainesville unit 1	**Start Time:**	12:46:00	**RUN No.**	2
Date:	23-Mar-2017	**End Time:**	15:30:00	**JOB No.**	11542

STACK DATA			EQUIPMENT			ESTIMATES			+/- 50°F ΔH			
% Moisture:	22	% est.	METER BOX:	CEMS7MB		Ts (°F):	333	Tm (°F): 73	Ts-50°	283	Ts+50°	383
Barometric:	29.86	in Hg	Y:	0.965		Est. Qs:	0.5735	acfm	Est. Qs:	0.5980	Est. Qs:	0.6207
Static Press:	-0.54	in H_2O	ΔH@:	1.920	in H_2O	Est. μ_s:	218.31	mpoise	Est. μ_s:	205.26	Est. μ_s:	228.14
Stack Press:	29.82	in Hg	Cp':	0.840	S/N PT-04	Est. ΔH:	0.325	("H_2O)	Est. ΔH:	0.370	Est. ΔH:	0.287
%CO_2:	17.30	%	Cp:	0.840	S/N PT-04	LEAK CHECKS						
%O_2:	3.30	%	Nozzle Dia:	0.1580	inches	DGM initial	0		0	cf		
%N_2/CO:	79.40	%	Stack Area:	112.3	ft^2	DGM final	0		0	cf		
M_d:	30.90	lb/lb-mole	# of Points:	12	points	Time	1		1	min.		
Est. ΔP:	1.1		Run Time:	120.00	min	Leak Rate	0.0000		0.0000	cfm		
T_{std}:	528	°R	P_{std}:	29.92	in Hg	Vacuum	10		10	in. Hg		

Sample Point	Clock Time (min)	Dry Gas Meter Reading (ft^3)	Pitot ΔP ("H_2O)	Gas Temperatures (°F) DGM Inlet	DGM Outlet	Stack	Orifice Press. ΔH (in H_20) Ideal	Actual	Pump Vac. (in Hg)	Gas Temps (°F) Probe	Filter	Imp. Exit	Qs (acfm)	D_{50} [10 µm]	D_{50} [2.5 µm]
1	8.50	782.4060	0.810	69.0	69.0	340	0.316	0.330	2	246	n/a	57	0.5766	10.48	2.50
2	17.50	785.0200	0.890	69.0	69.0	339	0.317	0.330	2	249	n/a	55	0.5868	10.34	2.44
3	26.25	787.8400	0.820	69.0	69.0	339	0.317	0.330	2	248	n/a	56	0.5997	10.18	2.37
4	34.50	790.6420	0.770	70.0	70.0	337	0.319	0.330	2	237	n/a	60	0.5668	10.57	2.53
5	43.50	793.1500	0.870	70.0	70.0	338	0.319	0.330	2	251	n/a	57	0.5787	10.43	2.47
6	53.50	795.9400	1.100	70.0	70.0	337	0.319	0.330	2	248	n/a	60	0.5880	10.30	2.42
7	62.75	799.0940	0.940	70.0	70.0	338	0.319	0.330	2	245	n/a	62	0.6006	10.16	2.36
8	72.75	802.0700	1.100	70.0	70.0	338	0.319	0.330	2	256	n/a	59	0.5824	10.38	2.46
9	83.25	805.1900	1.200	70.0	70.0	338	0.319	0.330	2	258	n/a	61	0.5901	10.28	2.42
10	92.00	808.5090	0.840	71.0	71.0	336	0.321	0.330	2	230	n/a	62	0.5865	10.31	2.42
11	101.25	811.2700	0.960	70.0	70.0	340	0.317	0.330	2	246	n/a	63	0.5908	10.30	2.42
12	110.50	814.1900	0.940	70.0	70.0	340	0.317	0.330	2	246	n/a	64	0.5881	10.33	2.44
13	-	817.0970		-			-				n/a		-	-	-
14	-			-			-						-	-	-
15	-			-			-						-	-	-
16	-			-			-						-	-	-
17	-			-			-						-	-	-
18	-			-			-						-	-	-
19	-			-			-						-	-	-
20	-			-			-						-	-	-
21	-			-			-						-	-	-
22	-			-			-						-	-	-
23	-			-			-						-	-	-
24	-			-			-						-	-	-

Actual Run Time	V_m	ΔP (avg)	$T_{m\ (avg)}$	$T_{s\ (avg)}$	Max Vac.	ΔH (avg)	$V_{s\ (avg)}$
110.50 min	34.691 cf	0.937 in H_2O	69.8 °F	338.3 °F	2	0.330 in H_2O	67.717 fps

Test Personnel (signature/date)

Project Leader (signature/date)

Spreadsheet for U.S. EPA Method 201A - Determination of PM10 and PM2.5 Emissions

TEST DATA SHEET

Location:	GREC Gainesville unit 1	**Start Time:**	16:25:00	**RUN No.**	3
Date:	23-Mar-2017	**End Time:**	18:47:00	**JOB No.**	11542

STACK DATA			EQUIPMENT			ESTIMATES			+/- 50°F ΔH			
% Moisture:	22	% est.	METER BOX:	CEMS7MB		Ts (°F):	338	Tm (°F): 67	Ts-50°	288	Ts+50°	388
Barometric:	29.86	in Hg	Y:	0.965		Est. Qs:	0.5780	acfm	Est. Qs:	0.6023	Est. Qs:	0.6250
Static Press:	-0.54	in H_2O	ΔH@:	1.920	in H_2O	Est. μ_s:	219.45	mpoise	Est. μ_s:	206.42	Est. μ_s:	229.26
Stack Press:	29.82	in Hg	Cp':	0.840	S/N PT-04	Est. ΔH:	0.322	("H_2O)	Est. ΔH:	0.366	Est. ΔH:	0.285
$\%CO_2$:	17.30	%	Cp:	0.840	S/N PT-04	LEAK CHECKS						
$\%O_2$:	3.30	%	Nozzle Dia:	0.1580	inches	DGM initial	0		0	cf		
$\%N_2/CO$:	79.40	%	Stack Area:	112.3	ft^2	DGM final	0		0	cf		
M_d:	30.90	lb/lb-mole	# of Points:	12	points	Time	1		1	min.		
Est. ΔP	1.1	in H20	Run Time:	120.00	min	Leak Rate	0.0000		0.0000	cfm		
T_{std}:	528	°R	P_{std}:	29.92	in Hg	Vacuum	10		10	in. Hg		

Sample Point	Clock Time (min)	Dry Gas Meter Reading (ft^3)	Pitot ΔP ("H_2O)	Gas Temperatures (°F) DGM Inlet	DGM Outlet	Stack	Orifice Press. ΔH (in H_20) Ideal	Actual	Pump Vac. (in Hg)	Gas Temps (°F) Probe	Filter	Imp. Exit	Qs (acfm)	D_{50} [10 µm]	D_{50} [2.5 µm]
1	8.75	817.3980	0.840	69.0	69.0	341	0.321	0.330	2	229	n/a	60	0.5926	10.28	2.42
2	18.00	820.1600	0.940	69.0	69.0	340	0.321	0.330	2	247	n/a	53	0.5899	10.31	2.43
3	26.75	823.0700	0.860	69.0	69.0	339	0.322	0.330	2	246	n/a	55	0.5851	10.36	2.45
4	36.00	825.8040	0.940	69.0	69.0	338	0.323	0.330	2	250	n/a	60	0.5916	10.27	2.41
5	46.00	828.7300	1.100	69.0	69.0	338	0.323	0.330	2	252	n/a	57	0.5948	10.23	2.39
6	56.00	831.9100	1.100	69.0	69.0	337	0.324	0.330	2	254	n/a	57	0.5841	10.35	2.44
7	66.00	835.0370	1.100	68.0	68.0	340	0.321	0.330	2	251	n/a	57	0.5961	10.23	2.40
8	75.00	838.2100	0.910	68.0	68.0	339	0.322	0.330	2	249	n/a	57	0.5629	10.65	2.57
9	84.00	840.9100	0.910	68.0	68.0	339	0.322	0.330	2	252	n/a	58	0.6023	10.15	2.36
10	92.00	843.7990	0.710	68.0	68.0	334	0.326	0.330	2	250	n/a	58	0.5829	10.33	2.43
11	101.00	846.3000	0.880	68.0	68.0	336	0.324	0.330	2	248	n/a	58	0.5857	10.32	2.43
12	109.50	849.1200	0.810	68.0	68.0	337	0.323	0.330	2	250	n/a	58	0.5865	10.32	2.43
13	-	851.7840		-			-						-	-	-
14	-			-			-						-	-	-
15	-			-			-						-	-	-
16	-			-			-						-	-	-
17	-			-			-						-	-	-
18	-			-			-						-	-	-
19	-			-			-						-	-	-
20	-			-			-						-	-	-
21	-			-			-						-	-	-
22	-			-			-						-	-	-
23	-			-			-						-	-	-
24	-			-			-						-	-	-

Actual Run Time	V_m	ΔP (avg)	$T_{m\ (avg)}$	$T_{s\ (avg)}$	Max Vac.	ΔH (avg)	$V_{s\ (avg)}$
109.50 min	34.386 cf	0.925 in H_2O	68.5 °F	338.2 °F	2	0.330 in H_2O	67.302 fps

Test Personnel (signature/date)

Project Leader (signature/date)

C.E.M. SOLUTIONS, INC.
METHOD 201A SAMPLE DATA SHEET

Plant Name	GREC	Date	03/23/17
Sampling Location	stack	Project #	11542
Test Method	201A	Run #	1
# of Points Across	4	# of Ports Used	4
Operators	MS	Technician Signature	

Estimate Data			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	65	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.920	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	29.06	%
Oxygen	(O_2)	3.3	%
Carbon Dioxide	(CO_2)	17.3	%
Carbon Monoxide	(CO)	0.0	%

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O

Sampling Equipment			
Meter #	CEMS7MB		
Meterbox Cal. Factor	(Y)	.965	
Nozzle #	1-3	947-99	
Actual Nozzle Diameter	(D_{na})	.158	in
Req. Nozzle Diameter	(D_{ni})	.158	in
Probe # / Length	05	5 ft	ft
Liner Material	GLASS		

REMOVE FILTER HEAD BEFORE POST LEAK CHECK

ΔV_m Leak Checks					
Pre	0.000	ft^3/min	@	10	in Hg
Post	0.005	ft^3/min	@	10	in Hg
Pitot Leak Checks					
Pre	0.0	ft^3/min	@	9.1	in Hg
Post	0.0	ft^3/min	@	9.2	in Hg

Traverse Point #	Dwell Time (Θ)	Elapsed Time	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Impinger Exit Temp <68 °F	Pump Vacuum
	min	~~hh:mm:ss~~ min CH	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	in Hg
A 1	10	0	0820	740.188	1.0	.324	.330	336	252	60	58	2
2	11	10	0830	743.36	1.2	.313	.33	338	243	61	58	2
3	10.5	21	0841	746.78	1.1	.337	.33	340	248	62	59	2
B 1	10	31.5	0902	750.152	1.0	.315	.33	338	246	63	60	2
2	12.25	41.5	~~0914~~ 0912	754.01	1.5	.315	.33	338	220	64	61	2
3	11.75	53.75	~~0926~~ 0924	757.92	1.4	.317	.33	336	246	65	63	2
C 1	8.75	65.50	0943	760.606	.78	.318	.33	338	254	68	57	2
2	9.0	74.25	0952	763.39	.81	.318	.33	338	251	67	56	2
3	9.25	83.25	1001	767.16	.94	.333	.33	319	226	68	57	2
D 1	9.25	92.50	1115	770.018	.86	.318	.33	338	230	69	63	2
2	8.75	101.75	1124	772.89	.96	.317	.33	339	239	69	63	2
3	9.75	111.50	1134	775.91	.94	.335	.33	318	231	70	65	2
Last		121.25	~~1144~~ 1144	778.964								

Paused 0959 resumed 1003

Paused 1030 resumed 1115

C.E.M. SOLUTIONS,INC.
METHOD 201A SAMPLE DATA SHEET

Plant Name	6REC	Date	03/23/17
Sampling Location	Stack	Project #	11542
Test Method	201A	Run #	2
# of Points Across	3	# of Ports Used	4
Operators	NM	Technician Signature	

Estimate Data			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	333	°F
Avg Gas Meter Temp	(t_m)	73	°F
DH @ 0.75 SCFM	(ΔH@)	1.920	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3.7	%
Carbon Dioxide	(CO_2)	17.3	%
Carbon Monoxide	(CO)	0.0	%

Sampling Equipment			
Meter #	CEM57MB		
Meterbox Cal. Factor	(Y)	.965	
Nozzle #	2-3		
Actual Nozzle Diameter	(D_{na})	.158	in
Req. Nozzle Diameter	(D_{ni})	0.158	in
Probe # / Length	P5	5 ft	ft
Liner Material	C1955		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O

REMOVE FILTER HEAD BEFORE POST LEAK CHECK

ΔV_m		Leak Checks			
Pre	0.000	ft^3/min	@	10	in Hg
Post	0.000	ft^3/min	@	13	in Hg
Pitot		**Leak Checks**			
Pre	0.000	ft^3/min	@	4.1	in Hg
Post	0.0	ft^3/min	@	3.1	in Hg

Traverse Point #	Dwell Time (Θ)	Elapsed Time	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	in Hg
A 1	8.5	8.5	1246	782.406	.81	.316	.33	340	246	69	57	2
2	9	17.5	1255	785.02	.89	.317	.33	339	249	69	55	2
3	8.75	26.25	1304	787.84	.82	.317	.33	339	248	69	56	2
B 1	8.25	34.50	1312	790.692	.77	.319	.33	337	248	69	60	2
2	9	43.50	1330	793.15	.87	.319	.33	338	251	70	57	2
3	10	53.50	1339	795.94	1.1	.319	.33	337	248	70	60	2
C 1	9.25	62.75	1400	799.094	.94	.319	.33	338	245	70	62	2
2	10.0	72.75	1410	802.07	1.1	.319	.33	338	256	70	59	2
3	10.5	83.25	1420	805.19	1.2	.319	.33	338	258	70	61	2
D 1	8.75	92.00	1503	808.509	.84	.321	.33	336	232	71	62	2
2	9.25	101.25	1512	811.27	.96	.317	.33	340	246	70	63	2
3	9.25	110.50	1521	814.19	.94	.317	.33	340	246	70	64	2
Last			1530	817.097								

C.E.M. SOLUTIONS,INC.

METHOD 201A SAMPLE DATA SHEET

Plant Name	GREC	Date	3/23/17
Sampling Location	Stack	Project #	11542
Test Method	201A	Run #	3
# of Points Across	3	# of Ports Used	4
Operators	MM	Technician Signature	

Estimate Data			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	338	°F
Avg Gas Meter Temp	(t_m)	67	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.920	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	.94	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	7.3	%
Carbon Dioxide	(CO_2)	3.3	%
Carbon Monoxide	(CO)	0.0	%

Sampling Equipment			
Meter #	CEMS7M13		
Meterbox Cal. Factor	(Y)	.965	
Nozzle #	1-3		
Actual Nozzle Diameter	(D_{na})	.158	in
Req. Nozzle Diameter	(D_{ni})	0.158	in
Probe # / Length	P5/5		ft
Liner Material	6055		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O

REMOVE FILTER HEAD BEFORE POST LEAK CHECK

ΔV_m	Leak Checks				
Pre	0.000	ft^3/min	@	10	in Hg
Post	0.000	ft^3/min	@	5	in Hg
Pitot	**Leak Checks**				
Pre	0.0	ft^3/min	@	3.7	in Hg
Post	0.0	ft^3/min	@	3.4	in Hg

Traverse Point #	Dwell Time (Θ)	Elapsed Time	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	in Hg
A 1	8.75	8.75	1625	817.38	.84	.321	.33	341	229	69	60	2
2	9.25	18.00	1634	820.16	.94	.321	.33	340	247	69	53	2
3	8.75	26.75	1643	823.07	.86	.322	.33	339	246	69	55	2
B 1	9.25	36.00	1655	825.804	.94	.323	.33	338	250	69	60	2
2	10.00	46.00	1705	828.73	1.1	.323	.33	338	252	69	57	2
3	10.00	56.00	1715	831.91	1.1	.324	.33	337	254	69	57	2
C 1	10.00	66.00	1746	835.037	.1	.321	.33	340	251	68	57	2
2	9.00	75.00	1756	838.11	.91	.322	.33	339	249	68	57	2
3	9.0	84.00	1755	840.91	.91	.322	.33	339	252	68	58	2
D 1	8.0	92.00	1821	843.799	.71	.326	.33	334	248	68	58	2
2	9.0	101.00	1829	846.30	.88	.324	.33	336	248	68	58	2
3	8.5	109.50	1838	849.12	.81	.323	.33	337	250	68	58	2
Last			1847	851.784								

Method 4 Field Data Sheets

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	GREC	**Date**	03/22/17
Sampling Location	Boiler stack	**Project #**	11542
Operator	TC	**# of Ports Used**	4
Stack Type	Circular	**Meter Box Number**	CEMS5MB
Train Leak Check	☐ **PreTest**	☐ **PostTest**	

Moisture Content Data								
Run Number	1		**Run Start Time**	12:35		**Run Stop Time**	16:56	
Total Meter Volume	(V_m)	135.143	dcf	**Barometric Press.**		(P_b)	29.93	in Hg
Avg Meter Temp	$(t_m)_{avg}$	88	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	334	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	2.01	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		DI	DI		Sil Gel			
Initial Value	$(V_i),(W_i)$	781.5	765.6	626.1	893.3			
Final Value	$(V_f),(W_f)$	948.0	911.3	963.7	961.0			
Net Value	$(V_n),(W_n)$	166.5	145.7	337.6	67.7			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	717.50	g	**Water Vol Weighed**		$(V_{wsg(std)})$	33.830	scf
Std Meter Volume	$(V_{m(std)})$	131.776	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	$(B_{ws(calc)})$	20.4	%	**Final Moisture Content**		(B_{ws})	20.4	%

Moisture Content Data								
Run Number	2		**Run Start Time**	7:23		**Run Stop Time**	11:07	
Total Meter Volume	(V_m)	120.211	dcf	**Barometric Press.**		(P_b)	29.86	in Hg
Avg Meter Temp	$(t_m)_{avg}$	63	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	332	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.84	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents			DI	DI		Sil Gel		
Initial Value	$(V_i),(W_i)$	752.4	726.6	615.5	594.9	907.9		
Final Value	$(V_f),(W_f)$	966.8	931.8	929.4	599.3	947.6		
Net Value	$(V_n),(W_n)$	214.4	205.2	313.9	4.4	39.7		
Results								
Total Volume	(V_t)	39.70	ml	**Water Vol Condensed**		$(V_{wc(std)})$	1.869	scf
Total Weight	(W_t)	737.90	g	**Water Vol Weighed**		$(V_{wsg(std)})$	34.792	scf
Std Meter Volume	$(V_{m(std)})$	122.376	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	23.1	%	**Final Moisture Content**		(B_{ws})	23.1	%

Moisture Content Data								
Run Number	3		**Run Start Time**	12:45		**Run Stop Time**	16:15	
Total Meter Volume	(V_m)	135.876	dcf	**Barometric Press.**		(P_b)	29.86	in Hg
Avg Meter Temp	$(t_m)_{avg}$	71	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	332	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	2.14	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents			DI	DI		Sil Gel		
Initial Value	$(V_i),(W_i)$	565.5	723.7	678.9	615.0	945.1		
Final Value	$(V_f),(W_f)$	1086.0	963.6	746.2	720.1	992.6		
Net Value	$(V_n),(W_n)$	520.5	239.9	67.3	105.1	47.5		
Results								
Total Volume	(V_t)	47.50	ml	**Water Vol Condensed**		$(V_{wc(std)})$	2.236	scf
Total Weight	(W_t)	932.80	g	**Water Vol Weighed**		$(V_{wsg(std)})$	43.982	scf
Std Meter Volume	$(V_{m(std)})$	136.787	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	25.3	%	**Final Moisture Content**		(B_{ws})	25.3	%

C.E.M. SOLUTIONS

IMPINGER TRAIN DATA SHEET

Plant Name	FREC	**Date**	3/22/12
Sampling Location	STACK	**Project #**	11542
Operators	TC	**Run #**	1
Test Method	5	**Impinger Bucket #**	14

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
					SG			
Contents		H_2O	H_2O	MT	~~893.3~~ AC			
Initial Value	(Vi),(Wi)	781.5	765.6	626.1	893.3			
Final Value	(Vf),(Wf)	948.0	911.3	~~926.~~ 963.7 AC	961.0			
Net Value	(Vn),(Wn)	166.5	145.7	337.6	67.7			

Train Prepared by:	A ZAGUNAS

Train Recovered by:	A Z AGUNAS

20.9% Bws

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	SREC	**Date**	3/23/17
Sampling Location	STACK	**Project #**	11542
Operators	MB, AL, TC	**Run #**	2
Test Method	5	**Impinger Bucket #**	1 4

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		H_2O	H_2O	MT	MT	SG		
Initial Value	(Vi),(Wi)	752.4	726.4	615.5	594.9	907.9		
Final Value	(Vf),(Wf)	966.8	931.8	929.4	599.3	947.6		
Net Value	(Vn),(Wn)	214.4	205.2	313.9	4.7	39.7		

Train Prepared by:	A LAGUNAS
Train Recovered by:	T. Cawiezell

23 Bags

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	Cree	**Date**	3/23/17
Sampling Location	STACK	**Project #**	11542
Operators	DC	**Run #**	3
Test Method	4, 5	**Impinger Bucket #**	14

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		40						
Contents		MT	DI	DI	MT	SG		
Initial Value	(Vi),(Wi)	565.5	723.7	678.9	615.0	945.1		
Final Value	(Vf),(Wf)	~~1088.0~~	963.6	746.2	720.1	992.6		
Net Value	(Vn),(Wn)	520.5	239.9	67.3	105.1	47.5		

Inlet: 1086.0

Train Prepared by:	
Train Recovered by:	

25.3 % B_{ws}

METHOD 3 - GAS ANALYSIS FOR THE DETERMINATION OF DRY MOLECULAR WEIGHT

Plant Name	GREC				**Date**	03/22/17	
Sampling Location	Boiler stack				**Project #**	11542	
Operator	TC				**# of Ports Used**	4	
Fuel Type	N/A		**Minimum Fuel Factor**			**Maximum Fuel Factor**	
Orsat Leak Check	☐	**PreTest**	☐	**PostTest**	**Orsat Identification**	-	

All Values must be DRY

Gas Analysis Data

Run Number	1			**Run Start Time**	12:35		**Run Stop Time**	16:56
Sample Analysis Time	**Carbon Dioxide Volume** (V_{CO2})	**Oxygen Volume** (V_{O2})	**Carbon Monoxide Volume** (V_{CO})	**Carbon Dioxide Conc.** (%CO_2)	**Oxygen Conc.** (%O_2)	**Carbon Monoxide Conc.** (%CO)	**Nitrogen Conc.** (%N_2)	**Dry Molecular Weight** (M_d)	**Molecular Weight Deviation** (ΔM_d)
hh:mm	ml	ml	ml	percent	percent	percent	percent	lb/lb-mole	lb/lb-mole
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
Results			**Averages**	17.3	3.3	0.0	79.4	30.90	
Average Calculated Fuel Factor			(F_o)$_{avg}$	1.017		**Molecular Wt Deviation < 0.3?**			☑
Average Excess Air			(%EA)$_{avg}$	18.7	percent	**Fuel Factor in Handbook Range?**			☑

All Values must be DRY

Gas Analysis Data

Run Number	2			**Run Start Time**	7:23		**Run Stop Time**	11:07
Sample Analysis Time	**Carbon Dioxide Volume** (V_{CO2})	**Oxygen Volume** (V_{O2})	**Carbon Monoxide Volume** (V_{CO})	**Carbon Dioxide Conc.** (%CO_2)	**Oxygen Conc.** (%O_2)	**Carbon Monoxide Conc.** (%CO)	**Nitrogen Conc.** (%N_2)	**Dry Molecular Weight** (M_d)	**Molecular Weight Deviation** (ΔM_d)
hh:mm	ml	ml	ml	percent	percent	percent	percent	lb/lb-mole	lb/lb-mole
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
Results			**Averages**	17.3	3.3	0.0	79.4	30.90	
Average Calculated Fuel Factor			(F_o)$_{avg}$	1.017		**Molecular Wt Deviation < 0.3?**			☐
Average Excess Air			(%EA)$_{avg}$	18.7	percent	**Fuel Factor in Handbook Range?**			☐

All Values must be DRY

Gas Analysis Data

Run Number	3			**Run Start Time**	12:45		**Run Stop Time**	16:15
Sample Analysis Time	**Carbon Dioxide Volume** (V_{CO2})	**Oxygen Volume** (V_{O2})	**Carbon Monoxide Volume** (V_{CO})	**Carbon Dioxide Conc.** (%CO_2)	**Oxygen Conc.** (%O_2)	**Carbon Monoxide Conc.** (%CO)	**Nitrogen Conc.** (%N_2)	**Dry Molecular Weight** (M_d)	**Molecular Weight Deviation** (ΔM_d)
hh:mm	ml	ml	ml	percent	percent	percent	percent	lb/lb-mole	lb/lb-mole
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
	17.3	20.6		17.3	3.3	0.0	79.4	30.90	0.00
Results			**Averages**	17.3	3.3	0.0	79.4	30.90	
Average Calculated Fuel Factor			(F_o)$_{avg}$	1.017		**Molecular Wt Deviation < 0.3?**			☐
Average Excess Air			(%EA)$_{avg}$	18.7	percent	**Fuel Factor in Handbook Range?**			☐

Fuel Factor Fo		
Fuel Type	**Minimum**	**Maximum**
Coal, Anthracite	1.016	1.130
Coal, Lignite	1.016	1.130
Coal, Bituminous	1.083	1.230
Oil, Distillate	1.260	1.413
Oil, Residual	1.210	1.370
Gas, Natural	1.600	1.836
Gas, Propane	1.434	1.586
Gas, Butane	1.405	1.553
Wood	1.000	1.120
Wood Bark	1.003	1.130

Formulas Used
$\%CO_2 = V_{CO2}$
$\%O_2 = V_{O2} - V_{CO2}$
$\%CO = V_{CO} - V_{O2}$
$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$
$M_d = .44(\%CO_2) + .32(\%O_2) + .28(\%N_2 + \%CO)$
$\Delta M_d = M_d - M_{davg}$
$F_o = (20.9 - \%O_2 - .5\%CO)/(\%CO_2 + \%CO)$
$\%EA=(\%O_2-.5\%CO)/(.264\%NO_2-(\%O_2-.5\%CO))$

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/23/17
Sampling Location	Stack	**Project #**	11542
Operators	MB	**Run #**	1
Test Method	201A	**Impinger Bucket #**	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		DI	DI	MT	SG			
Initial Value	(Vi),(Wi)	627.1	648.2	635.3	852.6			
Final Value	(Vf),(Wf)	807.4	696.0	634.0	864.7			
Net Value	(Vn),(Wn)	180.3	47.8	-1.3	12.1			

Train Prepared by:	C. Horton
Train Recovered by:	C. Horton

Imp: 226.8
SG: 12.1

23.0 % Bws

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/23/17
Sampling Location	Stack	**Project #**	11542
Operators	MJS	**Run #**	2
Test Method	201A	**Impinger Bucket #**	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		DI	DI	MT	SG			
Initial Value	(Vi),(Wi)	807.4	696.0	634.0	864.7			
Final Value	(Vf),(Wf)	983.8	746.0	633.2	878.7			
Net Value	(Vn),(Wn)	176.4	50.0	-0.8	14.0			

Train Prepared by:	C. Horton
Train Recovered by:	C. Horton / M. Brock

Imp 225.6

SG: 14.0

25.3 % B_{ws}

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	Date	3/23/17
Sampling Location	Stack	Project #	11542
Operators	MB	Run #	3
Test Method	201A	Impinger Bucket #	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		DI	DI	MT	SG			
Initial Value	(Vi),(Wi)	696.3	674.8	633.2	878.7			
Final Value	(Vf),(Wf)	884.2	676.2	634.6	888.3			
Net Value	(Vn),(Wn)	187.9	1.4	1.4	9.6			

BWS 22.2%

Train Prepared by: [signature]

Train Recovered by: [signature]

190.7

PM Analytical Results

PARTICULATE ANALYTICAL DATA SHEET

Plant Name	GREC	**Date**	03/22/17
Sampling Location	Boiler stack	**Project #**	11542
Operator	TC	**Acetone Lot Number**	-

Analytical Data

Placed in Desiccator					**Run Number**	1		
		Number	**Date**	**Time**	**Run Start Time**	12:35		
Filter		MQ-323	04/04/17	7:45	**Leakage Evident?**	☐		
Acetone Wash Beaker		45	04/04/17	14:00	**Estimated Volume**			
		Filter	**Acetone**	**Date**	**Time**	**Humidity**	**Temp**	**Cal Audit**
		g	g	mm/dd/yy	hh:mm	%RH	°F	g
Measurement 1	(m_{1f}),(m_{1a})	0.4074	5.2590	04/06/17	7:50	42	73	5.0000
Measurement 2	(m_{2f}),(m_{2a})	0.4075	5.2590	04/07/17	7:15	31	70	0.5000
Measurement 3	(m_{3f}),(m_{3a})							
Measurement 4	(m_{4f}),(m_{4a})							

Results					**Acetone Wash**			
Final Weight	(m_{ff}),(m_{fa}')	0.4075	5.2590	g	**Bottle Wt with Wash**	(m_{bw})	64.1152	g
Tare Weight	(m_{tf}),(m_{ta}')	0.4087	5.2542	g	**Additional Rinse Wt**	(m_{ar})	4.2792	g
Weight Gain	(m_f),(m_a')	-1.3	4.8	mg	**Bottle Tare Weight**	(m_{tb})	5.2542	g
Blank Adjustment	(W_a)		0.0	mg	**Net Wash Weight**	(m_{nw})	63.1402	g
Total Particulates	(m_n)		3.6	mg	**Blank Concentration**	(C_a)	0.0000	mg/g

Analytical Data

Placed in Desiccator					**Run Number**	2		
		Number	**Date**	**Time**	**Run Start Time**	7:23		
Filter		MQ-281	04/04/17	7:45	**Leakage Evident?**	☐		
Acetone Wash Beaker		52	04/04/17	14:00	**Estimated Volume**			
		Filter	**Acetone**	**Date**	**Time**	**Humidity**	**Temp**	**Cal Audit**
		g	g	mm/dd/yy	hh:mm	%RH	°F	g
Measurement 1	(m_{1f}),(m_{1a})	0.4099	4.9644	04/06/17	7:50	42	73	5.0000
Measurement 2	(m_{2f}),(m_{2a})	0.4102	4.9646	04/07/17	7:15	31	70	0.5000
Measurement 3	(m_{3f}),(m_{3a})							
Measurement 4	(m_{4f}),(m_{4a})							

Results					**Acetone Wash**			
Final Weight	(m_{ff}),(m_{fa}')	0.4101	4.9645	g	**Bottle Wt with Wash**	(m_{bw})	79.2514	g
Tare Weight	(m_{tf}),(m_{ta}')	0.4128	4.9597	g	**Additional Rinse Wt**	(m_{ar})	7.9136	g
Weight Gain	(m_f),(m_a')	-2.7	4.8	mg	**Bottle Tare Weight**	(m_{tb})	4.9597	g
Blank Adjustment	(W_a)		0.0	mg	**Net Wash Weight**	(m_{nw})	82.2053	g
Total Particulates	(m_n)		2.1	mg	**Blank Concentration**	(C_a)	0.0000	mg/g

Analytical Data

Placed in Desiccator					**Run Number**	3		
		Number	**Date**	**Time**	**Run Start Time**	12:45		
Filter		MQ-282	04/04/17	7:45	**Leakage Evident?**	☐		
Acetone Wash Beaker		53	04/04/17	14:00	**Estimated Volume**			
		Filter	**Acetone**	**Date**	**Time**	**Humidity**	**Temp**	**Cal Audit**
		g	g	mm/dd/yy	hh:mm	%RH	°F	g
Measurement 1	(m_{1f}),(m_{1a})	0.4132	5.3748	04/06/17	7:50	42	73	5.0000
Measurement 2	(m_{2f}),(m_{2a})	0.4133	5.3748	04/07/17	7:15	31	70	0.5000
Measurement 3	(m_{3f}),(m_{3a})							
Measurement 4	(m_{4f}),(m_{4a})							

Results					**Acetone Wash**			
Final Weight	(m_{ff}),(m_{fa}')	0.4133	5.3748	g	**Bottle Wt with Wash**	(m_{bw})	87.3747	g
Tare Weight	(m_{tf}),(m_{ta}')	0.4152	5.3685	g	**Additional Rinse Wt**	(m_{ar})	5.7167	g
Weight Gain	(m_f),(m_a')	-2.0	6.3	mg	**Bottle Tare Weight**	(m_{tb})	5.3685	g
Blank Adjustment	(W_a)		0.0	mg	**Net Wash Weight**	(m_{nw})	87.7229	g
Total Particulates	(m_n)		4.3	mg	**Blank Concentration**	(C_a)	0.0000	mg/g

Formulas Used

m_{ff} = average of last two filter measurements

m_{fa}' = average of last two acetone measurements

$m_f = m_{ff} - m_{tf}$

$m_a' = m_{fa}' - m_{ta}'$

$W_a = C_a m_{nw}$

$m_{nw} = m_{bw} + m_{ar} - m_{tb}$

$m_n = m_f + m_a' - W_a$

Appendix E-3: Sulfuric Acid Mist Test Data

Summaries
CTM-13 Field Data Sheets
Analytical Results

Method 8A RESULTS SUMMARY

	Units	Run 1	Run 2	Run 3	Average	Limit
Date	mm/dd/yy	3/24/2017	3/24/2017	3/24/2017		
Run Start Time	hh:mm	8:00	10:22	12:10		
Run Stop Time	hh:mm	9:00	11:22	13:20		
Meter Calibration Factor		1.012	1.012	1.012		
Meter Calibration Verification		1.057	1.041	1.009		
DH @ 0.75 SCFM		1.944	1.944	1.944		
Pitot Tube Coefficient		0.840	0.840	0.840		
Stack Test Data						
Initial Meter Volume	ft^3	169.290	188.177	209.046		
Final Meter Volume	ft^3	186.569	205.980	227.408		
Leak Check Volume	ft^3	0.000	0.000	0.000		
Total Meter Volume	ft^3	17.279	17.803	18.362	17.815	
Standard Meter Volume	dscf	17.948	17.959	18.531	18.146	
Total Sampling Time	min	60.0	60.0	60.0	60.0	
Average Meter Temperature	^oF	56.4	71.8	71.5	66.6	
Average Stack Temperature	^oF	330.0	330.0	330.0	330.0	
Barometric Pressure	in Hg	30.01	30.01	30.01	30.01	
Stack Static Pressure	in H_2O	-0.54	-0.54	-0.54	-0.54	
Absolute Stack Pressure	in Hg	29.97	29.97	29.97	29.97	
Average Orifice Pressure Drop	in H_2O	0.35	0.35	0.35	0.35	
Absolute Meter Pressure	in Hg	30.04	30.04	30.04	30.04	
Moisture Content Data						
Impinger Water Volume Gain	ml	0.0	0.0	0.0	0.0	
Impinger Water Weight Gain	g	98.1	94.3	105.6	99.3	
Standard Water Vapor Volume	scf	4.625	4.446	4.979	4.684	
Calculated Stack Moisture	%	20.5	19.8	21.2	20.5	
Saturated Stack Moisture	%	100.00	100.0	100.0	100.0	
Reported Stack Moisture Content	%	20.5	19.8	21.2	20.5	
Gas Analysis Data						
Carbon Dioxide Percentage	%	17.2	17.3	17.4	17.3	
Oxygen Percentage	%	3.4	3.4	3.4	3.4	
Carbon Monoxide Percentage	%	0.0	0.0	0.0	0.0	
Nitrogen Percentage	%	79.4	79.3	79.2	79.3	
Dry Gas Molecular Weight	lb/lb-mole	30.89	30.90	30.92	30.90	
Wet Stack Gas Molecular Weight	lb/lb-mole	28.25	28.34	28.18	28.26	
Calculated Fuel Factor		1.017	1.012	1.006	1.012	
Fuel F-Factor	dscf/mmBtu	9240	9240	9240	9240	
Percent Excess Air	%	19.4	19.4	19.4	19.4	
Volumetric Flow Rate Data						
Average Stack Gas Velocity	ft/sec	65.06	64.86	64.77	64.90	
Stack Cross-Sectional Area	ft^2	112.31	112.31	112.31		
Actual Stack Flow Rate	acfm	438424	437091	436501	437339	
Wet Standard Stack Flow Rate	wkscfh	17611	17557	17534	17567	
Dry Standard Stack Flow Rate	dscfm	233372	234552	230340	232755	
Emission Rate Data						
Mass of Sulfuric Acid from Lab	ug	51.2	60.1	51.8	54.4	
Sulfuric Acid Concentration	ppm	0.02	0.03	0.02	0.03	
Sulfuric Acid Emission Rate	lb/hr	0.1	0.1	0.1	0.1	1.4

CTM-013 Field Data Sheets

ISOKINETIC SAMPLING DATA

Plant Name	GREC - Gainesville	**Date**	3/24/2017
Sampling Location	Boiler Stack	**Project #**	11542
Operator	AL	**Run #**	1
# Traverse Points	#NAME?	**Test Method**	8A

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)		°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	($\Delta H@$)	1.94	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})		in H_2O
Stack Moisture Content	(B_{ws})		%
Stack Dry Molecular Weight	(M_{ds})	30.86	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)		

Sampling Equipment			
Meter #	CEMS5MB		
Meterbox Cal. Factor	(Y)	1.012	
Nozzle #			
Actual Nozzle Diameter	(D_{na})		in
Req. Nozzle Diameter	(D_{ni})		in
Probe # / Length	HTP-6	6.00	ft
Liner Material	Quartz		
Thermocouple ID #	TCHTP-6		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.97	in Hg
Absolute Meter Pressure	(P_m)	30.15	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	13	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0	ft^3/min	@	13	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☐		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0.0	8:00:00	169.290			0.350	330	600	55	142	46	11.0
1	5.0	8:05:00	170.730			0.350		600	55	158	46	12.0
1	10.0	8:10:00	172.230			0.350		601	56	157	47	12.0
1	15.0	8:15:00	173.640			0.350		600	56	153	49	12.0
1	20.0	8:20:00	174.830			0.350		603	56	144	47	10.0
1	25.0	8:25:00	176.100			0.350		603	56	140	47	7.0
1	30.0	8:30:00	177.650			0.350		600	57	159	48	4.0
1	35.0	8:35:00	179.170			0.350		600	56	155	49	3.0
1	40.0	8:40:00	180.690			0.350		602	57	160	49	3.0
1	45.0	8:45:00	182.280			0.350		601	57	158	49	4.0
1	50.0	8:50:00	183.660			0.350		599	58	156	50	4.0
1	55.0	8:55:00	185.110			0.350		600	58	158	50	5.0
Last Pt	60.0	9:00:00	186.569									
Last Pt	60.0	9:00:00	186.569						**Maximum Vacuum**			12.0
Average Values						0.35	330	601	56	153	48	

ISOKINETIC SAMPLING DATA

Plant Name	GREC - Gainesville	**Date**	3/24/2017
Sampling Location	Boiler Stack	**Project #**	11542
Operator	AL	**Run #**	2
# Traverse Points	#NAME?	**Test Method**	8A

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)		°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	($\Delta H@$)	1.94	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})		in H_2O
Stack Moisture Content	(B_{ws})		%
Stack Dry Molecular Weight	(M_{ds})	30.89	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)		

Sampling Equipment			
Meter #	CEMS5MB		
Meterbox Cal. Factor	(Y)	1.012	
Nozzle #			
Actual Nozzle Diameter	(D_{na})		in
Req. Nozzle Diameter	(D_{ni})		in
Probe # / Length	HTP-6	6.00	ft
Liner Material	Quartz		
Thermocouple ID #	TCHTP-6		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.97	in Hg
Absolute Meter Pressure	(P_m)	30.15	in Hg

ΔV_m		**Leak Checks**			
Pre	0	ft^3/min	@	13	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0	ft^3/min	@	8	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☐		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0.0	10:22:00	188.177			0.350	330	596	69	141	61	3.0
1	5.0	10:27:00	189.710			0.350		603	71	166	60	3.0
1	10.0	10:32:00	191.170			0.350		606	72	141	60	3.0
1	15.0	10:37:00	192.700			0.350		601	73	145	60	4.0
1	20.0	10:42:00	194.060			0.350		603	73	152	62	4.0
1	25.0	10:47:00	195.570			0.350		610	72	155	59	4.0
1	30.0	10:52:00	197.110			0.350		604	72	160	59	3.0
1	35.0	10:57:00	198.630			0.350		608	72	144	60	4.0
1	40.0	11:02:00	200.070			0.350		592	72	140	60	5.0
1	45.0	11:07:00	201.480			0.350		598	72	143	59	6.0
1	50.0	11:12:00	203.000			0.350		598	72	146	59	6.0
1	55.0	11:17:00	204.510			0.350		591	71	147	59	6.0
Last Pt	60.0	11:22:00	205.980									
Final Value	60.0	11:22:00	205.980						**Maximum Vacuum**			6.0
Average Values						0.35	330	601	72	148	60	
								336				

ISOKINETIC SAMPLING DATA

Plant Name	GREC - Gainesville	**Date**	3/24/2017
Sampling Location	Boiler Stack	**Project #**	11542
Operator	AL	**Run #**	3
# Traverse Points	#NAME?	**Test Method**	8A

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)		°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	($\Delta H@$)	1.94	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})		in H_2O
Stack Moisture Content	(B_{ws})		%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)		

Sampling Equipment			
Meter #	CEMS5MB		
Meterbox Cal. Factor	(Y)	1.012	
Nozzle #			
Actual Nozzle Diameter	(D_{na})		in
Req. Nozzle Diameter	(D_{ni})		in
Probe # / Length	HTP-6	6.00	ft
Liner Material	Quartz		
Thermocouple ID #	TCHTP-6		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.97	in Hg
Absolute Meter Pressure	(P_m)	30.15	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	8	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0.003	ft^3/min	@	17	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☐		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0.0	12:10:00	209.046			0.35	330	591	70	140	53	3.0
1	5.0	12:15:00	210.700			0.35		594	71	156	58	3.0
1	10.0	12:20:00	212.090			0.35		601	71	160	58	3.0
1	15.0	12:25:00	213.640			0.35		597	71	160	58	3.0
1	20.0	12:30:00	215.060			0.35		598	71	159	58	3.0
1	25.0	12:35:00	216.220			0.35		595	72	141	61	11.0
1	30.0	12:40:00	217.680			0.35		598	72	142	59	15.0
1	35.0	12:45:00	219.280			0.35		603	72	143	59	14.0
1	40.0	12:50:00	220.900			0.35		601	72	144	60	13.0
1	45.0	12:55:00	222.310			0.35		601	72	145	61	14.0
1	50.0	13:10:00	223.890			0.35		594	72	155	63	13.0
1	55.0	13:15:00	225.450			0.35		593	72	160	64	14.0
Last Pt	60.0	13:20:00	227.408									
Final Value	60.0	13:20:00	227.408						**Maximum Vacuum**			15.0
Average Values						0.35	330	597	72	150	59	
								334				

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/24/17
Sampling Location	STACK	Project #	11542
Operators	AL	Run #	1
Test Method	~~SAM~~ 8A	Sampling Type	Isokinetic ☐ Constant Rate ☒

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	—	°F
Avg Gas Meter Temp	(t_m)	—	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.944	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	—	in H_2O
Stack Moisture Content	(B_{ws})	—	%
Oxygen	(O_2)	—	%
Carbon Dioxide	(CO_2)	—	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	—	
Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre ~~Y~~ / N	Post ~~Y~~ / N	
Orsat Leak	Pre ~~Y~~ / N	Post ~~Y~~ / N	
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CEM55MB		
Meterbox Cal. Factor	(Y)	1.012	
Filter / Nozzle #	—	—	
Actual Nozzle Diameter	(D_{na})	—	in
Req. Nozzle Diameter	(D_{ni})	—	in
Probe #	HTP-06		
Liner Material	BS		
Pitot #	—		
Thermocouple #	TC HTP-06		

ΔV_m	Vacuum Leak Check				
Pre	.000	ft^3/min	@	13	in Hg
Post	.000	ft^3/min	@	13	in Hg
Pitot	Leak Checks				
Pre	.00	inches	@	—	in H_2O
Post	—	inches	@	—	in H_2O

.35 ~~DHC~~ 600 140-160

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum	OVEN
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg	
8:00	1	0	169.270 → 800			.35		600	55	142	46	11	510
		5	170.73	805			.35		600	55	158	46	12	510
172.23		10	606:	810			.35		601	56	157	47	12	512
		15	173.64	815			.35		600	56	153	49	12	520
		20	174.93	820			.35		603	56	144	47	10	525
		25	176.10	825			.35		607	56	140	47	7	532
		30	177.65	830			.35		600	57	159	45	4	534
		35	179.17	835			.35		600	56	155	49	3	538
		40	180.69	840			.35		602	57	160	49	3	544
		45	182.28	845			.35		601	57	158	49	4	548
		50	183.66	850			.35		599	58	156	50	4	554
		55	185.11	855			.35		600	58	158	50	5	555
		60	186.59	900			—		—	—	—	—	—	—

Operator Signature

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/24/12
Sampling Location	STACK	Project #	11541
Operators	AZ	Run #	2
Test Method	8A	Sampling Type	Isokinetic ☐ Constant Rate ☒

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	—	°F
Avg Gas Meter Temp	(t_m)	—	°F
DH @ 0.75 SCFM	(ΔH@)	1.944	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	—	in H_2O
Stack Moisture Content	(B_{ws})	—	%
Oxygen	(O_2)	—	%
Carbon Dioxide	(CO_2)	—	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	—	
Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	Y / N	Post Y / N
Orsat Leak	Pre	~~Y~~ / N	Post ~~Y~~ / N
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CEM55MB		
Meterbox Cal. Factor	(Y)	1.012	
Filter / Nozzle #	—	—	
Actual Nozzle Diameter	(D_{na})	—	in
Req. Nozzle Diameter	(D_{ni})	—	in
Probe #	HTP-6		
Liner Material	SS		
Pitot #	—		
Thermocouple #	TCHRP-6		

ΔV_m	Vacuum Leak Check				
Pre	.000	ft³/min	@	13	in Hg
Post	.000	ft³/min	@	8	in Hg
Pitot	Leak Checks				
Pre	—	inches	@	—	in H_2O
Post	—	inches	@	—	in H_2O

.35

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum	oven
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg	
A	0	1022	188.177			.35		69	596	141	61	3	555
	5	1027	189.71			.35		71	603	146	60	3	572
	10	1032	191.17			.35		72	604	141	60	3	582
	15	1037	192.70			.35		73	601	145	60	4	581
	20	1042	194.06			.35		73	603	152	62	4	580
	25	1047	195.57			.35		72	600	155	59	4	570
	30	1052	197.11			.35		72	604	160	57	3	573
	35	1057	198.63			.35		72	608	144	60	4	585
	40	1102	200.07			.35		72	592	140	60	5	577
	45	1107	201.48			.35		72	598	143	59	6	558
	50	1112	203.00			.35		72	598	146	59	6	566
	55	1117	204.51			.35		71	591	147	59	6	577
	60	1122	205.98			—		—	—	—	—	—	—

Operator Signature

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/24/17
Sampling Location	STACK	Project #	11542
Operators	AL	Run #	3
Test Method	8A	Sampling Type	Isokinetic ☐ Constant Rate ☒

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	—	°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	(ΔH@)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	—	in H_2O
Stack Moisture Content	(B_{ws})	—	%
Oxygen	(O_2)	—	%
Carbon Dioxide	(CO_2)	—	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	—	
Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre ~~Y~~ / N	Post	Y / N
Orsat Leak	Pre ~~Y / N~~	Post	~~Y~~ / N
Nozzle in direction of flow?	☒ N/A		

Sampling Equipment			
Meter #	CEMS5M3		
Meterbox Cal. Factor	(Y)	1.012	
Filter / Nozzle #	—	—	
Actual Nozzle Diameter	(D_{na})	—	in
Req. Nozzle Diameter	(D_{ni})	—	in
Probe #	HTP-6		
Liner Material	BS		
Pitot #	—		
Thermocouple #	TCHTP-6		

ΔV_m	Vacuum Leak Check				
Pre	00	ft³/min	@	8	in Hg
Post	~~.004~~	ft³/min	@	~~15~~ 17	in Hg
Pitot	.003	Leak Checks			
Pre	—	inches	@	—	in H_2O
Post	—	inches	@	—	in H_2O

.35

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum	OVEN
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg	
1	0	1210	209.046			.35		591	70	140	53	3	580
	5	1215	210.710			.35		594	71	154	58	3	579
	10	1220	212.09			.35		601	71	160	58	3	586
	15	1225	213.64			.35		597	71	160	56	3	585
	20	1230	215.06			.35		598	71	159	58	3	578
	25	1235	216.42			.35		595	72	141	60	11	572
P 1237	30	1240	217.68			.35		598	72	142	59	15	567
216.365	35	1245	219.25			.35		603	72	143	55	14	589
R 11247	40	1250	220.90			.35		601	72	144	60	13	588
	45	1255	222.31			.35		601	72	145	61	14	590
	50	1300	223.89			.35		594	72	155	63	13	580
	55	1305	225.45			.35		593	72	160	64	14	577
END TIME 1320	60	1320	227.08										

Operator Signature

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	Gainesville	**Date**	03/24/17
Sampling Location	Boiler Stack	**Project #**	11542
Operator	AL	**# of Ports Used**	1
Stack Type	Circular	**Meter Box Number**	CEMS5MB
Train Leak Check	☑ **PreTest**	☑ **PostTest**	

Moisture Content Data								
Run Number	1		**Run Start Time**	8:00		**Run Stop Time**	9:00	
Total Meter Volume	(V_m)	17.279	dcf	**Barometric Press.**		(P_b)	30.01	in Hg
Avg Meter Temp	$(t_m)_{avg}$	56	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	330	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	0.35	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		DI	DI		Sil Gel			
Initial Value	$(V_i),(W_i)$	692.50	676.20	634.60	888.30			
Final Value	$(V_f),(W_f)$	783.90	676.40	634.80	894.60			
Net Value	$(V_n),(W_n)$	91.4	0.2	0.2	6.3			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	98.10	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.625	scf
Std Meter Volume	$(V_{m(std)})$	17.948	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	$(B_{ws(calc)})$	20.5	%	**Final Moisture Content**		(B_{ws})	20.5	%

Moisture Content Data								
Run Number	2		**Run Start Time**	10:22		**Run Stop Time**	11:22	
Total Meter Volume	(V_m)	17.803	dcf	**Barometric Press.**		(P_b)	30.01	in Hg
Avg Meter Temp	$(t_m)_{avg}$	72	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	330	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	0.35	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		DI	DI		Sil Gel			
Initial Value	$(V_i),(W_i)$	783.90	676.40	634.80	889.90			
Final Value	$(V_f),(W_f)$	871.30	677.00	634.60	896.40			
Net Value	$(V_n),(W_n)$	87.4	0.6	-0.2	6.5			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	94.30	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.446	scf
Std Meter Volume	$(V_{m(std)})$	17.959	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	19.8	%	**Final Moisture Content**		(B_{ws})	19.8	%

Moisture Content Data								
Run Number	3		**Run Start Time**	12:10		**Run Stop Time**	13:20	
Total Meter Volume	(V_m)	18.362	dcf	**Barometric Press.**		(P_b)	30.01	in Hg
Avg Meter Temp	$(t_m)_{avg}$	72	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	330	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	0.35	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		DI	DI		Sil Gel			
Initial Value	$(V_i),(W_i)$	708.30	677.00	634.60	896.40			
Final Value	$(V_f),(W_f)$	801.90	678.90	635.20	905.90			
Net Value	$(V_n),(W_n)$	93.6	1.9	0.6	9.5			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	105.60	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.979	scf
Std Meter Volume	$(V_{m(std)})$	18.531	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	21.2	%	**Final Moisture Content**		(B_{ws})	21.2	%

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/22/17
Sampling Location	Stack	**Project #**	11542
Operators	MB, AL, TC	**Run #**	1
Test Method	8A / CTM-013	**Impinger Bucket #**	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		DI	DI	MT	SG			
Initial Value	(Vi),(Wi)	692.5	676.2	634.6	888.3			
Final Value	(Vf),(Wf)	783.9	676.4	634.8	894.6			
Net Value	(Vn),(Wn)	91.4	0.2	0.2	6.3			

Train Prepared by: [signature]

Train Recovered by: [signature]

20.5 % B_{ws}

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	Date	03/24/17
Sampling Location	Stack	Project #	11542
Operators	AL	Run #	2
Test Method	8A	Impinger Bucket #	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		DI	DI	MT	SG			
Initial Value	(Vi),(Wi)	783.9	676.4	634.8	889.9			
Final Value	(Vf),(Wf)	871.3	~~708.3~~ 677.0	634.6	896.4			
Net Value	(Vn),(Wn)	87.4	0.6	-0.2	6.5			

Train Prepared by: [signature]

Train Recovered by: [signature]

19.8 % B_{ws}

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	Date	03/24/17
Sampling Location	Stack	Project #	11542
Operators	AL	Run #	3
Test Method	8A	Impinger Bucket #	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		DI	DI	MT	SG			
Initial Value	(Vi),(Wi)	708.3	677.0	634.6	896.4			
Final Value	(Vf),(Wf)	801.9	678.9	635.2	905.9			
Net Value	(Vn),(Wn)	93.6	1.9	0.6	9.5			

Train Prepared by: [signature]

Train Recovered by: [signature]

21.2% B_{ws}

Appendix E-4: Ammonia Slip Test Data

Summaries
CTM-027 Field Data Sheets
Analytical Results

Method CTM-027 RESULTS SUMMARY

	Units	Run 1	Run 2	Run 3	Average	Limit
Date	mm/dd/yy	3/24/2017	3/24/2017	3/24/2017		
Run Start Time	hh:mm	8:00	10:22	12:10		
Run Stop Time	hh:mm	8:51	11:32	13:19		
Meter Calibration Factor		0.956	0.956	0.956		
Meter Calibration Verification		0.947	0.936	0.934		
DH @ 0.75 SCFM		1.982	1.982	1.982		
Pitot Tube Coefficient		0.840	0.840	0.840		
Actual Nozzle Diameter	in	0.253	0.257	0.253		
Stack Test Data						
Initial Meter Volume	ft^3	599.487	644.729	692.310		
Final Meter Volume	ft^3	643.566	692.027	738.054		
Leak Check Volume	ft^3	0.000	0.000	0.000		
Total Meter Volume	ft^3	44.079	47.298	45.744	45.707	
Standard Meter Volume	dscf	43.181	44.968	43.613	43.921	
Total Sampling Time	min	60.0	60.0	60.0	60.0	
Average Meter Temperature	^oF	59.2	75.2	73.5	69.3	
Average Stack Temperature	^oF	331.8	332.9	333.2	332.6	
Barometric Pressure	in Hg	30.01	30.01	30.01	30.01	
Stack Static Pressure	in H_2O	-0.54	-0.54	-0.54	-0.54	
Absolute Stack Pressure	in Hg	29.97	29.97	29.97	29.97	
Average Orifice Pressure Drop	in H_2O	1.86	2.03	1.90	1.93	
Absolute Meter Pressure	in Hg	30.15	30.16	30.15	30.15	
Avg Square Root Pitot Pressure	$(in\ H_2O)^{1/2}$	0.94	0.93	0.93	0.93	
Moisture Content Data						
Impinger Water Volume Gain	ml	0.0	0.0	0.0	0.0	
Impinger Water Weight Gain	g	243.9	238.0	248.2	243.4	
Standard Water Vapor Volume	scf	11.500	11.222	11.703	11.475	
Calculated Stack Moisture	%	21.0	20.0	21.2	20.7	
Saturated Stack Moisture	%	100.00	100.0	100.0	100.0	
Reported Stack Moisture Content	%	21.0	20.0	21.2	20.7	
Gas Analysis Data						
Carbon Dioxide Percentage	%	17.2	17.3	17.4	17.3	
Oxygen Percentage	%	3.4	3.4	3.4	3.4	
Carbon Monoxide Percentage	%	0.0	0.0	0.0	0.0	
Nitrogen Percentage	%	79.4	79.3	79.2	79.3	
Dry Gas Molecular Weight	lb/lb-mole	30.89	30.90	30.92	30.90	
Wet Stack Gas Molecular Weight	lb/lb-mole	28.18	28.33	28.19	28.23	
Calculated Fuel Factor		1.017	1.012	1.006	1.012	
Fuel F-Factor	dscf/mmBtu	9240	9240	9240	9240	
Fuel F-Factor	scf/mmBtu					
Percent Excess Air	%	19.4	19.4	19.4	19.4	
Volumetric Flow Rate Data						
Average Stack Gas Velocity	ft/sec	65.06	64.86	64.77	64.90	
Stack Cross-Sectional Area	ft^2	112.31	112.31	112.31		
Actual Stack Flow Rate	acfm	438424	437091	436501	437339	
Wet Standard Stack Flow Rate	wkscfh	17570	17493	17464	17509	
Dry Standard Stack Flow Rate	dscfm	231250	233322	229484	231352	
Percent of Isokinetic Rate	%	100.1	100.1	101.9	100.7	
Emission Rate Data						
Mass of Ammonia from Lab	ug	327	347	354	343	
Ammonia Concentration[a]	ppm	0.4	0.4	0.4	0.4	
Ammonia Conc. corrected to 7% O_2	ppmvd@7% O2	0.3	0.3	0.3	0.3	10

a = (micrograms of ammonia in sample/17.03)/[($Vm_{(std)}$*28.316)/24.056)]

where:

17.03 = Molecular weight of Ammonia

Vm(std) = Volume of gas sampled, standardised to temperature and pressure (68°F, 29.92 in. H

28.316 = Convert dscf to liters

24.056 = gas standard - molar gas volume at STP (68°F, 29.92 in. Hg)

CTM027 Field Data Sheets

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/24/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**Run #**	1
# Traverse Points	12	**Test Method**	CTM-027

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	75	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.84	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	2.19	

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #	G250-11		
Actual Nozzle Diameter	(D_{na})	0.2530	in
Req. Nozzle Diameter	(D_{ni})	0.2504	in
Probe # / Length	P5	6.00	ft
Liner Material	Glass		
Thermocouple ID #	TC5		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.97	in Hg
Absolute Meter Pressure	(P_m)	30.16	in Hg

ΔV_m	**Leak Checks**				
Pre	0.002	ft^3/min	@	15	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0.003	ft^3/min	@	14	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	8:00:00	599.487	0.900	1.975	1.900	331	252	54	244	53	9.0
A-2	5.0	8:05:00	603.040	0.910	1.997	1.900	330	252	56	250	53	9.0
A-3	10.0	8:10:00	606.880	0.910	1.997	1.900	332	251	55	249	53	9.0
B-1	15.0	8:15:00	610.870	0.900	1.975	1.900	331	249	58	254	56	9.0
B-2	20.0	8:20:00	614.590	0.880	1.932	1.900	333	238	58	255	59	9.0
B-3	25.0	8:25:00	618.060	0.930	2.041	2.000	333	234	59	255	59	9.0
C-1	30.0	8:30:00	621.900	0.800	1.756	1.700	328	241	60	257	59	8.0
C-2	35.0	8:35:00	625.550	0.830	1.822	1.800	333	259	60	258	63	8.0
C-3	40.0	8:36:00	627.180	0.840	1.844	1.700	333	260	62	257	62	8.0
D-1	45.0	8:41:00	632.730	0.870	1.910	1.900	332	252	62	255	63	8.0
D-2	50.0	8:46:00	636.360	0.910	1.997	1.900	333	248	63	254	64	9.0
D-3	55.0	8:51:00	640.010	0.830	1.822	1.800	333	251	63	257	65	8.0
Last Pt	60.0	8:51:00	643.566									
Last Pt	60.0	8:51:00	643.566						**Maximum Vacuum**			9.0
Average Values				0.88		1.86	332	249	59	254	59	

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/24/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**Run #**	2
# Traverse Points	12	**Test Method**	CTM-027

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	65	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.89	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	2.29	

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #	G250-13		
Actual Nozzle Diameter	(D_{na})	0.2570	in
Req. Nozzle Diameter	(D_{ni})	0.2528	in
Probe # / Length	P5	6.00	ft
Liner Material	Glass		
Thermocouple ID #	TC5		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.97	in Hg
Absolute Meter Pressure	(P_m)	30.16	in Hg

ΔV_m Leak Checks					
Pre	0.001	ft^3/min	@	14	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0.003	ft^3/min	@	15	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	10:22:00	644.729	0.800	1.835	1.900	334	259	73	253	58	7.0
A-2	5.0	10:27:00	648.700	0.930	2.133	2.200	333	259	75	257	53	8.0
A-3	10.0	10:32:00	652.650	0.800	1.835	1.900	333	260	77	255	53	7.0
B-1	15.0	10:41:00	656.700	0.780	1.789	1.800	324	260	77	256	59	7.0
B-2	20.0	10:46:00	660.330	0.880	2.019	2.000	333	253	77	254	58	7.0
B-3	25.0	10:51:00	664.190	0.770	1.766	1.800	333	253	77	255	60	7.0
C-1	30.0	11:00:00	667.940	0.900	2.064	2.100	330	244	75	258	64	7.0
C-2	35.0	11:05:00	671.770	0.950	2.179	2.200	334	256	75	257	61	8.0
C-3	40.0	11:10:00	675.820	0.840	1.927	1.900	334	261	75	259	63	8.0
D-1	45.0	11:17:00	679.770	0.900	2.064	2.100	329	254	73	249	54	8.0
D-2	50.0	11:22:00	683.900	0.950	2.179	2.200	344	243	74	246	51	9.0
D-3	55.0	11:27:00	687.700	1.000	2.294	2.300	334	244	74	247	49	9.0
Last Pt	60.0	11:32:00	692.027									
Final Value	60.0	11:32:00	692.027						**Maximum Vacuum**			9.0
Average Values				0.88		2.03	333	254	75	254	57	
								165				

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/24/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**Run #**	3
# Traverse Points	12	**Test Method**	CTM-027

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	70	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	2.18	

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #	G250-11		
Actual Nozzle Diameter	(D_{na})	0.2530	in
Req. Nozzle Diameter	(D_{ni})	0.2517	in
Probe # / Length	P5	6.00	ft
Liner Material	Glass		
Thermocouple ID #	TC5		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.97	in Hg
Absolute Meter Pressure	(P_m)	30.16	in Hg

ΔV_m	**Leak Checks**				
Pre	0.001	ft^3/min	@	15	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0.002	ft^3/min	@	15	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	12:10:00	692.310	0.85	1.85	1.90	334	248	69	230	45	9.0
A-2	5.0	12:15:00	696.270	0.91	1.98	2.00	334	249	71	238	59	10.0
A-3	10.0	12:20:00	700.110	0.85	1.85	1.90	334	252	72	238	57	9.0
B-1	15.0	12:30:00	703.910	0.93	2.02	2.00	330	201	72	258	63	9.0
B-2	20.0	12:35:00	707.700	0.94	2.04	2.10	334	260	73	257	62	10.0
B-3	25.0	12:40:00	711.650	0.89	1.94	1.90	334	262	75	261	65	10.0
C-1	30.0	12:47:00	715.460	0.85	1.85	1.90	334	259	74	259	63	9.0
C-2	35.0	12:52:00	719.290	0.83	1.81	1.80	334	261	74	259	65	9.0
C-3	40.0	12:57:00	722.980	0.83	1.81	1.80	333	259	75	246	60	9.0
D-1	45.0	13:04:00	726.600	0.75	1.63	1.60	330	260	75	260	58	8.0
D-2	50.0	13:09:00	730.370	0.82	1.78	1.80	334	261	76	258	59	9.0
D-3	55.0	13:14:00	734.130	0.96	2.09	2.10	333	261	76	247	60	10.0
Last Pt	60.0	13:19:00	738.054									
Final Value	60.0	13:19:00	738.054						**Maximum Vacuum**			10.0
Average Values				0.87		1.90	333	253	74	251	60	
								163				

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	**Date**	3/24/17
Sampling Location	STACK	**Project #**	1/542
Operators	AL	**Run #**	1
Test Method	CTM-027	**Sampling Type**	Isokinetic ☒ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	65	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3.0	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	2.11	
Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O

Sampling Equipment Checks				
Pump to Meter Leak	Pre	Ⓨ/ N	Post	Ⓨ/ N
Orsat Leak	Pre	~~Y / N~~	Post	~~Y~~/ N
Nozzle in direction of flow?	☐			

Sampling Equipment			
Meter #		CEM63MB	
Meterbox Cal. Factor	(Y)	.956	
Filter / Nozzle #		G250-11	
Actual Nozzle Diameter	(D_{na})	.253	in
Req. Nozzle Diameter	(D_{nl})		in
Probe #		~~GP P6~~ P5	
Liner Material		GLASS	
Pitot #		AS400	
Thermocouple #		~~TC6~~ TC5	

ΔV_m	Vacuum Leak Check				
Pre	.002	ft³/min	@	15	in Hg
Post	.007	ft³/min	@	14	in Hg

Pitot	Leak Checks				
Pre	.00	inches	@	4.7	in H_2O
Post	.00	inches	@	5.3	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	OVEN ~~Filter~~ Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
8:00 N 1	0	599.347	800	.90	1.90	1.9	331	252	54	244	53	9
2	5	603.04	805	.91	1.92	1.9	330	252	56	250	53	9
3	10	606.88	810	.91	1.92	1.9	332	251	55	249	53	9
~~4~~	15	610.87	815	—	—	—	—	—	—	—	—	—
W 1	15	610.87	820	.90	1.90	1.9	331	249	58	254	56	9
2	20	614.59	825	.88	1.85	1.9	333	238	58	255	59	9
3	25	618.06	830	.93	1.96	2.0	333	234	59	255	59	9
	30	621.90	835	—	—	—	—	—	—	—	—	—
S 1	30	621.90	836	.80	1.68	1.7	328	241	60	257	57	8
2	35	625.55	841	.83	1.75	1.8	332	259	60	258	63	8
3	40	629.18	846	.82	1.73	1.7	333	~~260~~ 262		257	62	8
	45	632.73	851	—	—	—	—	—	—	—	—	—
E 1	45	632.73	857	.87	1.84	1.6	332	252	62	255	63	8
2	50	636.36	902	.91	1.92	1.9	333	248	63	254	64	9
3	55	640.01	907	.83	1.75	1.8	333	253	63	257	65	8
	60	643.56	912	—	—	—	—	—	—	—	—	—

Operator Signature [signature]

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/24/17
Sampling Location	STACK	Project #	11542
Operators	AL	Run #	2
Test Method	OTM-027	Sampling Type	Isokinetic ☒ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	70	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3.0	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	2.31	
Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	Y / N	Post Y / N
Orsat Leak	Pre	Y / N	Post ~~Y / N~~
Nozzle in direction of flow?	☒		

Sampling Equipment			
Meter #	CEM S3mB		
Meterbox Cal. Factor	(Y)	.956	
Filter / Nozzle #	G250-13		
Actual Nozzle Diameter	(D_{na})	0.257	in
Req. Nozzle Diameter	(D_{ni})	0.253	in
Probe #	PS-1		
Liner Material	GLASS		
Pitot #	A5100		
Thermocouple #	TC 5		

ΔV_m	Vacuum Leak Check				
Pre	.001	ft^3/min	@	14	in Hg
Post	.003	ft^3/min	@	15	in Hg
Pitot	Leak Checks				
Pre	.00	inches	@	4.2	in H_2O
Post	0	inches	@	4.2	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	~~Filter~~ OVEN Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
~~1~~ 1	0	1022	644.729	.00	1.85	1.9	334	259	73	253	58	7
2	5	1027	648.70	.93	2.15	2.2	333	297	75	257	53	6
3	10	1032	652.65	.80	1.85	1.9	323	260	77	255	53	7
	15	1037	656.70	—	—	—	—	—	—	—	—	—
~~2~~ 1	15	1041	656.70	.78	1.8	1.8	324	260	77	256	59	7
2	20	1046	660.33	.88	2.0	2.0	333	253	77	254	58	7
3	25	1051	664.19	.77	1.75	1.8	333	253	77	255	60	7
	30	1056	667.92	—	—	—	—	—	—	—	—	—
1	30	1100	667.92	.90	2.1	2.1	330	244	75	258	64	7
2	35	1105	671.77	.95	2.2	2.2	334	256	75	257	61	8
3	40	1110	675.82	.84	1.9	1.9	334	261	75	259	63	8
	45	1115	679.77	—	—	—	—	—	—	—	—	—
1	45	1117	679.77	.90	2.1	2.1	325	254	73	249	51	8
2	50	1122	683.90	.95	2.2	2.2	334	243	74	246	55	9
3	55	1127	687.7	1.0	2.3	2.3	334	244	74	247	49	9
	60	1132	691.027	—	—	—	—	—	—	—	—	—

Operator Signature

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/24/17
Sampling Location	STACK	Project #	11542
Operators	AL	Run #	3
Test Method	CTM-027	Sampling Type	Isokinetic ☒ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	75	°F
DH @ 0.75 SCFM	(ΔH@)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	7.0	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	2.19	
Pressures			
Barometric Pressure	(P_b)	30.01	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	Y / N	Post Y / N
Orsat Leak	Pre	Y / N	Post Y / N
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CEMS 3MB		
Meterbox Cal. Factor	(Y)	.954	
Filter / Nozzle #		G250-11	
Actual Nozzle Diameter	(D_{na})	.253	in
Req. Nozzle Diameter	(D_{nl})		in
Probe #	05		
Liner Material	SS		
Pitot #	A540		
Thermocouple #	TC 5		

ΔV_m	Vacuum Leak Check			
Pre	.001	ft^3/min	@ 15	in Hg
Post	.002	ft^3/min	@ 15	in Hg
Pitot	Leak Checks			
Pre	.00	inches	@ 5.5	in H_2O
Post	.00	inches	@ 4.6	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	OVEN ~~Filter~~ Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0	1210	692.310	.85	1.86	1.9	334	248	69	230	45	9
2	5	1215	696.27	.91	1.99	2.0	334	249	71	238	59	10
3	10	1220	700.11	.85	1.86	1.9	334	252	72	258	57	9
	15	1225	703.91	—	—	—	—	—	—	—	—	—
1	15	1230	703.91	.93	2.0	2.0	330	261	72	258	63	9
2	20	1235	707.90	.96	2.1	2.1	334	260	73	257	62	10
3	25	1240	711.65	.87	1.9	1.9	334	262	75	261	65	10
	30	1245	715.46	—	—	—	—	—	—	—	—	—
1	30	1247	715.46	.85	1.9	1.9	334	259	74	259	63	9
2	35	1252	719.29	.83	1.8	1.8	334	261	74	259	65	9
3	40	1257	722.98	.83	1.8	1.8	333	259	75	246	Co	9
	45	1302	726.69	—	—	—	—	—	—	—	—	—
1	45	1304	726.69	.75	1.6	1.6	330	260	75	260	58	8
2	50	1309	730.37	.82	1.8	1.8	334	261	76	258	59	9
3	55	1314	734.23	.96	2.1	2.1	333	261	76	247	60	10
	60	1319	738.05	—	—	—	—	—	—	—	—	—

7/4.13

Operator Signature	

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	GREC	**Date**	03/24/17
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**# of Ports Used**	4
Stack Type	Circular	**Meter Box Number**	CEMS3MB
Train Leak Check	☐ **PreTest**	☐ **PostTest**	

Moisture Content Data								
Run Number	1		**Run Start Time**	8:00		**Run Stop Time**	8:51	
Total Meter Volume	(V_m)	44.079	dcf	**Barometric Press.**		(P_b)	30.01	in Hg
Avg Meter Temp	$(t_m)_{avg}$	59	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	332	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.86	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	g	ml	ml
Contents		H2SO4	H2SO4		Sil Gel			
Initial Value	$(V_i),(W_i)$	692.0	678.4	601.5	905.4			
Final Value	$(V_f),(W_f)$	918.9	680.3	601.9	920.1			
Net Value	$(V_n),(W_n)$	226.9	1.9	0.4	14.7			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	243.90	g	**Water Vol Weighed**		$(V_{wsg(std)})$	11.500	scf
Std Meter Volume	$(V_{m(std)})$	43.181	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	$(B_{ws(calc)})$	21.0	%	**Final Moisture Content**		(B_{ws})	21.0	%

Moisture Content Data								
Run Number	2		**Run Start Time**	10:22		**Run Stop Time**	11:32	
Total Meter Volume	(V_m)	47.298	dcf	**Barometric Press.**		(P_b)	30.01	in Hg
Avg Meter Temp	$(t_m)_{avg}$	75	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	333	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	2.03	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	g	ml	ml
Contents		H2SO4	H2SO4		Sil Gel			
Initial Value	$(V_i),(W_i)$	692.5	580.8	612.1	860.7			
Final Value	$(V_f),(W_f)$	909.6	585.9	612.9	875.7			
Net Value	$(V_n),(W_n)$	217.1	5.1	0.8	15.0			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	238.00	g	**Water Vol Weighed**		$(V_{wsg(std)})$	11.222	scf
Std Meter Volume	$(V_{m(std)})$	44.968	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	20.0	%	**Final Moisture Content**		(B_{ws})	20.0	%

Moisture Content Data								
Run Number	3		**Run Start Time**	12:10		**Run Stop Time**	13:19	
Total Meter Volume	(V_m)	45.744	dcf	**Barometric Press.**		(P_b)	30.01	in Hg
Avg Meter Temp	$(t_m)_{avg}$	74	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	333	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.90	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	g	ml	ml
Contents		H2SO4	H2SO4		Sil Gel			
Initial Value	$(V_i),(W_i)$	699.5	677.9	601.9	920.1			
Final Value	$(V_f),(W_f)$	926.4	683.9	604.6	932.7			
Net Value	$(V_n),(W_n)$	226.9	6.0	2.7	12.6			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	248.20	g	**Water Vol Weighed**		$(V_{wsg(std)})$	11.703	scf
Std Meter Volume	$(V_{m(std)})$	43.613	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	21.2	%	**Final Moisture Content**		(B_{ws})	21.2	%

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/24/2017
Sampling Location	Boiler Stack	**Project #**	11542
Operators	AL	**Run #**	1
Test Method	CTM-027	**Impinger Bucket #**	3

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		100 ml	100ml	0 ml	—			
Contents		0.1N H_2SO_4		MT	SG	905.4		
Initial Value	(Vi),(Wi)	692.0	678.4	601.5	~~884.3~~	CH		
Final Value	(Vf),(Wf)	918.9	680.3	601.9	920.1			
Net Value	(Vn),(Wn)	226.9	1.9	0.4	14.7			

Train Prepared by:	C. Horton
Train Recovered by:	C. Horton

21.1 % O2

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	Date	3/24/17
Sampling Location	Stack	Project #	11542
Operators	MB, AL, TC	Run #	2
Test Method	CTM-027	Impinger Bucket #	21

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		H_2SO_4	H_2SO_4	MT	SG			
Initial Value	(Vi),(Wi)	692.5	580.8	612.1	860.7			
Final Value	(Vf),(Wf)	909.6	585.9	612.9	875.7			
Net Value	(Vn),(Wn)	217.1	5.1	0.8	15.0			

Train Prepared by: [signature]

20.0 % Tons

Train Recovered by: C. Horton

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/24/2017
Sampling Location	Boiler Stack	**Project #**	11542
Operators	AL	**Run #**	3
Test Method	CTM-027	**Impinger Bucket #**	3

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		100 ml	100 ml					
Contents		0.1 N	H_2SO_4	MT	SG			
Initial Value	(Vi),(Wi)	699.5	677.9	601.9	920.1			
Final Value	(Vf),(Wf)	936.4	683.9	604.6	932.7			
Net Value	(Vn),(Wn)	236.9	6.0	2.7	12.6			

Train Prepared by:	C. HORTON
Train Recovered by:	C. HORTON

21.2 % B_{ws}

Appendix E-5: HCl and HF Test Data

Summaries
Method 26A Field Data Sheets
Analytical Results

Method 5 RESULTS SUMMARY

	Units	Run 1	Run 2	Run 3	Average	Limit
Date	mm/dd/yy	3/22/2017	3/22/2017	3/22/2017		
Run Start Time	hh:mm	14:10	18:23	17:42		
Run Stop Time	hh:mm	15:16	19:23	18:42		
Meter Calibration Factor		0.965	0.965	0.956		
Meter Calibration Verification		0.955	0.966	1.003		
DH @ 0.75 SCFM		1.920	1.920	1.982		
Pitot Tube Coefficient		0.840	0.840	0.840		
Stack Test Data						
Initial Meter Volume	ft^3	645.627	692.913	555.078		
Final Meter Volume	ft^3	692.141	739.048	598.687		
Leak Check Volume	ft^3	0.000	0.000	0.000		
Total Meter Volume	ft^3	46.514	46.135	43.609	45.419	
Standard Meter Volume	dscf	42.827	42.185	41.812	42.275	
Total Sampling Time	min	60.0	60.0	60.0	60.0	
Average Meter Temperature	^oF	92.1	95.9	68.0	85.3	
Average Stack Temperature	^oF	334.7	337.0	333.3	335.0	
Barometric Pressure	in Hg	29.71	29.71	29.86	29.76	
Stack Static Pressure	in H_2O	-0.54	-0.54	-0.54	-0.54	
Absolute Stack Pressure	in Hg	29.67	29.67	29.82	29.72	
Average Orifice Pressure Drop	in H_2O	1.90	1.90	2.00	1.93	
Absolute Meter Pressure	in Hg	29.85	29.85	30.01	29.90	
Avg Square Root Pitot Pressure	$(in\ H_2O)^{1/2}$		0.90	0.92	0.91	
Moisture Content Data						
Impinger Water Weight Gain	g	242.6	258.6	244.4	248.5	
Standard Water Vapor Volume	scf	11.439	12.193	11.525	11.719	
Calculated Stack Moisture	%	21.1	22.4	21.6	21.7	
Saturated Stack Moisture	%	100.00	100.0	100.0	100.0	
Reported Stack Moisture Content	%	21.1	22.4	21.6	21.7	
Gas Analysis Data						
Carbon Dioxide Percentage	%	17.4	17.3	17.3	17.3	
Oxygen Percentage	%	3.3	3.4	3.3	3.3	
Carbon Monoxide Percentage	%	0.0	0.0	0.0	0.0	
Nitrogen Percentage	%	79.3	79.3	79.4	79.3	
Dry Gas Molecular Weight	lb/lb-mole	30.92	30.90	30.90	30.91	
Wet Stack Gas Molecular Weight	lb/lb-mole	28.19	28.01	28.11	28.11	
Calculated Fuel Factor		1.011	1.012	1.017	1.013	
Fuel F-Factor	dscf/mmBtu	9240	9240	9240	9240	
Percent Excess Air	%	18.7	19.4	18.7	18.9	
Volumetric Flow Rate Data						
Average Stack Gas Velocity	ft/sec	65.36	63.26	64.41	64.34	
Stack Cross-Sectional Area	ft^2	112.31	112.31	112.31		
Actual Stack Flow Rate	acfm	440452	426323	434043	433606	
Wet Standard Stack Flow Rate	wkscfh	17412	16805	17277	17165	
Dry Standard Stack Flow Rate	dscfm	229035	217275	225725	224012	
Emission Rate Data						
Mass of Hydrogen chloride	ug	142	191	156	163	
Mass of Hydrogen chloride	mg	0.14	0.19	0.16	0.2	
Emission Rate	lb/hr	0.10	0.13	0.11	0.11	2.22
Mass of Hydrogen fluoride	ug	66.3	63.2	69.5	66.3	
Mass of Hydrogen fluoride	mg	0.07	0.06	0.07	0.1	
Emission Rate	lb/hr	0.05	0.04	0.05	0.05	2.22
Emission Rate HCl	lb/mmbtu	0.00008	0.00011	0.00009	0.00009	0.022
Emisison Rate HF	lb/mmbtu	0.00004	0.00004	0.00004	0.00004	

Method 26A Field Data Sheets

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/22/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	MB	**Run #**	1
# Traverse Points	1	**Test Method**	5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)		°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	($\Delta H@$)	1.92	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})		in H_2O
Stack Moisture Content	(B_{ws})		%
Stack Dry Molecular Weight	(M_{ds})	30.84	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)		

Sampling Equipment			
Meter #	CEMS7MB		
Meterbox Cal. Factor	(Y)	0.965	
Nozzle #			
Actual Nozzle Diameter	(D_{na})		in
Req. Nozzle Diameter	(D_{ni})		in
Probe # / Length	P6-1	7.00	ft
Liner Material	Glass		
Thermocouple ID #	TC6-1		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.71	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.67	in Hg
Absolute Meter Pressure	(P_m)	29.85	in Hg

ΔV_m	**Leak Checks**				
Pre	0.009	ft^3/min	@	15	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0	ft^3/min	@	10	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0.0	14:10:00	645.627			1.900	336	261	88	255	59	7.0
1	5.0	14:15:00	649.490			1.900	334	260	88	254	54	7.0
1	10.0	14:20:00	653.290			1.900	334	254	89	264	55	8.0
1	15.0	14:28:00	657.127			1.900	334	259	91	254	61	8.0
1	20.0	14:33:00	661.050			1.900	334	258	92	257	62	8.0
1	25.0	14:38:00	664.910			1.900	335	259	92	253	65	8.0
1	30.0	14:46:00	668.808			1.900	334	253	93	254	65	8.0
1	35.0	14:51:00	672.800			1.900	335	258	93	264	63	7.0
1	40.0	14:56:00	676.660			1.900	335	258	94	257	63	7.0
1	45.0	15:01:00	680.530			1.900	335	259	95	262	66	7.0
1	50.0	15:06:00	684.210			1.900	335	258	95	259	65	7.0
1	55.0	15:11:00	688.260			1.900	335	254	95	261	63	7.0
Last Pt	60.0	15:16:00	692.141									
Last Pt	60.0	15:16:00	692.141						**Maximum Vacuum**			8.0
Average Values						1.90	335	258	92	258	62	

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/22/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	MB	**Run #**	2
# Traverse Points	1	**Test Method**	5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)		°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	($\Delta H@$)	1.92	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})		in H_2O
Stack Moisture Content	(B_{ws})		%
Stack Dry Molecular Weight	(M_{ds})	30.92	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)		

Sampling Equipment			
Meter #	CEMS7MB		
Meterbox Cal. Factor	(Y)	0.965	
Nozzle #			
Actual Nozzle Diameter	(D_{na})		in
Req. Nozzle Diameter	(D_{ni})		in
Probe # / Length	P6-1	7.00	ft
Liner Material	Glass		
Thermocouple ID #	TC6-1		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.71	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.67	in Hg
Absolute Meter Pressure	(P_m)	29.85	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	12	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0	ft^3/min	@	12	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0.0	18:23:00	692.913	0.800		1.900	337	253	93	264	66	9.0
1	5.0	18:28:00	695.210	0.760		1.900	337	255	93	262	65	7.0
1	10.0	18:33:00	699.110	0.740		1.900	337	256	93	260	64	6.0
1	15.0	18:38:00	703.030	0.810		1.900	337	257	94	269	67	6.0
1	20.0	18:43:00	706.930	0.900		1.900	337	255	95	266	67	6.0
1	25.0	18:48:00	710.930	0.830		1.900	337	257	95	262	62	6.0
1	30.0	18:53:00	714.930	0.850		1.900	337	256	95	267	61	6.0
1	35.0	18:58:00	718.940	0.870		1.900	337	258	98	259	60	6.0
1	40.0	19:03:00	722.980	0.800		1.900	337	258	98	262	60	6.0
1	45.0	19:08:00	726.970	0.770		1.900	337	258	99	259	59	6.0
1	50.0	19:13:00	731.000	0.750		1.900	337	258	99	258	59	6.0
1	55.0	19:18:00	735.130	0.840		1.900	337	259	99	257	59	6.0
Last Pt	60.0	19:23:00	739.048									
Final Value	60.0	19:23:00	739.048						**Maximum Vacuum**			9.0
Average Values				0.81		1.90	337	257	96	262	62	
								176				

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/22/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	MB	**Run #**	3
# Traverse Points	1	**Test Method**	5

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)		°F
Avg Gas Meter Temp	(t_m)		°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})		in H_2O
Stack Moisture Content	(B_{ws})		%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)		

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #			
Actual Nozzle Diameter	(D_{na})		in
Req. Nozzle Diameter	(D_{ni})		in
Probe # / Length	P6-1	7.00	ft
Liner Material	Glass		
Thermocouple ID #	TC6-1		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.82	in Hg
Absolute Meter Pressure	(P_m)	30.01	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	10	in Hg
Leak Check Total Volume (ft3):				0	ft^3
Post	0	ft^3/min	@	10	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
1	0.0	17:42:00	555.078	0.74		2.00	334	250	66	n/a	65	15.0
1	5.0	17:47:00	557.480	0.87		2.00	333	255	66	n/a	52	13.0
1	10.0	17:52:00	561.060	0.89		2.00	333	255	67	n/a	52	13.0
1	15.0	17:57:00	564.860	0.80		2.00	333	256	68	n/a	55	13.0
1	20.0	18:02:00	568.650	0.87		2.00	333	256	68	n/a	58	13.0
1	25.0	18:07:00	572.440	0.89		2.00	333	256	69	n/a	60	13.0
1	30.0	18:12:00	576.180	0.87		2.00	334	255	68	n/a	63	13.0
1	35.0	18:17:00	579.970	0.83		2.00	333	255	68	n/a	64	13.0
1	40.0	18:22:00	583.670	0.87		2.00	334	256	69	n/a	65	13.0
1	45.0	18:27:00	587.400	0.89		2.00	333	256	69	n/a	65	13.0
1	50.0	18:32:00	591.140	0.89		2.00	333	256	69	n/a	58	14.0
1	55.0	18:37:00	594.920	0.80		2.00	333	255	69	n/a	58	14.0
Last Pt	60.0	18:42:00	598.687									
Final Value	60.0	18:42:00	598.687						**Maximum Vacuum**			15.0
Average Values				0.85		2.00	333	255	68		60	
								162				

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/22/17
Sampling Location	STACK	Project #	11542
Operators	MB	Run #	1
Test Method	26A	Sampling Type	Isokinetic ☐ Constant Rate ☒

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	—	°F
Avg Gas Meter Temp	(t_m)	—	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.920	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	—	in H_2O
Stack Moisture Content	(B_{ws})	—	%
Oxygen	(O_2)	—	%
Carbon Dioxide	(CO_2)	—	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	—	
Pressures			
Barometric Pressure	(P_b)	29.71	in Hg
Stack Static Pressure	(P_{static})	—	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	(Y) / N	Post (Y) / N
Orsat Leak	Pre	~~Y~~ / ~~N~~	Post ~~Y~~ / ~~N~~
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CEMS7MB		
Meterbox Cal. Factor	(Y)	~~1.920~~ cH	0.965
Filter / Nozzle #	—	—	
Actual Nozzle Diameter	(D_{na})	—	in
Req. Nozzle Diameter	(D_{ni})	—	in
Probe #	P6-1		
Liner Material	GLASS		
Pitot #	—		
Thermocouple #	TC61		

ΔV_m	Vacuum Leak Check				
Pre	.009	ft³/min	@	~~15~~	in Hg
Post	0.000	ft³/min	@	10	in Hg
Pitot	Leak Checks				
~~Pre~~		~~inches~~	@		in H_2O
Post		inches	@		in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A	0	1410	645.627		1.9	1.9	336	261	88	255	59	7
	5	1415	649.49		1.9	1.9	234	260	88	254	54	7
	10	1420	653.29		1.9	1.9	334	254	89	264	55	8
	15	1428	657.127		1.9	1.9	334	259	91	254	61	8
	20	1433	661.05		1.9	1.9	334	258	92	257	62	8
	25	1438	664.91		1.9	1.9	335	259	92	253	65	8
	30	1446	668.808		1.9	1.9	334	253	93	254	65	8
	35	1451	672.80		1.9	1.9	335	259	93	264	63	7
	40	1456	676.66		1.9	1.9	335	258	94	257	63	7
	45	1501	680.53		1.9	1.9	335	259	95	262	66	7
	50	1506	684.21		1.9	1.9	335	258	95	259	65	7
	55	1511	688.26		1.9	1.9	335	254	95	261	63	7
	60	516	692.141									

Operator Signature

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/22/17
Sampling Location	STACK	Project #	11542
Operators	TJC	Run #	2
Test Method	MM26	Sampling Type	Isokinetic ☐ Constant Rate ☒

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	/	°F
Avg Gas Meter Temp	(t_m)	/	°F
DH @ 0.75 SCFM	(ΔH@)	1.9	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	/	in H_2O
Stack Moisture Content	(B_{ws})	/	%
Oxygen	(O_2)	/	%
Carbon Dioxide	(CO_2)	/	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	/	
Pressures			
Barometric Pressure	(P_b)	29.71	in Hg
Stack Static Pressure	(P_{static})	—	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre Y / N	Post	Y / N
Orsat Leak	Pre Y / N	Post	Y / N
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CEMS 7 M13		
Meterbox Cal. Factor	(Y)	0.965	
Filter / Nozzle #	~~11-0520~~ CH N/A		
Actual Nozzle Diameter	(D_{na})	~~0.253~~ CH	in
Req. Nozzle Diameter	(D_{ni})	—	in
Probe #	P6-1		
Liner Material	Glass		
Pitot #	PT04		
Thermocouple #	TC6-1		

ΔV_m	Vacuum Leak Check				
Pre	0.000	ft³/min	@	12	in Hg
Post	.00	ft³/min	@	12	in Hg
Pitot	Leak Checks				
Pre	0.0	inches	@	5.1	in H_2O
Post	.00	inches	@	5.6	in H_2O

248-273

1818
894.531

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
	0	1823	692.913	.80	N/A	1.9	337	253	93	264	66	9
	5	1828	695.21	.76		1.9	337	255	93	262	65	7
	10	1833	699.11	.74		1.9	337	256	93	260	64	6
	15	1838	703.03	.81		1.9	337	257	94	269	67	6
	20	1843	706.93	.90		1.9	337	255	95	266	67	6
	25	1848	710.93	.83		1.9	337	257	95	262	62	6
	30	1853	714.93	.85		1.9	337	256	95	267	61	6
	35	1858	718.94	.87		1.9	337	258	98	259	60	6
	40	1903	722.98	.80		1.9	337	258	98	262	60	6
	45	1908	726.97	.77		1.9	337	258	99	259	59	6
	50	1913	731.00	.75		1.9	337	258	99	258	59	6
	55	1918	735.13	.84		1.9	337	259	99	257	59	6
	60	1923	739.048			1.9					5	

Operator Signature

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/23/17
Sampling Location	STACK	Project #	11542
Operators	AI TC	Run #	3
Test Method	26A	Sampling Type	Isokinetic ☐ Constant Rate ☒

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	—	°F
Avg Gas Meter Temp	(t_m)	—	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	—	in H_2O
Stack Moisture Content	(B_{ws})	—	%
Oxygen	(O_2)	—	%
Carbon Dioxide	(CO_2)	—	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	—	
Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	Ø / N	Post ✓ / N
Orsat Leak	Pre	~~Y / N~~	~~Post Y / N~~
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CFM 3 nB		
Meterbox Cal. Factor	(Y)	.956	
Filter / Nozzle #	—	—	
Actual Nozzle Diameter	(D_{na})	—	in
Req. Nozzle Diameter	(D_{ni})	—	in
Probe #	P6-2		
Liner Material	S GLASS		
Pitot #	PT-04		
Thermocouple #	TC6-2		

ΔV_m	Vacuum Leak Check				
Pre	.000	ft^3/min	@	10	in Hg
Post	0.0	ft^3/min	@	10	in Hg
Pitot	Leak Checks				
Pre	.00	inches	@	5.1	in H_2O
Post	0.0	inches	@	6.2	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A1	0	1742	555.078	.74		2.0	334	250	66	|	65	13
	5	1747	557.43	.87	|	2.0	333	255	66	|	52	13
	10	1752	561.06	.89	|	2.0	333	255	67	|	52	13
	15	1757	564.86	.80	|	2.0	333	256	68	|	55	13
	20	1802	568.65	.87	|	2.0	333	256	68	|	58	13
	25	1807	572.44	.84	|	2.0	333	256	69	|	60	13
	30	1812	576.18	.87	|	2.0	334	255	68	|	63	13
	35	1817	579.97	.83	|	2.0	333	255	68	|	64	13
	40	1822	583.67	.87	|	2.0	334	256	69	|	65	13
	45	1827	587.40	.89	|	2.0	333	256	69	|	65	13
	50	1832	591.14	.84	|	2.0	333	256	69	|	58	14
	55	1837	594.92	.80	|	2.0	333	255	69	|	58	14
	60	1842	598.687		|					|		

Operator Signature

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	GREC	**Date**	03/22/17
Sampling Location	Boiler stack	**Project #**	11542
Operator	MB	**# of Ports Used**	1
Stack Type	Circular	**Meter Box Number**	CEMS7MB
Train Leak Check	☐ **PreTest**	☐ **PostTest**	

Moisture Content Data								
Run Number	1		**Run Start Time**	14:10		**Run Stop Time**	15:16	
Total Meter Volume	(V_m)	46.514	dcf	**Barometric Press.**		(P_b)	29.71	in Hg
Avg Meter Temp	$(t_m)_{avg}$	92	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	335	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.90	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		h2so4	h2so4		Sil Gel			
Initial Value	$(V_i),(W_i)$	574.70	686.40	624.50	875.80			
Final Value	$(V_f),(W_f)$	780.60	700.80	628.60	894.00			
Net Value	$(V_n),(W_n)$	205.9	14.4	4.1	18.2			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	242.60	g	**Water Vol Weighed**		$(V_{wsg(std)})$	11.439	scf
Std Meter Volume	$(V_{m(std)})$	42.827	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	$(B_{ws(calc)})$	21.1	%	**Final Moisture Content**		(B_{ws})	21.1	%

Moisture Content Data								
Run Number	2		**Run Start Time**	18:23		**Run Stop Time**	19:23	
Total Meter Volume	(V_m)	46.135	dcf	**Barometric Press.**		(P_b)	29.71	in Hg
Avg Meter Temp	$(t_m)_{avg}$	96	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	337	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.90	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		h2so4	h2so4		Sil Gel			
Initial Value	$(V_i),(W_i)$	683.90	687.60	628.60	894.00			
Final Value	$(V_f),(W_f)$	899.10	705.60	635.30	912.70			
Net Value	$(V_n),(W_n)$	215.2	18.0	6.7	18.7			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	258.60	g	**Water Vol Weighed**		$(V_{wsg(std)})$	12.193	scf
Std Meter Volume	$(V_{m(std)})$	42.185	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	22.4	%	**Final Moisture Content**		(B_{ws})	22.4	%

Moisture Content Data								
Run Number	3		**Run Start Time**	17:42		**Run Stop Time**	18:42	
Total Meter Volume	(V_m)	43.609	dcf	**Barometric Press.**		(P_b)	29.86	in Hg
Avg Meter Temp	$(t_m)_{avg}$	68	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	333	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	2.00	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	ml	ml	ml
Contents		h2so4	h2so4		Sil Gel			
Initial Value	$(V_i),(W_i)$	693.80	580.90	608.30	870.90			
Final Value	$(V_f),(W_f)$	913.50	585.33	612.60	886.90			
Net Value	$(V_n),(W_n)$	219.7	4.4	4.3	16.0			
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	244.43	g	**Water Vol Weighed**		$(V_{wsg(std)})$	11.525	scf
Std Meter Volume	$(V_{m(std)})$	41.812	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	21.6	%	**Final Moisture Content**		(B_{ws})	21.6	%

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	03/22/17
Sampling Location	Stack	**Project #**	11542
Operators	AL, TC, MB	**Run #**	1
Test Method	26A	**Impinger Bucket #**	13

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		H_2SO_4	H_2SO_4	MT	SG			
Initial Value	(Vi),(Wi)	574.7	686.4	624.5	875.8			
Final Value	(Vf),(Wf)	780.6	700.8	628.6	894.0			
Net Value	(Vn),(Wn)	205.9	14.4	4.1	18.2			

Train Prepared by: [signature]

Train Recovered by: [signature]

25.3% R_{SV}

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/22/17
Sampling Location	Boiler Stack	**Project #**	11542
Operators	TC	**Run #**	2
Test Method	MM26	**Impinger Bucket #**	2

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		100ml	100ml	—	—			
Contents		0.1N H_2SO_4	0.1N H_2SO_4	MT	SG			
Initial Value	(Vi),(Wi)	683.9	687.6	628.6	894.0			
Final Value	(Vf),(Wf)	899.1	705.6	635.3	912.7			
Net Value	(Vn),(Wn)	215.2	18.0	6.7	18.7			

Train Prepared by:	C. HORTON
Train Recovered by:	A LAGUNAS

22.9 g B_{ws}

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/23/17
Sampling Location	Boiler Stack	**Project #**	11542
Operators	TC	**Run #**	3
Test Method	MM26	**Impinger Bucket #**	21

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		100 ml	100 ml	MT	SG			
Contents		0.1 N H2SO4						
Initial Value	(Vi),(Wi)	695.8	580.9	608.3	870.7			
Final Value	(Vf),(Wf)	913.5	585.3	612.6	886.9			
Net Value	(Vn),(Wn)	219.7	4.4	4.3	16.0			

Train Prepared by:	C. Horton
Train Recovered by:	C. Horton

21.4 % Bwa

Appendix E-7: Mercury Test Data

Summaries
Method 30B Field Data Sheets
Analytical Results

C.E.M. Solutions, Inc. **Mercury Results Summary**

Client: GREC - Gainesville
Unit: 1
Job #: 11542

	Units	Not Used 1	3	4	5	Average Run 1-8	Standard
		Not Used					
Run Start Date	mm/dd/yyyy	3/22/2017	3/24/2017	3/24/2017	3/24/2017		
Start Time	hh:mm:ss	14:10:00	8:00:00	10:22:00	12:10:00		
Run Stop Date	mm/dd/yyyy	3/22/2027	3/24/2017	3/24/2017	3/24/2017		
Stop Time	hh:mm:ss	2:48:00	9:12:00	11:32:00	13:45:00		
Fuel Factor	Fc	9240	9240	9240	9240	9240	
Total Hg Dry	$\mu g/m^3$	0.565	0.638	0.515	0.544	0.6	
Total Hg Rate	Lb/mmBtu	3.87E-07	4.39E-07	3.54E-07	3.75E-07	3.89E-07	8.00E-07

C.E.M. Solutions, Inc. **30B Average Emissions Run Summary**

Client:	GREC - Gainesville	Run Start Date:	3/22/2017
Unit:	1	Run Start Time:	14:10
Job #:	11542	Run End Date:	3/22/2027
Run #:	1	Run End Time:	2:48

Trap A Data

Actual Spike Amount (m_{spiked})		50.000 ng	
Measured Spike (C_{rec})		0.258 ug/m3	
Spiked Hg Recovery (R)		65%	
Serial Number		OL295477	
Carbon Sec. 1 Recovered (m_{1a})		112.425 ng	
Carbon Sec. 2 Recovered (m_{2a})		0.647 ng	J
Breakthrough % (B_a)		1%	
Total Hg Collected:		0.497 ug/m3	
Dry Standard Liters Sampled	(Vs)	126.913 L	
Total Collected Hg (C_a)		0.497 ug/m3	

Trap B Data

Actual Spike Amount (m_{spiked})		0.000 ng	
Measured Spike (C_{rec})		0.000 ug/m3	
Spiked Hg Recovery (R)		0%	
Serial Number		OL299325	
Carbon Sec. 1 Recovered (m_{1b})		79.775 ng	
Carbon Sec. 2 Recovered (m_{2b})		0.338 ng	ND
Breakthrough % (B_b)		0%	
Total Hg Collected:		0.633 ug/m3	
Dry Standard Liters Sampled	(Vu)	126.476 L	
Total Collected Hg (C_b)		0.633 ug/m3	

30B Average Emissions

Trap A and B Total Hg Relative Deviation (RD)	12%
Average Total Hg Concentration µg/m^3 Dry (C_d)	0.565 ug/m3

Data Flags:

ND =	Catch < MDL	J =	Estimate. Catch over MDL but under calibration curve
E =	Catch above calibration curve		

C.E.M. Solutions, Inc. **30B Average Emissions Run Summary**

Client:	GREC - Gainesville	Run Start Date:	3/24/2017
Unit:	1	Run Start Time:	8:00
Job #:	11542	Run End Date:	3/24/2017
Run #:	3	Run End Time:	9:12

Trap A Data

Actual Spike Amount (m_{spiked})		0.000 ng	
Measured Spike (C_{rec})		0.000 ug/m3	
Spiked Hg Recovery (R)		0%	
Serial Number		OL299443	
Carbon Sec. 1 Recovered (m_{1a})		68.100 ng	
Carbon Sec. 2 Recovered (m_{2a})		1.052 ng	J
Breakthrough % (B_a)		2%	
Total Hg Collected:		0.628 ug/m3	
Dry Standard Liters Sampled	(Vu)	110.080 L	
Total Collected Hg (C_a)		0.628 ug/m3	

Trap B Data

Actual Spike Amount (m_{spiked})		50.000 ng	
Measured Spike (C_{rec})		0.470 ug/m3	
Spiked Hg Recovery (R)		104%	
Serial Number		OL303250	
Carbon Sec. 1 Recovered (m_{1b})		121.200 ng	
Carbon Sec. 2 Recovered (m_{2b})		0.609 ng	J
Breakthrough % (B_b)		1%	
Total Hg Collected:		0.648 ug/m3	
Dry Standard Liters Sampled	(Vs)	110.880 L	
Total Collected Hg (C_b)		0.648 ug/m3	

30B Average Emissions

Trap A and B Total Hg Relative Deviation (RD)	2%
Average Total Hg Concentration µg/m^3 Dry (C_d)	0.638 ug/m3

Data Flags:

ND =	Catch < MDL	J =	Estimate. Catch over MDL but under calibration curve
E =	Catch above calibration curve		

C.E.M. Solutions, Inc. **30B Average Emissions Run Summary**

Client:	GREC - Gainesville	Run Start Date:	3/24/2017
Unit:	1	Run Start Time:	10:22
Job #:	11542	Run End Date:	3/24/2017
Run #:	4	Run End Time:	11:32

Trap A Data

Actual Spike Amount (m_{spiked})		0.000 ng	
Measured Spike (C_{rec})		0.000 ug/m3	
Spiked Hg Recovery (R)		0%	
Serial Number		OL299334	
Carbon Sec. 1 Recovered (m_{1a})		70.325 ng	
Carbon Sec. 2 Recovered (m_{2a})		0.283 ng	ND
Breakthrough % (B_a)		0%	
Total Hg Collected:		0.541 ug/m3	
Dry Standard Liters Sampled	(Vu)	130.416 L	
Total Collected Hg (C_a)		0.541 ug/m3	

Trap B Data

Actual Spike Amount (m_{spiked})		50.000 ng	
Measured Spike (C_{rec})		0.333 ug/m3	
Spiked Hg Recovery (R)		86%	
Serial Number		OL300761	
Carbon Sec. 1 Recovered (m_{1b})		112.750 ng	
Carbon Sec. 2 Recovered (m_{2b})		0.415 ng	ND
Breakthrough % (B_b)		0%	
Total Hg Collected:		0.488 ug/m3	
Dry Standard Liters Sampled	(Vs)	129.472 L	
Total Collected Hg (C_b)		0.488 ug/m3	

30B Average Emissions

Trap A and B Total Hg Relative Deviation (RD)	5%
Average Total Hg Concentration µg/m^3 Dry (C_d)	0.515 ug/m3

Data Flags:

ND =	Catch < MDL	J =	Estimate. Catch over MDL but under calibration curve
E =	Catch above calibration curve		

C.E.M. Solutions, Inc. **30B Average Emissions Run Summary**

Client:	GREC - Gainesville	Run Start Date:	3/24/2017
Unit:	1	Run Start Time:	12:10
Job #:	11542	Run End Date:	3/24/2017
Run #:	5	Run End Time:	13:45

Trap A Data

Actual Spike Amount (m_{spiked})		0.000 ng	
Measured Spike (C_{rec})		0.000 ug/m3	
Spiked Hg Recovery (R)		0%	
Serial Number		OL299321	
Carbon Sec. 1 Recovered (m_{1a})		70.050 ng	
Carbon Sec. 2 Recovered (m_{2a})		0.448 ng	ND
Breakthrough % (B_a)		1%	
Total Hg Collected:		0.556 ug/m3	
Dry Standard Liters Sampled	(Vu)	126.816 L	
Total Collected Hg (C_a)		0.556 ug/m3	

Trap B Data

Actual Spike Amount (m_{spiked})		50.000 ng	
Measured Spike (C_{rec})		0.371 ug/m3	
Spiked Hg Recovery (R)		94%	
Serial Number		OL300597	
Carbon Sec. 1 Recovered (m_{1b})		116.800 ng	
Carbon Sec. 2 Recovered (m_{2b})		0.549 ng	J
Breakthrough % (B_b)		0%	
Total Hg Collected:		0.532 ug/m3	
Dry Standard Liters Sampled	(Vs)	126.563 L	
Total Collected Hg (C_b)		0.532 ug/m3	

30B Average Emissions

Trap A and B Total Hg Relative Deviation (RD)	2%
Average Total Hg Concentration µg/m^3 Dry (C_d)	0.544 ug/m3

Data Flags:

ND =	Catch < MDL	J =	Estimate. Catch over MDL but under calibration curve
E =	Catch above calibration curve		

Method 30B Field Data Sheets

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	GREC	**Date**	3/22/2017
Plant	Gainesville	**Project #**	11542
Sampling Location	Boiler Stack	**Run #**	1
Operator	MB/TJC	**Probe #**	P6-30B
Barometric Pressure	29.71	**Thermocouple #**	TC-P6-30B

Sampling Equipment	**Train: A**		
Meter #	CEMS30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL295477		
Spiked Concentration	50		ng

Sampling Equipment	**Train: B**		
Meter #	CEMS30B-01B		
Meterbox Cal. Factor	(Y)	1.001	
Sorbent Tube #	OL299325		
Spiked Concentration	0		ng

ΔV_m	**Leak Checks**		**Train: A**		
Pre	0.0	l/min	@	12.0	in/Hg
Post	0.0	l/min	@	23.0	in/Hg

ΔV_m	**Leak Checks**		**Train: B**		
Pre	0.0	l/min	@	14.0	in/Hg
Post	0.0	l/min	@	22.0	in/Hg

						Train: A				**Train: B**			
Traverse Point	**Clock Time**	**Sampling Time**	**Stack Temp**	**Trap Temp**	**Chiller Temp**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**
			°F	°F	°F	liters	l/min	°F	in/Hg	liters	l/min	°F	in/Hg
A1	14:10:00	0	336	330	n/a	0.000	2.0	89	17.0	0.000	2.0	89	15.0
A2	14:15:00	5	334	334	n/a	10.600	2.0	89	17.0	10.400	2.0	89	15.0
A3	14:20:00	10	334	335	n/a	21.400	2.0	89	17.0	20.900	2.0	89	15.0
B1	14:28:00	15	334	335	n/a	32.130	2.0	90	17.0	31.577	2.0	90	15.0
B2	14:33:00	20	334	336	n/a	43.400	2.0	91	17.0	42.600	2.0	91	15.0
B3	14:38:00	25	334	337	n/a	54.100	2.0	92	17.0	53.400	2.0	92	15.0
C1	15:18:00	30	335	235	n/a	64.870	2.0	93	17.0	64.187	2.0	93	15.0
C2	15:23:00	35	335	254	n/a	76.900	2.0	93	17.0	76.300	2.0	93	15.0
C3	15:28:00	40	335	274	n/a	87.900	2.0	93	17.0	87.300	2.0	93	15.0
D1	16:33:00	45	335	216	n/a	98.870	2.0	93	17.0	98.259	2.0	93	15.0
D2	16:38:00	50	335	231	n/a	111.000	2.0	93	17.0	110.700	2.0	93	15.0
D3	16:43:00	55	338	260	n/a	122.500	2.0	93	17.0	122.100	2.0	93	15.0
	16:48:00	60				133.232				132.906			
Averages			334.9	289.8			2.00	91.5			2.00	91.5	
Maximum Value									17.0				15.0
Std. Meter Volume Collected						126.913				126.476			

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	GREC	**Date**	3/24/2017
Plant	Gainesville	**Project #**	11542
Sampling Location	Boiler Stack	**Run #**	3
Operator	MB/TJC	**Probe #**	P6-30B
Barometric Pressure	30.01	**Thermocouple #**	TC-P6-30B

Sampling Equipment	**Train: A**		
Meter #	CEMS30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL299443		
Spiked Concentration	0		ng

Sampling Equipment	**Train: B**		
Meter #	CEMS30B-01B		
Meterbox Cal. Factor	(Y)	1.001	
Sorbent Tube #	OL303250		
Spiked Concentration	50		ng

ΔV_m	**Leak Checks**	**Train: A**			
Pre	0.0	l/min	@	17.0	in/Hg
Post	0.0	l/min	@	17.0	in/Hg

ΔV_m	**Leak Checks**	**Train: B**			
Pre	0.0	l/min	@	17.0	in/Hg
Post	0.0	l/min	@	17.0	in/Hg

						Train: A				**Train: B**			
Traverse Point	**Clock Time**	**Sampling Time**	**Stack Temp**	**Trap Temp**	**Chiller Temp**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**
			°F	°F	°F	liters	l/min	°F	in/Hg	liters	l/min	°F	in/Hg
A1	08:00:00	0	333	322	n/a	0.000	2.0	58	13.0	0.000	2.0	59	12.0
A2	08:05:00	5	332	331	n/a	12.100	2.0	58	13.0	9.600	2.0	59	12.0
A3	08:10:00	10	333	327	n/a	20.400	2.0	58	13.0	17.400	2.0	59	13.0
B1	08:22:00	15	334	328	n/a	29.940	2.0	58	10.0	26.948	2.0	59	13.0
B2	08:27:00	20	333	329	n/a	38.800	2.0	60	10.0	35.900	2.0	60	13.0
B3	08:32:00	25	334	329	n/a	47.200	2.0	60	10.0	45.000	2.0	60	13.0
C1	08:39:00	30	333	336	n/a	56.012	2.0	61	10.0	54.270	2.0	61	13.0
C2	08:44:00	35	334	331	n/a	64.600	2.0	61	10.0	63.400	2.0	61	13.0
C3	08:49:00	40	333	333	n/a	73.100	2.0	61	10.0	72.500	2.0	62	13.0
D1	08:57:00	45	324	329	n/a	81.588	2.0	63	9.0	81.409	2.0	62	12.0
D2	09:02:00	50	334	329	n/a	90.400	2.0	63	9.0	90.800	2.0	63	12.0
D3	09:07:00	55	332	331	n/a	99.100	2.0	63	9.0	99.900	2.0	63	12.0
	09:12:00	60				107.940				108.903			
Averages			332.4	329.6			2.00	60.3			2.00	60.7	
Maximum Value									13.0				13.0
Std. Meter Volume Collected						110.080				110.880			

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	GREC	**Date**	3/24/2017
Plant	Gainesville	**Project #**	11542
Sampling Location	Boiler Stack	**Run #**	4
Operator	MB/TJC	**Probe #**	P6-30B
Barometric Pressure	30.01	**Thermocouple #**	TC-P6-30B

Sampling Equipment	**Train: A**		
Meter #	CEMS30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL299334		
Spiked Concentration	0		ng

Sampling Equipment	**Train: B**		
Meter #	CEMS30B-01B		
Meterbox Cal. Factor	(Y)	1.001	
Sorbent Tube #	OL300761		
Spiked Concentration	50		ng

ΔV_m	**Leak Checks**	**Train: A**			
Pre	0.0	l/min	@	17.0	in/Hg
Post	0.0	l/min	@	18.0	in/Hg

ΔV_m	**Leak Checks**	**Train: B**			
Pre	0.0	l/min	@	17.0	in/Hg
Post	0.0	l/min	@	18.0	in/Hg

						Train: A				**Train: B**			
Traverse Point	**Clock Time**	**Sampling Time**	**Stack Temp**	**Trap Temp**	**Chiller Temp**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**
			°F	°F	°F	liters	l/min	°F	in/Hg	liters	l/min	°F	in/Hg
A1	10:22:00	0	332	166	n/a	0.000	2.0	70	12.0	0.000	2.0	71	12.0
A2	10:27:00	5	334	190	n/a	10.500	2.0	70	12.0	10.700	2.0	71	12.0
A3	10:32:00	10	333	226	n/a	20.300	2.0	71	16.0	20.700	2.0	71	14.0
B1	10:41:00	15	335	278	n/a	30.867	2.0	72	16.0	31.535	2.0	72	14.0
B2	10:46:00	20	334	291	n/a	42.400	2.0	72	16.0	42.600	2.0	72	14.0
B3	10:51:00	25	334	311	n/a	53.400	2.0	73	17.0	53.600	2.0	73	15.0
C1	11:00:00	30	325	310	n/a	64.319	2.0	74	17.0	64.442	2.0	74	15.0
C2	11:05:00	35	335	321	n/a	75.800	2.0	74	17.0	75.700	2.0	74	15.0
C3	11:10:00	40	335	321	n/a	86.600	2.0	74	17.0	86.400	2.0	74	15.0
D1	11:17:00	45	335	316	n/a	97.493	2.0	74	17.0	97.232	2.0	74	15.0
D2	11:22:00	50	335	317	n/a	109.400	2.0	74	17.0	108.800	2.0	74	15.0
D3	11:27:00	55	335	322	n/a	120.100	2.0	77	17.0	119.500	2.0	77	15.0
	11:32:00	60				130.974				130.196			
Averages			333.5	280.8			2.00	72.9			2.00	73.1	
Maximum Value									17.0				15.0
Std. Meter Volume Collected						130.416				129.472			

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	GREC	**Date**	3/24/2017
Plant	Gainesville	**Project #**	11542
Sampling Location	Boiler Stack	**Run #**	5
Operator	MB/TJC	**Probe #**	P6-30B
Barometric Pressure	30.01	**Thermocouple #**	TC-P6-30B

Sampling Equipment	**Train: A**		
Meter #	CEMS30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL299321		
Spiked Concentration	0		ng

Sampling Equipment	**Train: B**		
Meter #	CEMS30B-01B		
Meterbox Cal. Factor	(Y)	1.001	
Sorbent Tube #	OL300597		
Spiked Concentration	50		ng

ΔV_m	**Leak Checks**	**Train: A**			
Pre	0.0	l/min	@	23.0	in/Hg
Post	0.0	l/min	@	21.0	in/Hg

ΔV_m	**Leak Checks**	**Train: B**			
Pre	0.0	l/min	@	23.0	in/Hg
Post	0.0	l/min	@	21.0	in/Hg

						Train: A				**Train: B**			
Traverse Point	**Clock Time**	**Sampling Time**	**Stack Temp**	**Trap Temp**	**Chiller Temp**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**	**Dry Gas Meter Reading**	**Flow Rate**	**Meter Temp**	**Pump Vacuum**
			°F	°F	°F	liters	l/min	°F	in/Hg	liters	l/min	°F	in/Hg
A1	12:10:00	0	334	197	n/a	0.000	2.0	75	17.0	0.000	2.0	75	15.0
A2	12:15:00	5	334	215	n/a	11.900	2.0	76	17.0	11.600	2.0	76	15.0
A3	12:20:00	10	334	239	n/a	22.300	2.0	76	17.0	22.900	2.0	76	15.0
B1	12:30:00	15	334	290	n/a	33.945	2.0	76	17.0	33.116	2.0	76	15.0
B2	12:35:00	20	334	297	n/a	45.500	2.0	77	18.0	44.100	2.0	77	15.0
B3	12:40:00	25	334	313	n/a	46.300	2.0	77	18.0	54.700	2.0	77	15.0
C1	12:50:00	30	334	315	n/a	67.184	2.0	77	18.0	65.336	2.0	77	15.0
C2	12:55:00	35	335	319	n/a	79.300	2.0	77	18.0	77.200	2.0	77	15.0
C3	13:00:00	40	335	321	n/a	90.100	2.0	77	17.0	88.300	2.0	77	15.0
D1	13:30:00	45	335	293	n/a	101.075	2.0	78	14.0	100.577	2.0	78	13.0
D2	13:35:00	50	335	293	n/a	108.700	2.0	78	14.0	110.400	2.0	78	13.0
D3	13:40:00	55	337	293	n/a	118.300	2.0	79	14.0	119.700	2.0	79	13.0
	13:45:00	60				128.314				128.186			
Averages			334.6	282.1			2.00	76.9			2.00	76.9	
Maximum Value									18.0				15.0
Std. Meter Volume Collected						126.816				126.563			

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	GREC	Date	3/22/17
Plant	GREC	Project #	11542
Sampling Location	Stack	Run #	1
Operator	MB	Probe #	P6-3013
Barometric Pressure	29.71	Thermocouple #	TC6-3013

Sampling Equipment	Train: A		
Meter #	CEMS30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL295477		
Spiked Concentration	50		ng

Sampling Equipment	Train: B		
Meter #	CEMS30B-01B		
Meterbox Cal. Factor	(Y)	1.001	
Sorbent Tube #	OL299325		
Spiked Concentration	———		ng

ΔV_m	Leak Checks	Train: A		
Pre	0.000	l/min	@ 12	in/Hg
Post	0.000	l/min	@ 23	in/Hg

ΔV_m	Leak Checks	Train: B		
Pre	0.000	l/min	@ 14	in/Hg
Post	0.002	l/min	@ 22	in/Hg

Traverse Point	Clock Time	Sampling Time	Stack Temp °F	Trap Temp °F	Chiller Temp °F	Train: A Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg	Train: B Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg
A 1	1410	0	336	330		0.000	2.0	89	17	0.000	2.0	89	15
2	1415	5	334	334		10.6	2.0	89	17	10.4	2.0	89	15
3	1420	10	334	335		21.4	2.0	89	17	20.9	2.0	89	15
B 1	1428	15	334	335		32.130	2.0	90	17	31.577	2.0	90	15
2	1433	20	334	336		43.4	2.0	91	17	42.6	2.0	91	15
3	1438	25	334	337		54.1	2.0	92	17	53.4	2.0	92	15
C 1	1518	30	335	235		64.870	2.0	93	17	64.187	2.0	93	15
2	1523	35	335	254		76.9	2.0	93	17	76.3	2.0	93	15
3	1528	40	335	274		87.9	2.0	93	17	87.3	2.0	93	15
D 1	1633	45	335	216		98.870	2.0	93	17	98.259	2.0	93	15
2	1638	50	335	231		111.0	2.0	93	17	110.7	2.0	93	15
3	1643	55	336	260		122.5	2.0	93	17	122.1	2.0	93	15
END	1648	60				133.232				132.906			

Pause 1428 1443 Resume 1518

Paused 1533 resume 1633

Train A Std. Meter Volume Collected: 126.913 Train B Std. Meter Volume Collected: 126.476

Operator Signature:

17.4

3.3

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	Grec	Date	3/24/17
Plant	Gainesville	Project #	11542
Sampling Location	STACK	Run #	3
Operator	TJC	Probe #	P6-30B
Barometric Pressure	30.01	Thermocouple #	TCP6-30B

Sampling Equipment	Train: A		
Meter #	Cems 30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL2994HB		
Spiked Concentration	—		ng

Sampling Equipment	Train: B		
Meter #	Cems 30B-01B		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL303250		
Spiked Concentration	50		ng

ΔV_m		Leak Checks	Train: A		
Pre	.00	l/min	@	17	in/Hg
Post	.00	l/min	@	17	in/Hg

ΔV_m		Leak Checks	Train: B		
Pre	.00	l/min	@	17	in/Hg
Post	.00	l/min	@	17	in/Hg

						Train: A				Train: B			
Traverse Point	Clock Time	Sampling Time	Stack Temp °F	Trap Temp °F	Chiller Temp °F	Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg	Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg
1	800	0	333	332	|	0.00	2.0	58	13	0.00	2.0	59	12
2	805	5	332	331	|	12.1	2.0	58	13	9.6	2.0	59	12
3	810	10	333	327	|	20.4	2.0	58	13	17.4	2.0	59	13
		15		~~327~~ 332	|								
1	822	15	334	328	|	29.94	2.0	58	10	26.948	2.0	59	13
2	827	20	333	329	|	38.8	2.0	60	10	35.9	2.0	60	13
3	832	25	334	329	|	47.2	2.0	60	10	45.0	2.0	60	13
					|							
1	839	30	333	336	|	56.012	2.0	61	10	54.270	2.0	61	13
2	844	35	334	331	|	64.6	2.0	61	10	63.4	2.0	61	13
3	849	40	333	333	|	73.1	2.0	61	10	72.5	2.0	62	13
					|							
1	857	45	324	329	|	81.588	2.0	63	9	81.409	2.0	62	12
2	902	50	334	329	|	90.4	2.0	63	9	90.8	2.0	63	12
3	907	56	332	331	|	99.1	2.0	63	9	99.9	2.0	63	12
END	912	60				107.940				108.903			

Train A Std. Meter Volume Collected: ~~108.779~~ cf 110.080

Train B Std. Meter Volume Collected: ~~109.771~~ cf 110.880

Operator Signature: Thomas Camp

17.2
3.14

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	Gree	Date	3/24/17
Plant	Gainesville	Project #	11542
Sampling Location	STACK	Run #	4
Operator	TJC	Probe #	PB-305
Barometric Pressure	30.01	Thermocouple #	TCPB-305

Sampling Equipment	Train: A		
Meter #	Cems30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL749334		
Spiked Concentration	—		ng

Sampling Equipment	Train: B		
Meter #	Cems30B-01B		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL3007781		
Spiked Concentration	50		ng

ΔV_m		Leak Checks	Train: A		
Pre	.00	l/min	@	17	in/Hg
Post	.00	l/min	@	18	in/Hg

ΔV_m		Leak Checks	Train: B		
Pre	.00	l/min	@	17	in/Hg
Post	.00	l/min	@	18	in/Hg

							Train: A				Train: B			
Traverse Point		Clock Time	Sampling Time	Stack Temp °F	Trap Temp °F	Chiller Temp °F	Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg	Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg
A	1	1022	0	332	166		0.000	2.0	70	12	0.000	2.0	71	12
	2	1027	5	334	190		10.5	2.0	70	12	10.7	2.0	71	12
	3	1032	10	333	226		20.3	2.0	71	16	20.7	2.0	71	14
B	1	1041	15	335	278		30.867	2.0	72	16	31.535	2.0	72	14
	2	1046	20	334	291		42.4	2.0	72	16	42.6	2.0	72	14
	3	1051	25	334	311		53.4	2.0	73	17	53.6	2.0	73	15
C	1	1100	30	325	310		64.319	2.0	74	17	64.442	2.0	74	15
	2	1105	35	335	321		75.8	2.0	74	17	75.7	2.0	74	15
	3	1110	40	335	321		86.6	2.0	74	17	86.4	2.0	74	15
D	1	1117	45	335	316		97.493	2.0	74	17	97.323	2.0	74	15
	2	1122	50	335	317		109.4	2.0	74	17	109.8	2.0	74	15
	3	1127	55	335	322		120.1	2.0	77	17	119.5	2.0	77	15
END		1132	60				130.474				130.196			

Train A Std. Meter Volume Collected: 130.416 Train B Std. Meter Volume Collected: 129.472

Operator Signature: [signature]

17.3

3.4

C.E.M. SOLUTIONS
30B RUN DATA SHEET

Company	Gee	Date	3/24/17
Plant	Gainesville	Project #	11542
Sampling Location	STACK	Run #	5
Operator	TJC	Probe #	PB-3015
Barometric Pressure	30.01	Thermocouple #	TC PB-3015

Sampling Equipment	Train: A		
Meter #	Cems30B-01A		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL2993		
Spiked Concentration	—		ng

Sampling Equipment	Train: B		
Meter #	Cems 30B-01B		
Meterbox Cal. Factor	(Y)	1.002	
Sorbent Tube #	OL300597		
Spiked Concentration	50ng		ng

ΔV_m		Leak Checks	Train: A		
Pre	.00	l/min	@	23	in/Hg
Post	0.000	l/min	@	21	in/Hg

ΔV_m		Leak Checks	Train: B		
Pre	.00	l/min	@	23	in/Hg
Post	0.000	l/min	@	21	in/Hg

						Train: A				Train: B			
Traverse Point	Clock Time	Sampling Time	Stack Temp °F	Trap Temp °F	Chiller Temp °F	Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg	Dry Gas Meter Reading liters	Flow Rate l/min	Meter Temp °F	Pump Vacuum in/Hg
A 1	1210	0	334	197		0.00	2.0	75	17	0.00	2.0	75	15
2	1215	5	334	215		4.9	2.0	76	17	11.6	2.0	76	15
3	1220	10	334	234		22.3	2.0	76	17	22.9	2.0	76	15
B 1	1230	15	334	290		33.945	2.0	76	17	33.116	2.0	76	15
2		20	334	297		45.5	2.0	77	18	44.1	2.0	77	15
3		25	334	313		56.3	2.0	77	18	54.7	2.0	77	15
C 1	1250	30	334	~~67.184~~ 315		67.184	2.0	77	18	65.336	2.0	77	15
2	1255	35	335	319		79.3	2.0	77	18	77.2	2.0	77	15
3	1300	40	335	321		90.1	2.0	77	17	88.3	2.0	77	15
					off	98.806	Pre leak	check	→	99.116			
D 1	1330	45	335	293		101.075	2.0	78	14	100.577	2.0	78	13
2	1335	50	335	293		108.7	2.0	78	14	110.4	2.0	78	13
3	1340	55	337	293		118.3	2.0	79	14	119.7	2.0	79	13
END	1345	60				128.314				128.186			

Pre leak check

Train A Std. Meter Volume Collected: 126.816 Train B Std. Meter Volume Collected: 126.563

Operator Signature: [signature]

Paused 1302 42.05
resumed 1315 93356 91.917

94.3 77.2 17.4
293 22.9 3.4

C.E.M. Solutions, Inc. **Hg Sorbent Tube Analysis Raw Data**

Client: GREC - Gainesville
Analyst: A. Lagunas

Project #	Run:	Train	Date	Cal Curve Used	Analyzer Serial #	Trap ID	Spike (ng)	Carbon Analytical Bed Section 1 Area	Carbon Analytical Bed Section 1 ng	Carbon Breakthrough Bed Section 2 Area	Carbon Breakthrough Bed Section 2 ng
11542	1	A	4/4/2017	1	2222	OL295477	50.00	44970	112.43	270	0.65
		B	4/4/2017	1	2222	OL299325	0.00	31910	79.78	141	0.34
11542	3	A	4/4/2017	1	2222	OL299443	0.00	27240	68.10	439	1.05
		B	4/4/2017	1	2222	OL303250	50.00	48480	121.20	254	0.61
11542	4	A	4/4/2017	1	2222	OL299334	0.00	28130	70.33	118	0.28
		B	4/4/2017	1	2222	OL300761	50.00	45100	112.75	173	0.41
11542	5	A	4/4/2017	1	2222	OL299321	0.00	28020	70.05	187	0.45
		B	4/4/2017	1	2222	OL300597	50.00	46720	116.80	229	0.55

C.E.M. Solutions, Inc. **30B Analysis QA/QC Summary**

Client: GREC - Gainesville
Analyst: A. Lagunas
Cal Date: 4/4/2017

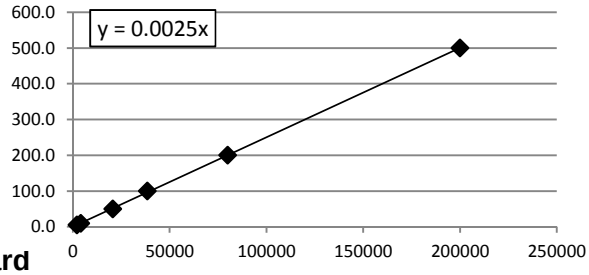
Analyzer Serial #: 2222
Analyzer MDL: 0.517 ng
Analytical Bias Test Min: 10 ng
Analytical Bias Test Max: 4000 ng
Flow Rate: 1.50 LPM
Oven Temp: 680 °C

Multipoint Analyzer Calibration 1

No.	Cal Std. Lot #	Conc. (µg/mL)	Volume Used (µL)	Standard (ng)	Area Count	Area/ng	Calculated (ng)	Recovery (%)
1	K2-MEB603126	0.1001	50.0	5.01	2036	406.8	**5.1**	102
2	K2-MEB603126	0.1001	100.0	10.01	4125	412.1	**10.3**	103
3	K2-MEB631041	1.0010	50.0	50.05	20680	413.2	**51.8**	103
4	K2-MEB631041	1.0010	100.0	100.10	38500	384.6	**96.4**	96
5	K2-HG650192	10.0020	20.0	200.04	80030	400.1	**200.3**	100
6	K2-HG650192	10.0020	50.0	500.10	200000	399.9	**500.5**	100
7								

Note: Recovery must be ±10%

Mean (Area/ng)	**402.8**
Std. Dev.	**10.6**
% RSD	**2.6**
Calibration Coefficient, A	**0.0025**
R-Square	**0.99990**



Analysis of Independent Calibration Standard

No.	Cal Std. Lot #	Conc. (µg/mL)	Volume Used (µL)	Standard (ng)	Area Count	Area/ng	Calculated (ng)	Recovery (%)
1	J2-MEB600156	10.0000	10.0	100.00	40000	400.0	**100.1**	100

Note: Recovery must be ±10%

Low Sample Analysis

No.	Cal Std. Lot #	Conc. (µg/mL)	Volume Used (µL)	Standard (ng)	Area Count	Area/ng
1	K2-MEB603126	0.1001	25.0	2.50	1044	417.2

Continuing Calibration Verification Standard Analysis Table

No.	Sample ID prior to analysis	Standard Conc. (mg/mL)	Volume Used (µL)	Standard (ng)	Area Count	Area/ng	Calculated (ng)	Recovery (%)
1	INITIAL	10.0020	13.0	130.03	49170	378.2	**123.1**	95
2	OL303250_S1	10.0020	13.0	130.03	53600	412.2	**134.1**	103
3	FINAL	10.0020	13.0	130.03	55230	424.8	**138.2**	106
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Note: Recovery must be ±10%

C.E.M. Solutions, Inc. — Field Recovery Test

Client: GREC - Gainesville
Unit: 1

Run ID	Trap ID	Sample Volume, L	Actual Spike, ng	Individual Vol. Deviation from FRT Avg	Spiked Train Vol. Deviation from Estimate	Spiked Hg Recovery (R)
1	OL295477	126.913	50.00	4%		
	OL299325	126.476	0.00	3%		
3	OL299443	110.080	0.00	-10%	8%	104%
	OL303250	110.880	50.00	-9%		
4	OL299334	130.416	0.00	7%	-7%	86%
	OL300761	129.472	50.00	6%		
5	OL299321	126.816	0.00	4%	-5%	94%
	OL300597	126.563	50.00	3%		
Average						95%

Criteria: Sample volume deviations must be within 20%
Average (R) must be between 85% and 115%

Trap ID

OL295477

OHIO LUMEX

R1

Sorbent Trap Chain of Custody Form

☐ **Unspiked** ☒ **Spiked At:** 50ng

Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) _____

QA/QC Signature (Spiker) _____

Production Lot: S-C94 Carbon Lot: RC

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☒ 185 mm ☐ 450 mm

Spike Date: 9/23/2015 Spike Time: 1100

Type of Trap: 30B

Plant/Stack	GREC Stack		Notes		
STMMS ID (check box)	Primary STMMS ☐		Backup STMMS ☐		Tester ☑
Trap A or B (check box)	Trap A ☑	Trap B ☐	Sampling System Manufacturer (check box)		Altech ☐
RATA Run Number (For RATA only)			Apex ☑ Clean Air ☐ Environmental Supply ☐ M&C ☐ Ohio Lumex ☐		
Trap Inserted/Pre-Leak Check (CEMS Date/Time)			Pre-Leak Check (check box)		
Date	3/22/17	Time 1400	Pass ☑ Fail ☐		
Sample Collection Start (CEMS Date/Time)			Duct Temp. (°F)		
Date	3/22/17	Time 1410	Sorbent Trap Temp. (°F)		
Sample Collection End (CEMS Date/Time)			Average Flow Rate (cc/min)		
Date		Time	Total Volume (L)		
Post-Leak Check/Trap Removed (CEMS Date/Time)			Post-Leak Check (check box)		
Date		Time	Pass ☑ Fail ☐		
Startup Event and/or Shutdown Event occurred (check box)			Startup Event ☐		Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)			**Estimated Hg in Section 1**		

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns Indicate number of Raw Mill Off events during this sample run: _____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/22/17		**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/22/17	1710	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		4/4/17	15:00	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID

OL299325

Ohio Lumex

Sorbent Trap Chain of Custody Form

☒ **Unspiked** ☐ **Spiked At:**_____
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) [signature]

QA/QC Signature (Spiker)_____

Production Lot: U-5AD Carbon Lot: RC

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☒ 185 mm ☐ 450 mm

Spike Date:_____ Spike Time:_____

Type of Trap: 30B

Plant/Stack	Grec Stack			Notes	
STMMS ID (check box)	Primary STMMS ☐			Backup STMMS ☐	Tester ☑
Trap A or B (check box)	Trap A ☐		Trap B ☑	Sampling System Manufacturer (check box)	Altech ☐
RATA Run Number (For RATA only)	—			Apex ☐ Clean Air ☐ Environmental Supply ☐ M&C ☐ Ohio Lumex ☐	
Trap Inserted/Pre-Leak Check (CEMS Date/Time)				Pre-Leak Check (check box)	
Date	3/22/17	Time	1400	Pass ☐ Fail ☐	
Sample Collection Start (CEMS Date/Time)				Duct Temp. (°F)	
Date	3/22/17	Time	1410	Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)				Average Flow Rate (cc/min)	
Date		Time		Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)				Post-Leak Check (check box)	
Date		Time		Pass ☑ Fail ☐	
Startup Event and/or Shutdown Event occurred (check box)				Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)				**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns Indicate number of Raw Mill Off events during this sample run:_____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by	[signature]	3/22/17	1400	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by	[signature]	3/22/17	1710	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by	[signature]	4/4/12	15:30	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID

OL299443

Ohio Lumex

Sorbent Trap Chain of Custody Form

~~RZ~~ R3

☒ **Unspiked** ☐ **Spiked At:**_____
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker)_____

QA/QC Signature (Spiker)_____

Production Lot: U-5AD Carbon Lot: RC

☐High Flow ☐Coil Pre-filter ☐240 mm
☐Static Pre-filter ☐AGS ☐300 mm
☐Fluffy Pre-filter ☒185 mm ☐450 mm

Spike Date:_____ Spike Time:_____

Type of Trap: 30B

Plant/Stack		Notes	
STMMS ID (check box)	Primary STMMS ☐	Backup STMMS ☐	Tester ☐
Trap A or B (check box)	Trap A ☑ Trap B ☐	Sampling System Manufacturer (check box)	Altech ☐
		Apex ☐ Clean Air ☐ Environmental Supply ☐	
RATA Run Number (For RATA only)		M&C ☐ Ohio Lumex ☐	
Trap Inserted/Pre-Leak Check (CEMS Date/Time)		Pre-Leak Check (check box)	
Date 3/23/17 Time 1300		Pass ☐ Fail ☐	
Sample Collection Start (CEMS Date/Time)		Duct Temp. (°F)	
Date 3/24/17 Time 600		Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)		Average Flow Rate (cc/min)	
Date 3/24/17 Time 612		Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)		Post-Leak Check (check box)	
Date 3/24/17 Time 920		Pass ☐ Fail ☐	
Startup Event and/or Shutdown Event occurred (check box)		Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)		**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns	Indicate number of Raw Mill Off events during this sample run:_____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/23/17	1300	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/24/17	930	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		4/4/17	15:30	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID

OL303250

OHIO LUMEX

R2 R3

Sorbent Trap Chain of Custody Form

☐ **Unspiked** ☒ **Spiked At:** 50ng

Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) _____

QA/QC Signature (Spiker) _____

Production Lot: S-C94 Carbon Lot: RC

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☒ 185 mm ☐ 450 mm

Spike Date: 9/23/2015 Spike Time: 1100

Type of Trap: 30B

Plant/Stack		Notes	
STMMS ID (check box)	Primary STMMS ☐	Backup STMMS ☐	Tester ☐
Trap A or B (check box)	Trap A ☐ Trap B ☒	Sampling System Manufacturer (check box)	Altech ☐ Apex ☐ Clean Air ☐ Environmental Supply ☐ M&C ☐ Ohio Lumex ☐
RATA Run Number (For RATA only)			
Trap Inserted/Pre-Leak Check (CEMS Date/Time)		Pre-Leak Check (check box)	
Date 3/23/17	Time 1300	Pass ☐	Fail ☐
Sample Collection Start (CEMS Date/Time)		Duct Temp. (°F)	
Date 3/24/17	Time 800	Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)		Average Flow Rate (cc/min)	
Date 3/24/17	Time 912	Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)		Post-Leak Check (check box)	
Date 3/24/17	Time 930	Pass ☑	Fail ☐
Startup Event and/or Shutdown Event occurred (check box)		Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)		**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns Indicate number of Raw Mill Off events during this sample run: _____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/23/17	1300	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/24/17	930	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		4/4/17	1530	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID

OL299334

OHIO LUMEX

Sorbent Trap Chain of Custody Form

RB RU

☒ **Unspiked** ☐ **Spiked At:**_____
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) Stan M

QA/QC Signature (Spiker)_____

Production Lot: U-5AD Carbon Lot: RC

☐High Flow ☐Coil Pre-filter ☐240 mm
☐Static Pre-filter ☐AGS ☐300 mm
☐Fluffy Pre-filter ☒185 mm ☐450 mm

4

Spike Date:_____ Spike Time:_____

Type of Trap: 30B

Plant/Stack		Notes	
STMMS ID (check box)	Primary STMMS ☐	Backup STMMS ☐	Tester ☐
Trap A or B (check box)	Trap A ☒ Trap B ☐	Sampling System Manufacturer (check box)	Altech ☐ Apex ☐ Clean Air ☐ Environmental Supply ☐ M&C ☐ Ohio Lumex ☐
RATA Run Number (For RATA only)			
Trap Inserted/Pre-Leak Check (CEMS Date/Time)		Pre-Leak Check (check box)	
Date 3/24/17	Time 1015	Pass ☑	Fail ☐
Sample Collection Start (CEMS Date/Time)		Duct Temp. (°F)	
Date 3/24/17	Time 1822	Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)		Average Flow Rate (cc/min)	
Date 3/24/17	Time 1132	Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)		Post-Leak Check (check box)	
Date 3/24/17	Time 1140	Pass ☑	Fail ☐
Startup Event and/or Shutdown Event occurred (check box)		Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)		**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns	Indicate number of Raw Mill Off events during this sample run:_____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/24/17	1015	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/24/17	1140	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		4/4/17	16:05	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:

Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID

OL300761

OHIO LUMEX

Sorbent Trap Chain of Custody Form

~~R3~~ R4

☐ **Unspiked** ☒ **Spiked At:** 50ng

Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) _____

QA/QC Signature (Spiker) _____

4

Production Lot: S-C94 **Carbon Lot:** RC

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☒ 185 mm ☐ 450 mm

Spike Date: 9/23/2015 **Spike Time:** 1100

Type of Trap: 30B

Plant/Stack		Notes	
STMMS ID (check box)	Primary STMMS ☐	Backup STMMS ☐	Tester ☐
Trap A or B (check box)	Trap A ☐ Trap B ☒	Sampling System Manufacturer (check box)	Altech ☐ Apex ☐ Clean Air ☐ Environmental Supply ☐ M&C ☐ Ohio Lumex ☐
RATA Run Number (For RATA only)			
Trap Inserted/Pre-Leak Check (CEMS Date/Time)		Pre-Leak Check (check box)	
Date 3/24/17	Time 1015	Pass ☑	Fail ☐
Sample Collection Start (CEMS Date/Time)		Duct Temp. (°F)	
Date 3/24/17	Time 1022	Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)		Average Flow Rate (cc/min)	
Date 3/24/17	Time 1132	Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)		Post-Leak Check (check box)	
Date 3/24/17	Time 1140	Pass ☑	Fail ☐
Startup Event and/or Shutdown Event occurred (check box)		Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)		**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns	Indicate number of Raw Mill Off events during this sample run: _____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/24/17	1015	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/24/17	1140	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		4/9/17	16:15	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID

OL300597

OHIO LUMEX

RS

Sorbent Trap Chain of Custody Form

☐ **Unspiked** ☒ **Spiked At:** 50ng

Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) _____

QA/QC Signature (Spiker) _____

Production Lot: S-C94 Carbon Lot: RC

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☒ 185 mm ☐ 450 mm

Spike Date: 9/23/2015 Spike Time: 1100

Type of Trap: 30B

Plant/Stack		Notes	
STMMS ID (check box)	Primary STMMS ☐	Backup STMMS ☐	Tester ☐
Trap A or B (check box)	Trap A ☐ Trap B ☒	Sampling System Manufacturer (check box)	Altech ☐
RATA Run Number (For RATA only)		Apex ☐ Clean Air ☐ Environmental Supply ☐ M&C ☐ Ohio Lumex ☐	
Trap Inserted/Pre-Leak Check (CEMS Date/Time)		Pre-Leak Check (check box)	
Date 3/24/17	Time 1155	Pass ☑ Fail ☐	
Sample Collection Start (CEMS Date/Time)		Duct Temp. (°F)	
Date 3/24/17	Time 1210	Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)		Average Flow Rate (cc/min)	
Date 3/24/17	Time 1345	Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)		Post-Leak Check (check box)	
Date 3/24/17	Time 1350	Pass ☑ Fail ☐	
Startup Event and/or Shutdown Event occurred (check box)		Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)		**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns	Indicate number of Raw Mill Off events during this sample run:

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/24/17	1155	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/24/17	1350	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		4/4/17	16:40	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Trap ID
OL299321

OHIO LUMEX

RS

Sorbent Trap Chain of Custody Form

☒ **Unspiked** ☐ **Spiked At:**_____
Certified Accuracy ± 10%, Traceable to NIST

QA/QC Signature (Trap Maker) _____

QA/QC Signature (Spiker) _____

Production Lot: U-5AD Carbon Lot: RC

☐ High Flow ☐ Coil Pre-filter ☐ 240 mm
☐ Static Pre-filter ☐ AGS ☐ 300 mm
☐ Fluffy Pre-filter ☒ 185 mm ☐ 450 mm

Spike Date:_____ Spike Time:_____

Type of Trap: 30B

Plant/Stack		Notes	
STMMS ID (check box)	Primary STMMS ☐	Backup STMMS ☐	Tester ☐
Trap A or B (check box)	Trap A ☑ Trap B ☐	Sampling System Manufacturer (check box)	Altech ☐
		Apex ☐ Clean Air ☐ Environmental Supply ☐	
RATA Run Number (For RATA only)		M&C ☐ Ohio Lumex ☐	
Trap Inserted/Pre-Leak Check (CEMS Date/Time)		Pre-Leak Check (check box)	
Date 3/24/17 Time 1155		Pass ☑ Fail ☐	
Sample Collection Start (CEMS Date/Time)		Duct Temp. (°F)	
Date 3/24/17 Time 1210		Sorbent Trap Temp. (°F)	
Sample Collection End (CEMS Date/Time)		Average Flow Rate (cc/min)	
Date 3/24/17 Time 1345		Total Volume (L)	
Post-Leak Check/Trap Removed (CEMS Date/Time)		Post-Leak Check (check box)	
Date 3/24/17 Time 1350		Pass ☑ Fail ☐	
Startup Event and/or Shutdown Event occurred (check box)		Startup Event ☐	Shutdown Event ☐
Estimated Hg Concentration (µg/dscm)		**Estimated Hg in Section 1**	

If thermal desorption is used for analysis, an estimated Hg mass is required for sample acceptance.
If no estimated mass is provided, the spike mass will be used as the estimate. Results are guaranteed between 20% and 300% of the estimate.

For Cement Kilns Indicate number of Raw Mill Off events during this sample run:_____

Chain Of Custody

Signatures along with Date/Time required for insertion, removal, lab receiving and lab analysis of trap.

	Signature	Date	Time	Security Seal
Trap inserted by		3/24/17	1155	**If Applicable** Place Chain of Custody seal here (See Security Seal Instruction Sheet)
Trap removed and sealed by		3/24/17	1350	
Trap received by lab				Seal intact as received Yes ☐ No ☐
Trap analyzed by		9/9/17	16:30	Seal intact as received Yes ☐ No ☐

Make sure all of your sampling conditions prevent moisture condensation in the trap media. Moisture condensation is a major cause of breakthrough and spike loss in sorbent traps and should be prevented at all costs.

For Analysis contact us:
Ohio Lumex Co., Inc. 9263 Ravenna Road Unit A-3, Twinsburg, OH 44087 USA
Phone 330-405-0837 Fax 330-405-0847 US Toll Free: 888-876-2611

Impregnated Activated Carbon – Refer to MSDS
Deactivated glass and glass wool

Best Before: September 2018

Appendix E-8: Dioxins and Furans Test Data

Summaries
Method 23 Field Data Sheets
Analytical Results

Method 23 RESULTS SUMMARY

	Units	Run 1	Run 2	Run 3	Average	Limit
Date	mm/dd/yy	3/22/2017	3/23/2017	3/23/2017		
Run Start Time	hh:mm	12:35	7:23	12:45		
Run Stop Time	hh:mm	16:56	11:07	16:15		
Meter Calibration Factor		0.956	0.956	0.956		
Meter Calibration Verification		0.928	0.929	0.940		
DH @ 0.75 SCFM		1.982	1.982	1.982		
Pitot Tube Coefficient		0.840	0.840	0.840		
Actual Nozzle Diameter	in	0.218	0.218	0.218		
Stack Test Data						
Initial Meter Volume	ft^3	248.129	352.123	451.170		
Final Meter Volume	ft^3	351.661	450.444	554.645		
Leak Check Volume	ft^3	0.465	0.702	0.733		
Total Meter Volume	ft^3	103.067	97.619	102.742	101.143	
Standard Meter Volume	dscf	95.370	93.800	97.705	95.625	
Total Sampling Time	min	180.0	180.0	180.0	180.0	
Average Meter Temperature	^oF	87.1	65.5	71.1	74.6	
Average Stack Temperature	^oF	333.7	331.6	332.0	332.4	
Barometric Pressure	in Hg	29.93	29.86	29.86	29.88	
Stack Static Pressure	in H_2O	-0.54	-0.54	-0.54	-0.54	
Absolute Stack Pressure	in Hg	29.89	29.82	29.82	29.84	
Average Orifice Pressure Drop	in H_2O	1.03	0.96	1.07	1.02	
Absolute Meter Pressure	in Hg	30.01	29.93	29.94	29.96	
Avg Square Root Pitot Pressure	$(in\ H_2O)^{1/2}$	0.91	0.90	0.95	0.92	
Moisture Content Data						
Impinger Water Volume Gain	ml	0.0	0.0	0.0	0.0	
Impinger Water Weight Gain	g	519.1	545.4	602.2	555.6	
Standard Water Vapor Volume	scf	24.476	25.716	28.394	26.195	
Calculated Stack Moisture	%	20.4	21.5	22.5	21.5	
Saturated Stack Moisture	%	100.00	100.0	100.0	100.0	
Reported Stack Moisture Content	%	20.4	21.5	22.5	21.5	
Gas Analysis Data						
Carbon Dioxide Percentage	%	17.3	17.3	17.3	17.3	
Oxygen Percentage	%	3.3	3.3	3.3	3.3	
Carbon Monoxide Percentage	%	0.0	0.0	0.0	0.0	
Nitrogen Percentage	%	79.4	79.4	79.4	79.4	
Dry Gas Molecular Weight	lb/lb-mole	30.90	30.90	30.90	30.90	
Wet Stack Gas Molecular Weight	lb/lb-mole	28.27	28.12	28.00	28.13	
Calculated Fuel Factor		1.017	1.017	1.017	1.017	
Fuel F-Factor	dscf/mmBtu	9240	9240	9240	9240	
Percent Excess Air	%	18.7	18.7	18.7	18.7	
Volumetric Flow Rate Data						
Average Stack Gas Velocity	ft/sec	63.62	62.88	66.14	64.21	
Stack Cross-Sectional Area	ft^2	112.31	112.31	112.31		
Actual Stack Flow Rate	acfm	428719	423716	445724	432720	
Wet Standard Stack Flow Rate	wkscfh	17095	16902	17770	17255	
Dry Standard Stack Flow Rate	dscfm	226733	221082	229473	225763	
Percent of Isokinetic Rate	%	101.3	102.1	102.5	102.0	
Emission Rate Data						
PCDD/PCDF TEQ	pg	66.2	101.0	71.6	79.6	
Standard Meter Volume (dscm)	dscm	2.7	2.7	2.8	2.7	
PCDD/PCDF emission	ng/dscm	0.02	0.04	0.03	0.03	
PCDD/PCDF Corrected to 7% Oxygen	ng/dscm @ 7%	0.02	0.03	0.02	0.02	0.15

Method 23 Field Data Sheets

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/22/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**Run #**	1
# Traverse Points	16	**Test Method**	23

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	75	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.84	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	1.21	

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #	G218-15		
Actual Nozzle Diameter	(D_{na})	0.2180	in
Req. Nozzle Diameter	(D_{ni})	0.2502	in
Probe # / Length	P5	6.00	ft
Liner Material	Glass		
Thermocouple ID #	TC5		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.93	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.89	in Hg
Absolute Meter Pressure	(P_m)	30.08	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	10	in Hg
Leak Check Total Volume (ft3):				0.465	ft^3
Post	0	ft^3/min	@	7	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	12:35:00	248.129	0.800	0.968	0.970	334	233	76	62	65	3.0
A-2	11.3	12:46:15	254.490	0.850	1.028	1.000	333	255	79	61	64	3.0
A-3	22.5	12:57:30	260.940	0.870	1.053	1.000	333	257	82	63	65	3.0
A-4	33.8	13:08:45	267.410	0.800	0.968	0.970	332	259	84	64	67	3.0
B-1	45.0	14:12:00	273.816	0.830	1.004	1.000	333	258	83	60	66	3.0
B-2	56.3	14:23:15	279.990	0.850	1.028	1.000	334	260	86	59	66	3.0
B-3	67.5	14:34:30	286.320	0.800	0.968	0.970	334	260	88	55	67	3.0
B-4	78.8	14:45:45	282.490	0.770	0.932	0.930	327	260	89	61	66	3.0
C-1	90.0	15:15:00	298.977	0.930	1.125	1.100	335	259	89	58	64	3.0
C-2	101.3	15:26:15	306.110	0.870	1.053	1.100	335	259	90	65	66	3.0
C-3	112.5	15:37:30	312.000	0.880	1.065	1.100	335	261	91	66	64	3.0
C-4	123.8	15:48:45	319.250	0.800	0.968	0.970	333	259	92	67	66	3.0
D-1	135.0	16:11:00	326.189	0.720	0.871	1.100	333	260	90	65	65	3.0
D-2	146.3	16:22:15	332.340	0.890	1.077	1.100	336	264	91	65	66	3.0
D-3	157.5	16:33:30	338.700	0.880	1.065	1.100	336	259	92	57	60	3.0
D-4	168.8	16:44:45	344.930	0.840	1.016	1.000	336	260	91	59	60	3.0
Last Pt	180.0	16:56:00	351.661									
Last Pt	180.0	16:56:00	351.661						**Maximum Vacuum**			3.0
Average Values				0.84		1.03	334	258	87	62	65	

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/23/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**Run #**	2
# Traverse Points	16	**Test Method**	23

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	65	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	1.19	

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #	G218-25		
Actual Nozzle Diameter	(D_{na})	0.2180	in
Req. Nozzle Diameter	(D_{ni})	0.2525	in
Probe # / Length	P5	6.00	ft
Liner Material	Glass		
Thermocouple ID #	TC5		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.82	in Hg
Absolute Meter Pressure	(P_m)	30.01	in Hg

ΔV_m	**Leak Checks**				
Pre	0	ft^3/min	@	8	in Hg
Leak Check Total Volume (ft3):				0.702	ft^3
Post	0	ft^3/min	@	7	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	7:23:00	352.123	0.860	1.021	1.000	330	237	58	58	57	4.0
A-2	11.3	7:34:15	358.910	0.780	0.926	0.920	330	231	60	59	55	5.0
A-3	22.5	7:45:30	364.560	0.830	0.986	0.980	331	240	61	60	57	4.0
A-4	33.8	7:56:45	370.480	0.770	0.914	0.910	330	233	62	60	58	4.0
B-1	45.0	8:22:00	376.637	0.800	0.950	0.940	327	257	60	59	60	5.0
B-2	56.3	8:33:15	382.560	0.850	1.009	1.000	333	254	62	63	67	5.0
B-3	67.5	8:44:30	389.010	0.750	0.891	0.890	333	253	62	62	66	5.0
B-4	78.8	8:55:45	395.360	0.730	0.867	0.860	332	254	65	60	64	5.0
C-1	90.0	9:27:00	401.416	0.840	0.998	0.990	334	253	64	58	49	5.0
C-2	101.3	9:38:15	407.460	0.910	1.081	1.100	333	253	67	66	48	6.0
C-3	112.5	9:49:30	413.070	0.830	0.986	0.980	333	255	68	66	48	5.0
C-4	123.8	10:00:45	419.780	0.750	0.891	0.860	331	248	71	66	52	4.0
D-1	135.0	10:22:00	425.685	0.860	1.021	1.000	330	252	70	65	58	4.0
D-2	146.3	10:33:15	431.780	0.840	0.998	1.000	333	253	73	66	60	5.0
D-3	157.5	10:44:30	439.340	0.870	1.033	1.000	333	253	72	67	65	5.0
D-4	168.8	10:55:45	444.640	0.740	0.879	0.880	332	245	73	67	66	5.0
Last Pt	180.0	11:07:00	450.444									
Final Value	180.0	11:07:00	450.444						**Maximum Vacuum**			6.0
Average Values				0.81		0.96	332	248	66	63	58	
								157				

ISOKINETIC SAMPLING DATA

Plant Name	GREC - GREC	**Date**	3/23/2017
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**Run #**	3
# Traverse Points	16	**Test Method**	23

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.840	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	70	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.98	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.00	in H_2O
Stack Moisture Content	(B_{ws})	22.0	%
Stack Dry Molecular Weight	(M_{ds})	30.90	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.7500	acfm
DP to DH Isokinetic Factor	(K)	1.20	

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	0.956	
Nozzle #	G218-15		
Actual Nozzle Diameter	(D_{na})	0.2180	in
Req. Nozzle Diameter	(D_{ni})	0.2513	in
Probe # / Length	P5	6.00	ft
Liner Material	Glass		
Thermocouple ID #	TC5		
Impinger Case #	-		

Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-0.54	in H_2O
Absolute Stack Pressure	(P_s)	29.82	in Hg
Absolute Meter Pressure	(P_m)	30.01	in Hg

ΔV_m Leak Checks					
Pre	0	ft^3/min	@	7	in Hg
Leak Check Total Volume (ft3):				0.733	ft^3
Post	0	ft^3/min	@	7	in Hg
ΔV_m <	0.020	ft^3/min	☑	**Leak Check OK?**	
Pitot OK?	☑		**Orsat OK?**	☑	

Traverse Point #	**Sampling Time** (Θ)	**Clock Time**	**Dry Gas Meter Reading** (V_m)	**Velocity Head** (Δp)	**Desired Orifice ΔH** (ΔH)	**Actual Orifice ΔH** (ΔH)	**Stack Temp** (t_s)	**Probe Temp** (t_p)	**Meter Outlet Temp** (t_{mo})	**Filter Temp**	**Impinger Exit Temp**	**Pump Vacuum**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg
A-1	0.0	12:45:00	451.170	0.74	0.89	0.89	332	253	67	59	61	4.0
A-2	11.3	12:56:15	457.180	0.93	1.11	1.10	332	254	69	57	61	4.0
A-3	22.5	13:07:30	463.470	0.94	1.13	1.10	332	254	70	60	63	4.0
A-4	33.8	13:18:45	469.340	0.85	1.02	1.00	332	254	72	60	64	4.0
B-1	45.0	13:40:00	476.745	0.88	1.06	1.10	332	259	71	65	66	6.0
B-2	56.3	13:51:15	483.240	1.00	1.20	1.20	332	255	72	57	58	5.0
B-3	67.5	14:02:30	489.630	0.92	1.10	1.10	332	254	73	62	59	5.0
B-4	78.8	14:13:45	496.150	0.88	1.06	1.10	333	253	72	67	65	5.0
C-1	90.0	14:36:00	503.087	0.85	1.02	1.00	331	254	71	60	62	4.0
C-2	101.3	14:47:15	509.440	0.92	1.10	1.10	332	255	73	58	57	4.0
C-3	112.5	14:58:30	515.980	0.83	1.00	1.00	333	255	73	64	61	4.0
C-4	123.8	15:09:45	522.710	0.83	1.00	1.00	331	255	72	67	65	4.0
D-1	135.0	15:30:00	528.452	0.99	1.19	1.20	333	256	70	62	60	5.0
D-2	146.3	15:41:15	534.140	0.94	1.13	1.10	333	255	71	67	64	5.0
D-3	157.5	15:52:30	540.190	1.00	1.20	1.20	331	254	71	66	60	5.0
D-4	168.8	16:03:45	546.950	0.83	1.00	1.00	331	254	71	62	64	5.0
Last Pt	180.0	16:15:00	554.645									
Final Value	180.0	16:15:00	554.645						**Maximum Vacuum**			6.0
Average Values				0.90		1.07	332	255	71	62	62	
								163				

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GDEC	Date	3/22/17
Sampling Location	STACK	Project #	11542
Operators	AZ	Run #	1
Test Method	23	Sampling Type	Isokinetic ☒ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	75	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	30	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	1.21	
Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre (Y) / N	Post	(Y) / N
Orsat Leak	Pre ~~Y / N~~	Post	~~Y / N~~
Nozzle in direction of flow?	☒		

Sampling Equipment			
Meter #	CEMS3MB		
Meterbox Cal. Factor	(Y)	.956	
Filter / Nozzle #		G218-15	
Actual Nozzle Diameter	(D_{na})	.218	in
Req. Nozzle Diameter	(D_{ni})	0.251	in
Probe #	P5		
Liner Material	GLASS		
Pitot #	A5400		
Thermocouple #	TC5		

ΔV_m	Vacuum Leak Check				
Pre	.000	ft^3/min	@	10	in Hg
Post	.000	ft^3/min	@	7	in Hg
Pitot	**Leak Checks**				
Pre	.00	inches	@	5.4	in H_2O
Post	.00	inches	@	6.2	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	XAD ~~Filter~~ Temp	Impinger Exit Temp <68 °F	Pump Vacuum	XAD Temp (<68°F)
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg	°F
PS1	0	1235	248.129	.80	.968	.97	334	233	76	62	65	3	
2	11.3	1246	254.49	.85	1.02	1.0	333	255	79	101	64	3	
3	22.5	1358	260.94	.87	1.05	1.0	333	257	82	63	65	3	
4	33.8	1309	267.41	.80	.966	.97	334	259	84	64	67	3	
	45	1320	273.057	—	—	—	—	—	—	—	—	—	
1	45	1412	273.816	.83	1.00	1.0	333	258	83	60	66	3	
2	56.3	1423	279.99	.85	1.02	1.0	334	260	86	59	66	3	
3	67.5	1434	286.32	.80	.965	.97	334	260	88	55	67	3	
4	78.8	1445	292.49	.77	.932	.93	327	260	89	61	66	3	
	90	1457	298.599	—	—	—	—	—	—	—	—	—	
1	90	1515	298.977	.93	1.12	1.1	335	259	89	58	64	3	
2	101.3	1524	306.11	.87	1.05	1.1	335	257	90	65	66	3	
3	112.5	1537	312.00	.84	1.06	1.1	335	261	91	66	64	3	
4	123.8	1548	319.25	.80	.968	.97	333	259	92	67	66	3	
	135.0	1600	326.011	—	—	—	—	—	—	—	—	—	
1	135.0	1611	326.189	.72	1.13	1.1	333	260	90	65	65	3	
2	146.5	1622	332.84	.89	1.08	1.1	336	261	91	65	66	3	
3	157.3	1633	338.70	.86	1.06	1.1	336	259	92	57	60	3	
4	168.8	1644	344.93	.84	1.02	1.0	336	260	91	59	60	3	
	180.0	1656	351.41	—	—	—	—	—	—	—	—	—	

Operator Signature	

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/23/17
Sampling Location	STACK	Project #	11542
Operators	AL	Run #	2
Test Method	23	Sampling Type	Isokinetic [X] Constant Rate [ ]

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	60	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	3.0	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	1.16	
Pressures			
Barometric Pressure	(P_b)	29.86	in Hg
Stack Static Pressure	(P_{static})	-.54	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre	~~Y~~ / N	Post ~~Y~~ / N
Orsat Leak	Pre	~~Y~~ / ~~N~~	Post ~~Y~~ / ~~N~~
Nozzle in direction of flow?		[X]	

70

1.19

Sampling Equipment			
Meter #	CEMS 3 MB		
Meterbox Cal. Factor	(Y)	.956	
Filter / Nozzle #		G218-25	
Actual Nozzle Diameter	(D_{na})	.218	in
Req. Nozzle Diameter	(D_{nl})	.255	in
Probe #	P6		
Liner Material	~~SS~~ R GLASS		
Pitot #	A5400		
Thermocouple #	TC 4		

ΔV_m	Vacuum Leak Check				
Pre	.006	ft^3/min	@	8	in Hg
Post	.000	ft^3/min	@	7	in Hg
Pitot	Leak Checks				
Pre	.06	inches	@	6.4	in H_2O
Post	.00	inches	@	3.1	in H_2O

(<68°)

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum	XAD T
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg	°F
EA 1	0	723	352.123	.86	1.01	1.0	330	237	58	254	57	4	58
2	11.3	734	358.91	.78	.92	.92	330	231	60	251	55	3	59
3	22.5	746	364.56	.83	.98	.96	331	240	61	250	57	4	60
4	33.8	757	370.48	.77	.91	.91	333	330	61	256	58	4	60
	45	808	376.456	/	/	/	/	/	/	/	/	/	/
S 1	45	822	376.637	.80	.94	.94	327	257	60	257	60	5	59
2	56.3	833	382.56	.85	1.03	1.0	333	254	62	260	67	5	63
3	67.5	845	389.01	.75	.89	.89	333	253	62	258	64	5	62
4	78.8	856	395.36	.73	.86	.86	332	254	65	253	64	5	60
	90	907	401.059	/	/	/	/	/	/	/	/	/	/
W 1	90	927	401.41	.84	.99	.99	334	253	64	261	49	5	58
2	101.5	938	407.46	.91	1.07	1.1	333	253	67	255	48	6	66
3	112.5	949	413.07	.83	.98	.98	333	255	68	257	48	5	66
4	123.5	1001	419.78	.75	.86	.84	331	298	71	297	52	4	64
	135	1012	425.521	/	/	/	/	/	/	/	/	/	/
N 1	135	1022	425.685	.86	1.01	1.0	330	252	70	246	58	4	65
2	146.5	1034	431.78	.84	1.00	1.0	333	253	73	256	60	5	66
3	159.3	1045	439.34	.87	1.04	1.0	333	253	72	258	65	5	67
4	148.8	1057	444.64	.74	.88	.88	332	245	73	252	66	5	67
	180	1107	450.444	/	/	/	/	/	/	/	/	/	/

NEW K-factor

Operator Signature	

C.E.M. SOLUTIONS
SAMPLE DATA SHEET

Plant Name	GREC	Date	3/23/17
Sampling Location	STACK	Project #	11542
Operators	AR	Run #	3
Test Method	23	Sampling Type	Isokinetic ☒ Constant Rate ☐

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Tube Coefficient	(C_p)	0.84	
Avg Stack Temp	(t_s)	330	°F
Avg Gas Meter Temp	(t_m)	70	°F
DH @ 0.75 SCFM	($\Delta H@$)	1.982	in H_2O
Avg Pitot Tube Diff. Pressure	(Δp_{avg})	1.0	in H_2O
Stack Moisture Content	(B_{ws})	22	%
Oxygen	(O_2)	2	%
Carbon Dioxide	(CO_2)	17	%
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
K-Factor	(K)	1.20	
Pressures			
Barometric Pressure	(P_b)	29.82	in Hg
Stack Static Pressure	(P_{static})	-.50	in H_2O
Sampling Equipment Checks			
Pump to Meter Leak	Pre ~~Y~~ / N	Post	~~Y~~ / N
Orsat Leak	Pre ~~Y~~ / N	Post	Y / N
Nozzle in direction of flow?	☐		

Sampling Equipment			
Meter #	CEMS 3MB		
Meterbox Cal. Factor	(Y)	.956	
Filter / Nozzle #	G210-15		
Actual Nozzle Diameter	(D_{na})	.218	in
Req. Nozzle Diameter	(D_{ni})	0.257	in
Probe #	PG-		
Liner Material	GLASS		
Pitot #	AS450		
Thermocouple #	TC-		

ΔV_m	Vacuum Leak Check				
Pre	.000	ft^3/min	@	7	in Hg
Post	.000	ft^3/min	@	7	in Hg
Pitot	**Leak Checks**				
Pre	.01	inches	@	7.2	in H_2O
Post	.00	inches	@	6.4	in H_2O

Traverse Point #	Sampling Time (Θ)	Clock Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH)	Actual Orifice ΔH (ΔH)	Stack Temp (t_s)	Probe Temp (t_p)	Meter Outlet Temp (t_{mo})	Filter Temp	Impinger Exit Temp <68 °F	Pump Vacuum	XAD °F
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	in Hg	
F 1	0	1245	461.170	.74	.89	.89	332	253	67	239	61	4	59
2	11.3	1256	459.16	.93	1.12	1.1	332	254	69	247	61	4	57
3	22.5	1307	463.47	.94	1.13	1.1	332	254	70	256	62	4	60
4	33.8	1319	469.34	.85	1.02	1.0	332	254	72	259	64	4	60
	45	1330	476.363	—	—	—	—	—	—	—	—	—	—
1	45	1340	476.745	.88	1.06	1.1	332	253	71	257	66	3	65
2	56.3	1351	483.24	1.0	1.2	1.2	332	255	72	259	58	5	57
3	67.3	1402	489.63	.92	1.1	1.1	332	254	73	251	59	5	562
4	~~90~~ 78.8	1414	496.15	.88	1.1	1.1	333	253	72	245	65	5	67
	90	1425	502.848	—	—	—	—	—	—	—	—	—	—
1	90	1436	503.057	.85	1.02	1.0	331	254	71	257	62	4	60
2	101.5	1447	509.44	.92	1.1	1.1	332	255	73	257	57	4	58
3	112.5	1458	515.98	.83	1.0	1.0	333	255	73	259	61	4	64
4	~~135~~ 123.5	1510	522.71	.80	1.0	1.0	331	255	72	258	65	4	67
	135	1521	528.324	—	—	—	—	—	—	—	—	—	—
1	135	1530	528.452	.91	1.2	1.2	333	256	70	262	60	5	62
~~2~~	~~144.5~~												
2	144.5	1541	534.14	.94	1.1	1.1	333	255	71	257	64	5	69
3	155.3	1552	540.19	1.0	1.2	1.2	331	254	71	258	60	5	Cu
4	166.8	1604	546.95	.83	1.0	1.0	331	254	71	257	64	5	62
	180	1615	554.645	—	—	—	—	—	—	—	—	—	—

Operator Signature

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	GREC	**Date**	03/22/17
Sampling Location	Boiler stack	**Project #**	11542
Operator	AL	**# of Ports Used**	4
Stack Type	Circular	**Meter Box Number**	CEMS3MB
Train Leak Check	☐ **PreTest**	☐ **PostTest**	

Moisture Content Data								
Run Number	1		**Run Start Time**	12:35		**Run Stop Time**	16:56	
Total Meter Volume	(V_m)	103.532	dcf	**Barometric Press.**		(P_b)	29.93	in Hg
Avg Meter Temp	$(t_m)_{avg}$	87	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	334	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.03	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	g	ml	ml
Contents			DI	DI		Sil Gel		
Initial Value	$(V_i),(W_i)$	371.30	652.40	647.50	607.40	845.60		
Final Value	$(V_f),(W_f)$	856.00	653.20	645.50	607.10	881.50		
Net Value	$(V_n),(W_n)$	484.7	0.8	-2.0	-0.3	35.9		
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	519.10	g	**Water Vol Weighed**		$(V_{wsg(std)})$	24.476	scf
Std Meter Volume	$(V_{m(std)})$	95.370	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	$(B_{ws(calc)})$	20.4	%	**Final Moisture Content**		(B_{ws})	20.4	%

Moisture Content Data								
Run Number	2		**Run Start Time**	7:23		**Run Stop Time**	11:07	
Total Meter Volume	(V_m)	98.321	dcf	**Barometric Press.**		(P_b)	29.86	in Hg
Avg Meter Temp	$(t_m)_{avg}$	66	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	332	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	0.96	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	g	ml	ml
Contents			DI	DI		Sil Gel		
Initial Value	$(V_i),(W_i)$	373.70	653.20	645.50	607.10	909.30		
Final Value	$(V_f),(W_f)$	874.60	656.60	645.50	608.30	949.20		
Net Value	$(V_n),(W_n)$	500.9	3.4	0.0	1.2	39.9		
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	545.40	g	**Water Vol Weighed**		$(V_{wsg(std)})$	25.716	scf
Std Meter Volume	$(V_{m(std)})$	93.800	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	21.5	%	**Final Moisture Content**		(B_{ws})	21.5	%

Moisture Content Data								
Run Number	3		**Run Start Time**	12:45		**Run Stop Time**	16:15	
Total Meter Volume	(V_m)	103.475	dcf	**Barometric Press.**		(P_b)	29.86	in Hg
Avg Meter Temp	$(t_m)_{avg}$	71	°F	**Stack Static Press.**		(P_{static})	-0.54	in H_2O
Avg Stack Temp	$(t_s)_{avg}$	332	°F	**Avg Orifice Press.**		$(\Delta H)_{avg}$	1.07	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**
		g	g	g	g	g	ml	ml
Contents			DI	DI		Sil Gel		
Initial Value	$(V_i),(W_i)$	353.30	669.20	625.20	606.50	917.50		
Final Value	$(V_f),(W_f)$	911.50	669.70	627.40	607.50	957.80		
Net Value	$(V_n),(W_n)$	558.2	0.5	2.2	1.0	40.3		
Results								
Total Volume	(V_t)	0.00	ml	**Water Vol Condensed**		$(V_{wc(std)})$	0.000	scf
Total Weight	(W_t)	602.20	g	**Water Vol Weighed**		$(V_{wsg(std)})$	28.394	scf
Std Meter Volume	$(V_{m(std)})$	97.705	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.0	%
Calc Moisture Content	(B_{ws})	22.5	%	**Final Moisture Content**		(B_{ws})	22.5	%

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	**Date**	3/22/2017
Sampling Location	CFB Boiler	**Project #**	11542
Operators	AL	**Run #**	1
Test Method	23	**Impinger Bucket #**	3

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
		KO						
Contents		MT	DI	DI	MT	SG		
Initial Value	(Vi),(Wi)	371.3	652.4	647.5	607.4	845.6		
Final Value	(Vf),(Wf)	856.0	653.2	645.5	607.1	881.5		
Net Value	(Vn),(Wn)	484.7	0.8	-2.0	-0.3	35.9		

Train Prepared by:	C. Horton

Train Recovered by:	C. Horton

20.4 %

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	Date	3/22/17
Sampling Location	STACK	Project #	11542
Operators	AL	Run #	2
Test Method	23	Impinger Bucket #	3

		Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		MT	DI	DI	MT	SG		
Initial Value	(Vi),(Wi)	373.7	653.2	645.5	607.1	909.3		
Final Value	(Vf),(Wf)	874.6	656.6	645.5	608.3	949.2		
Net Value	(Vn),(Wn)	500.9	3.4	0.0	1.2	39.9		

Train Prepared by:	C. Horton
Train Recovered by:	C. Horton

21.5 % Bws

C.E.M. SOLUTIONS
IMPINGER TRAIN DATA SHEET

Plant Name	GREC	Date	3/23/17
Sampling Location	Boiler Stack	Project #	11542
Operators	AL	Run #	3
Test Method	23	Impinger Bucket #	13

		Impinger 1 (KO)	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Contents		MT	DI	DI	MT	SG		
Initial Value	(Vi),(Wi)	353.3	669.2	625.2	606.5	917.5		
Final Value	(Vf),(Wf)	911.5	669.7	627.4	607.5	957.8		
Net Value	(Vn),(Wn)	558.2	0.5	2.2	1.0	40.3		

Train Prepared by:	C. Horton
Train Recovered by:	C. Horton

22.5% B_{ws}

Appendix E-9: Method 9

Data Summary
Field Data Sheets
VE Observers Certificate

VISIBLE EMISSION OBSERVATION FORM

SOURCE INFORMATION

Facility Name: GREC (EU-002)

Source Name: Boiler Stack

Permit Number: 0010131-006-AV

Location Address: 11201 NW US Hwy 441

City: Gainesville | State: FL | Zip: 32653

Unit Load: Base

Operating Mode: Normal

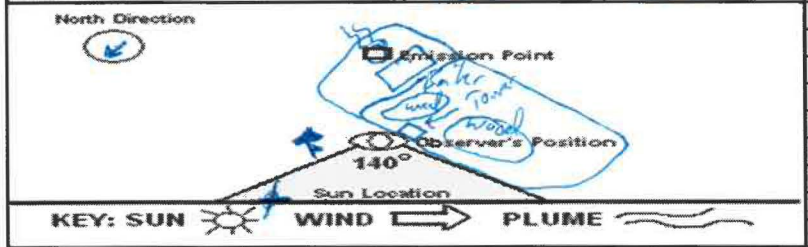
Fuel Type: Wood

Permitted Rate:

Control Equipment:

Describe Emission Point: Tall steel stack

PLUME INFORMATION	START	END
Describe Emissions (Smoke, Dust, Heat Trace, etc.)	None	Same
Height of Emission Point (ft)	~200	"
Height Relative to Observer (ft)	~194	"
Distance from Observer (ft)	~600	"
Direction to Source	SE	"
Plume Type (Continuous, Intermittent, Fugitive, etc.)	Continuous	"
Plume Color	Clear	"
Water Droplets Present?	NO	"
Plume Attached or Detached?	—	"
Angle of Inclination (°)	12°	"
Description of Background (Sky, Trees, Building, etc.)	Sky	"
Color of Background	Blue	"
Condition of Sky (Clear, Scattered, Broken, Overcast)	Clear	"
Wind Speed (mph)	9 mph	"
Wind Direction (From)	NW	"
Ambient Temp (°F)	82°F	82°F



Comments

Range of Opacity Readings (%): Minimum 0 / Maximum 0

Average Opacity for 24 Readings = 0.0 %

Observer's Name (print): Charles Horton | Date: 3/22/2017

Observer's Signature

Organization: C.E.M. Solutions, Inc.

Certified By: Eastern Technical Associates

Certification Date: 2/1/2017 444542

Date: 3/22/2017

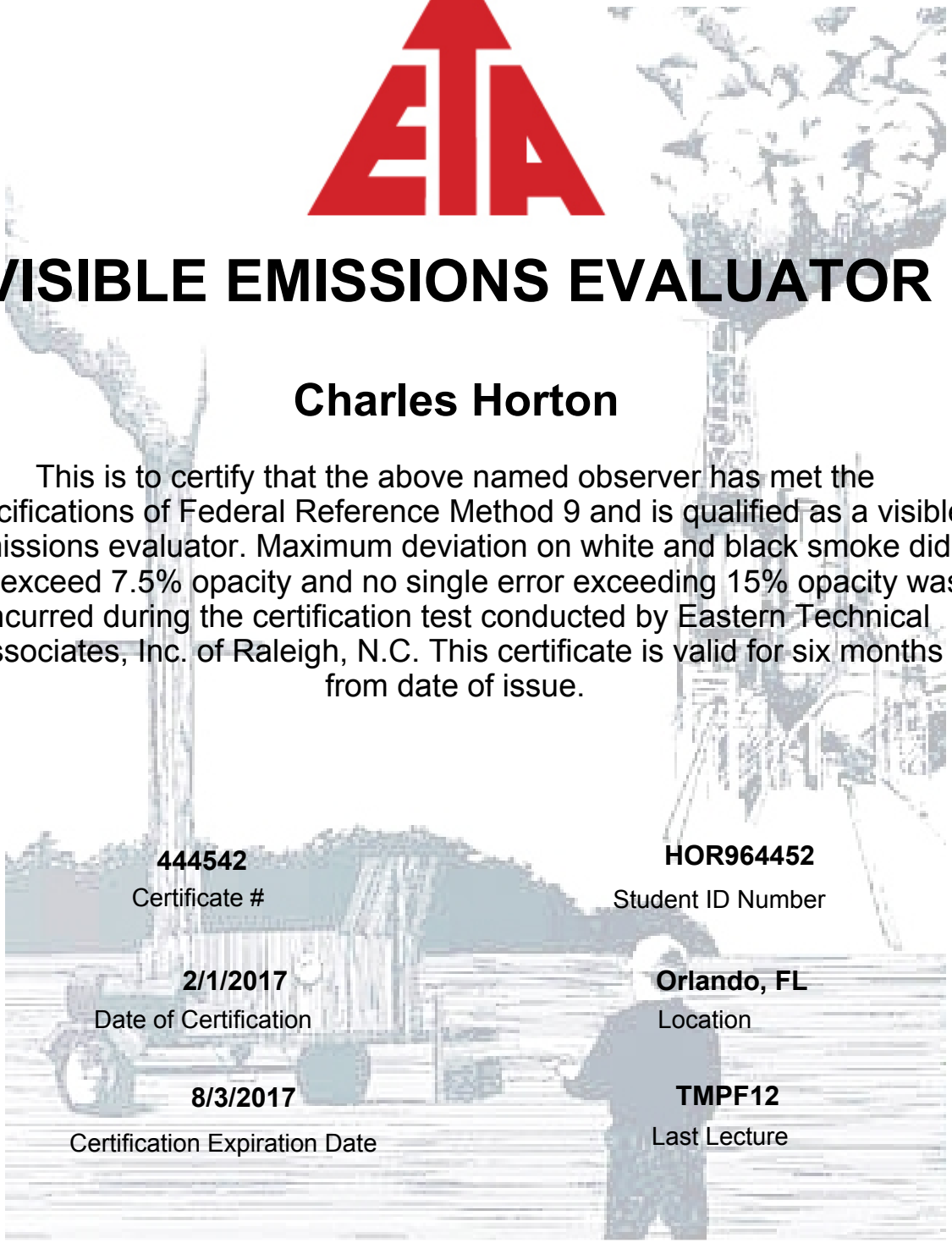
OBSERVATION RECORD

Hour	Minute	Stack A 0	Stack A 15	Stack A 30	Stack A 45	Stack B 0	Stack B 15	Stack B 30	Stack B 45
14:10	0	0	0	0	0				
	1	0	0	0	0				
	2	0	0	0	0				
	3	0	0	0	0				
	4	0	0	0	0				
1415	5	0	0	0	0				
	6	0	0	0	0				
	7	0	0	0	0				
	8	0	0	0	0				
	9	0	0	0	0				
1420	10	0	0	0	0				
	11	0	0	0	0				
	12	0	0	0	0				
	13	0	0	0	0				
	14	0	0	0	0				
1425	15	0	0	0	0				
	16	0	0	0	0				
	17	0	0	0	0				
	18	0	0	0	0				
	19	0	0	0	0				
1430	20	0	0	0	0				
	21	0	0	0	0				
	22	0	0	0	0				
	23	0	0	0	0				
	24	0	0	0	0				
1435	25	0	0	0	0				
	26	0	0	0	0				
	27	0	0	0	0				
	28	0	0	0	0				
	29	0	0	0	0				
1440	30	0	0	0	0				
	31	0	0	0	0				
	32	0	0	0	0				
	33	0	0	0	0				
	34	0	0	0	0				
1445	35	0	0	0	0				
	36	0	0	0	0				
	37	0	0	0	0				
	38	0	0	0	0				
	39	0	0	0	0				
1450	40	0	0	0	0				
	41	0	0	0	0				
	42	0	0	0	0				
	43	0	0	0	0				
	44	0	0	0	0				
1455	45	0	0	0	0				
	46	0	0	0	0				
	47	0	0	0	0				
	48	0	0	0	0				
	49	0	0	0	0				
1500	50	0	0	0	0				
	51	0	0	0	0				
	52	0	0	0	0				
	53	0	0	0	0				
	54	0	0	0	0				
1505 CH ~~1510~~	55	0	0	0	0				
	56	0	0	0	0				
	57	0	0	0	0				
	58	0	0	0	0				
~~1550~~ 1509 1514 CH	59	0	0	0	0				

VISIBLE EMISSIONS EVALUATOR

Charles Horton

This is to certify that the above named observer has met the specifications of Federal Reference Method 9 and is qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates, Inc. of Raleigh, N.C. This certificate is valid for six months from date of issue.



444542
Certificate #

HOR964452
Student ID Number

2/1/2017
Date of Certification

Orlando, FL
Location

8/3/2017
Certification Expiration Date

TMPF12
Last Lecture

Marty Hughes
Director of Training

Appendix F: Laboratory Reports

C.E.M. Solutions, Inc.

1183 E. Overdrive Circle
Hernando, FL 34442

GREC Boiler Compliance

Project # 11542

Analytical Report
(0317-144)

EPA Method 26A

Hydrogen chloride and Hydrogen fluoride

EPA CTM-027

Ammonia

NCASI Method 8A (HPLC/IC)

Sulfuric acid mist

Enthalpy Analytical, Inc.

Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
800-1 Capitola Drive Durham, NC 27713-4385

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains ??? pages.

Report Issued: xx/xx/xxxx

ENTHALPY
ANALYTICAL

Summary of Results

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 1. EPA Method 26A

Client No.: 11542

Summary Table

	Catch Weight µg			
	Compound			
Sample ID	Hydrogen chloride		Hydrogen fluoride	
M26A-Imp12BH - Run 1	142	J	66.3	ND
M26A-Imp12BH - Run 2	191	J	63.2	ND
M26A-Imp12BH - Run 3	156	J	69.5	ND
H2SO4 Blank	68.9	ND	70.6	ND
	Concentration mg/L			
Audit Lot# 101315B	19.6		18.1	

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.
Job No.: 0317-144 - 2. EPA CTM-027
Client No.: 11542

Summary Table - Ammonia

Sample ID	Catch Weight µg
Run 1	327
Run 2	347
Run 3	354
BLANK	4.80 ND

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 3. NCASI Method 8A (HPLC/ IC)

Client No.: 11542

Summary Table - Sulfuric acid Mist

Sample ID	Catch Weight µg
8A-Condensate Rinse - Run 1	51.2 J
8A-Condensate Rinse - Run 2	60.1 J
8A-Condensate Rinse - Run 3	51.8
DI H2O Blank	7.69 ND

Results

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.
Job No.: 0317-144 - 1. EPA Method 26A
Client No.: 11542

Chloride as Hydrogen Chloride

Sample ID	Filename #1	Filename #2	Analysis Method	Curve Min	Curve Max	MDL	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	DF	Liquid Vol (mL)	Conv Factor	Catch Weight (ug)	Flag	pH
M26A-Imp1,2,BH - Run 1	023-1001.D	023-1002.D	Nelson725.M	1.00	30.00	0.100	4.09	4.09	0.0	0.218	0.221	0.8	0.220	1	630	1.028	142	J	0
M26A-Imp1,2,BH - Run 2	024-1101.D	024-1102.D	Nelson725.M	1.00	30.00	0.100	4.09	4.10	0.0	0.318	0.302	2.6	0.310	1	600	1.028	191	J	0
M26A-Imp1,2,BH - Run 3	025-1201.D	025-1202.D	Nelson725.M	1.00	30.00	0.100	4.09	4.09	0.0	0.232	0.227	0.9	0.230	1	660	1.028	156	J	0
H2SO4 Blank	026-1301.D	026-1302.D	Nelson725.M	1.00	30.00	0.100				0.100	0.100	0.0	0.100	1	670	1.028	68.9	ND	0

Sample ID	Filename #1	Filename #2	Analysis Method	Curve Min	Curve Max	MDL	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	DF	Liquid Vol (mL)	Conv Factor	Conc mg/L	Flag	pH
Audit Lot#: 101315B	029-1601.D	029-1602.D	Nelson725.M	1.00	30.00	0.100	4.15	4.14	0.0	18.9	19.1	0.5	19.0	1	1000	1.028	19.6		

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 1. EPA Method 26A

Client No.: 11542

Fluoride as Hydrogen Fluoride

Sample ID	Filename #1	Filename #2	Analysis Method	Curve Min	Curve Max	MDL	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	DF	Liquid Vol (mL)	Conv Factor	Catch Weight (ug)	Flag	pH
M26A-Imp1,2,BH - Run 1	023-1001.D	023-1002.D	Nelson725.M	1.00	30.00	0.100				0.100	0.100	0.0	0.100	1	630	1.053	66.3	ND	0
M26A-Imp1,2,BH - Run 2	024-1101.D	024-1102.D	Nelson725.M	1.00	30.00	0.100				0.100	0.100	0.0	0.100	1	600	1.053	63.2	ND	0
M26A-Imp1,2,BH - Run 3	025-1201.D	025-1202.D	Nelson725.M	1.00	30.00	0.100				0.100	0.100	0.0	0.100	1	660	1.053	69.5	ND	0
H2SO4 Blank	026-1301.D	026-1302.D	Nelson725.M	1.00	30.00	0.100				0.100	0.100	0.0	0.100	1	670	1.053	70.6	ND	0

Sample ID	Filename #1	Filename #2	Analysis Method	Curve Min	Curve Max	MDL	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	DF	Liquid Vol (mL)	Conv Factor	Conc mg/L	Flag	pH
Audit Lot#: 101315B	029-1601.D	029-1602.D	Nelson725.M	1.00	30.00	0.100	2.93	2.93	0.1	17.4	17.0	1.3	17.2	1	1000	1.053	18.1		

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 1. EPA Method 26A

Client No.: 11542

Matrix Spike Recovery

Sample ID	Compound	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Flag	DF	vol mL	Mass (ug)	Recov %
MS / M26A-Imp1,2,BH - Run 1	Chloride	027-1401.D	027-1402.D	Nelson725.M	4.08	4.08	0.0	10.4	10.3	0.3	10.4		1	5.00	51.8	
M26A-Imp1,2,BH - Run 1	Chloride	023-1001.D	023-1002.D	Nelson725.M	4.09	4.09	0.0	0.218	0.221	0.8	0.220		1	4.50	0.988	
													Mass Spiked:		50.0	102
MSD / M26A-Imp1,2,BH - Run 1	Chloride	028-1501.D	028-1502.D	Nelson725.M	4.08	4.08	0.0	10.5	10.5	0.1	10.5		1	5.00	52.5	
M26A-Imp1,2,BH - Run 1	Chloride	023-1001.D	023-1002.D	Nelson725.M	4.09	4.09	0.0	0.218	0.221	0.8	0.220		1	4.50	0.988	
													Mass Spiked:		50.0	103

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 1. EPA Method 26A

Client No.: 11542

Matrix Spike Recovery

Sample ID	Compound	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Flag	DF	vol mL	Mass (ug)	Recov %
MS / M26A-Imp1,2,BH - Run 1	Fluoride	027-1401.D	027-1402.D	Nelson725.M	2.93	2.92	0.2	10.1	10.7	2.7	10.4		1	5.00	52.1	
M26A-Imp1,2,BH - Run 1	Fluoride	023-1001.D	023-1002.D	Nelson725.M	NA	NA	NA	0.100	0.100	NA	0.100	ND	1	4.50	0.00	
														Mass Spiked:	50.0	104
MSD / M26A-Imp1,2,BH - Run 1	Fluoride	028-1501.D	028-1502.D	Nelson725.M	2.93	2.93	0.0	10.4	10.3	0.7	10.3		1	5.00	51.7	
M26A-Imp1,2,BH - Run 1	Fluoride	023-1001.D	023-1002.D	Nelson725.M	NA	NA	NA	0.100	0.100	NA	0.100	ND	1	4.50	0.00	
														Mass Spiked:	50.0	103

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 2. EPA CTM-027

Client No.: 11542

Ammonia

Sample ID	Filename #1	Filename #2	Analysis Method	Curve Min	Curve Max	MDL	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	DF	Liquid Vol (mL)	Catch Weight (ug)	Flag	pH
CTM027-Imp1,BH - Run 1	011-1101.D	011-1102.D	Curly329.M	0.200	12.3	0.0200	4.22	4.23	0.1	0.739	0.746	0.5	0.743	1	440	327		0
CTM027-Imp2 - Run 1	014-1401.D	014-1402.D	Curly329.M	0.200	12.3	0.0200	4.19	4.19	0.0	0.0200	0.0200	0.0	0.0200	1	190	3.80	ND	0
																327		
CTM027-Imp1,BH - Run 2	012-1201.D	012-1202.D	Curly329.M	0.200	12.3	0.0200	4.23	4.22	0.1	0.817	0.821	0.3	0.819	1	420	344		0
CTM027-Imp2 - Run 2	015-1501.D	015-1502.D	Curly329.M	0.200	12.3	0.0200	4.18	4.20	0.3	0.0200	0.0217	4.0	0.0208	1	150	3.13	J	0
																347		
CTM027-Imp1,BH - Run 3	013-1301.D	013-1302.D	Curly329.M	0.200	12.3	0.0200	4.23	4.23	0.0	0.814	0.813	0.1	0.813	1	435	354		0
CTM027-Imp2 - Run 3	016-1601.D	016-1602.D	Curly329.M	0.200	12.3	0.0200	4.18	4.20	0.2	0.0200	0.0200	0.0	0.0200	1	180	3.60	ND	0
																354		
H2SO4 Blank + Impinger Rinse	017-1701.D	017-1702.D	Curly329.M	0.200	12.3	0.0200	4.19	4.20	0.1	0.0200	0.0200	0.0	0.0200	1	240	4.80	ND	0

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.
Job No.: 0317-144 - 2. EPA CTM-027
Client No.: 11542

Matrix Spike Recovery

Sample ID	Compound	Sequence	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Flag	DF	vol mL	Mass (ug)	Recov %
MS / CTM027-Imp1,BH - Run 1	Ammonia	Curly329.v4	018-1801.D	018-1802.D	Curly329.M	4.24	4.24	0.0	2.93	2.94	0.2	2.94		1	0.520	1.53	
CTM027-Imp1,BH - Run 1	Ammonia	Curly329.v4	011-1101.D	011-1102.D	Curly329.M	4.22	4.23	0.1	0.739	0.746	0.5	0.743		1	0.500	0.371	
															Mass Spiked:	1.89	61.2
MSD / CTM027-Imp1,BH - Run 1	Ammonia	Curly329.v4	019-1901.D	019-1902.D	Curly329.M	4.24	4.23	0.1	2.93	2.91	0.4	2.92		1	0.520	1.52	
CTM027-Imp1,BH - Run 1	Ammonia	Curly329.v4	011-1101.D	011-1102.D	Curly329.M	4.22	4.23	0.1	0.739	0.746	0.5	0.743		1	0.500	0.371	
															Mass Spiked:	1.89	60.7

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 3. NCASI Method 8A (HPLC/ IC)

Client No.: 11542

Sulfate as Sulfuric Acid

Sample ID	Filename #1	Filename #2	Analysis Method	Curve Min	Curve Max	MDL	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	DF	Liquid Vol (mL)	Conv Factor	Catch Weight (ug)	Flag	pH
8A-Condensate Rinse - Run 1	021-0501.D	021-0502.D	Gonzo230.M	0.495	50.0	0.0554	8.52	8.39	0.8	0.425	0.426	0.1	0.425	1	118	1.021	51.2	J	7
8A-Condensate Rinse - Run 2	OnlineEdited34.D	OnlineEdited35.D	Gonzo235.M	1.00	50.0	0.0554	7.27	7.26	0.0	0.470	0.450	2.2	0.460	1	128	1.021	60.1	J	7
8A-Condensate Rinse - Run 3	023-1301.D	023-1302.D	Gonzo234.M	0.495	50.0	0.0554	8.25	8.25	0.0	0.526	0.531	0.5	0.528	1	96.0	1.021	51.8		7
DI H2O Blank	024-0801.D	024-0802.D	Gonzo230.M	0.495	50.0	0.0554	NA	NA	NA	0.0554	0.0554	NA	0.0554	1	136	1.021	7.69	ND	7

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 3. NCASI Method 8A (HPLC/ IC)

Client No.: 11542

Matrix Spike Recovery

Sample ID	Compound	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Flag	DF	vol mL	Mass (ug)	Recov %
MSD / 8A-Condensate Rinse - Run 1	Sulfate	026-1001.D	026-1002.D	Gonzo230.M	8.34	8.51	1.0	2.14	2.29	3.4	2.22		1	0.520	1.15	
8A-Condensate Rinse - Run 1	Sulfate	021-0501.D	021-0502.D	Gonzo230.M	8.52	8.39	0.8	0.425	0.426	0.1	0.425		1	0.500	0.213	
														Mass Spiked:	1.00	94.0
MS / 8A-Condensate Rinse - Run 1	Sulfate	025-0901.D	025-0902.D	Gonzo230.M	8.51	8.44	0.4	2.19	2.12	1.8	2.16		1	0.520	1.12	
8A-Condensate Rinse - Run 1	Sulfate	021-0501.D	021-0502.D	Gonzo230.M	8.52	8.39	0.8	0.425	0.426	0.1	0.425		1	0.500	0.213	
														Mass Spiked:	1.00	90.8

Narrative Summary

ENTHALPY
ANALYTICAL

Enthalpy Analytical Narrative Summary

Company	C.E.M. Solutions, Inc.
Job #	0317-144 – 1. EPA Method 26A
Client #	11542

Custody	Matt Hill of Enthalpy Analytical, Inc. received the samples on 3/28/17 at 2.8 °C after being relinquished by C.E.M. Solutions, Inc. The samples were received in good condition. Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.
Analysis	The samples were analyzed for hydrogen chloride and hydrogen fluoride using the analytical procedures in EPA Method 26A, Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources Isokinetic Method (40 CFR Part 60, Appendix A). The samples were analyzed following the procedures in Section 11.0, Analytical Procedures. All samples and standards are prepared, stored, and analyzed using high-density polyethylene containers. The Metrohm 861, High Performance Liquid Chromatograph ("Nelson") was equipped with a Conductivity Detector for these analyses.
Calibration	The calibration curves are included in the Raw Data section of this report. The data analysis method is referenced in the Analysis Method column on the Detailed Results page. The first page of the curve contains all method specific parameters (i.e., curve type, origin, weight, etc.) used to quantify the samples. The calibration curve section also includes a table with the Retention Time (RetTime), Level (Lvl), Amount (corresponding units), Area, Response Factor (Amt/Area) and the analyte Name. The calibration table is used to identify (by retention time) and quantify each target compound.
Chromatographic Conditions	The acquisition method (METROHM.M) is included in the Raw Data section of this report.
QC Notes	The analyses of the field and laboratory reagent blanks contained no target compounds at concentrations greater than the detection limit.

ENTHALPY
ANALYTICAL

Enthalpy Analytical Narrative Summary
(continued)

QC Notes (continued)	The samples were analyzed within the four-week holding time specified by the method. Duplicate matrix spikes were prepared using aliquots of sample ***M26A-Imp1,2,BH - Run 1*** and exhibited spike recovery values of the 102% and 103% for chloride and 103% and 104% for fluoride. The analyses of the second source standards served as the laboratory control samples and exhibited spike recovery values of 99.3% and 102%. The Stationary Source Audit Sample (SSAS) ***Lot# 101315B*** was received and analyzed along with these samples.
Reporting Notes	The sulfuric acid matrix samples were analyzed for chloride and fluoride but are reported as hydrogen chloride and hydrogen fluoride. The results were converted using a conversion factor of 1.028 for hydrogen chloride and 1.053 for hydrogen fluoride. The SSAS was reported on a concentration basis (mg/L). The results presented in this report are representative of the samples as provided to the laboratory. These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

ENTHALPY
ANALYTICAL

Enthalpy Analytical Narrative Summary

Company	C.E.M. Solutions, Inc.
Job #	0317-144 – 2. EPA CTM-027
Client #	11542

Custody

Matt Hill of Enthalpy Analytical, Inc. received the samples on 3/28/17 at 2.8 °C after being relinquished by C.E.M. Solutions, Inc. The samples were received in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis

The samples were analyzed for ammonia using the analytical procedures in EPA Conditional Test Method 027, Procedure for Collection and Analysis of Ammonia in Stationary Sources.

The samples were analyzed following the procedures in Section 4.2, Sample Analysis.

The Agilent Model 1100, High Performance Liquid Chromatograph ("Curly") was equipped with a Conductivity Detector for these analyses.

Calibration

The calibration curve is included in the Raw Data section of this report. The data analysis method is referenced in the Analysis Method column on the Detailed Results page.

The first page of the curve contains all method specific parameters (i.e., curve type, origin, weight, etc.) used to quantify the samples. The calibration curve section also includes a table with the Retention Time (RetTime), Level (Lvl), Amount (corresponding units), Area, Response Factor (Amt/Area) and the analyte Name. The calibration table is used to identify (by retention time) and quantify each target compound.

Chromatographic Conditions

The acquisition methods (ENV_AMM_18MM.M and CATIONS.M) are included in the Raw Data section of this report.

QC Notes

The analyses of the field and laboratory reagent blanks contained no ammonia at concentrations greater than the LOQ.

The analysis of the second source standard also served as the laboratory control sample and exhibited a spike recovery value of 98%.

ENTHALPY
ANALYTICAL

Enthalpy Analytical Narrative Summary
(continued)

QC Notes (continued)	Duplicate matrix spikes were prepared using aliquots of sample ***CTM027-Imp1,BH - Run 1*** and exhibited spike recovery values of 61.2% and 60.7%. The matrix spikes were repeated using alternate sample aliquots with similar spike recovery results. The initial analysis of the matrix spikes have been included in this report. The samples were analyzed within the two week holding time specified by the method.
Reporting Notes	The results presented in this report are representative of the samples as provided to the laboratory. These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

ENTHALPY
ANALYTICAL

Enthalpy Analytical Narrative Summary

Company	C.E.M. Solutions, Inc.
Job #	0317-144 – 3. NCASI Method 8A (HPLC/IC)
Client #	11542

Custody

Matt Hill of Enthalpy Analytical, Inc. received the samples on 3/28/17 at 2.8 °C after being relinquished by C.E.M. Solutions, Inc. The samples were received in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis

The samples were analyzed for sulfuric acid mist using the analytical procedures in NCASI Method 8A (HPLC/IC) Analysis, Determination of Sulfuric Acid Vapor or Mist and Sulfur Dioxide Emissions from Kraft Recovery Furnaces.

The Agilent Model 1100, High Performance Liquid Chromatograph ("Gonzo") was equipped with a Conductivity Detector for these analyses.

Calibration

The calibration curve is included in the Raw Data section of this report. The data analysis method is referenced in the Analysis Method column on the Detailed Results page.

The first page of the curve contains all method specific parameters (i.e., curve type, origin, weight, etc.) used to quantify the samples. The calibration curve section also includes a table with the Retention Time (RetTime), Level (Lvl), Amount (corresponding units), Area, Response Factor (Amt/Area) and the analyte Name. The calibration table is used to identify (by retention time) and quantify each target compound.

Chromatographic Conditions

The acquisition method (ANIONS!.M) is included in the Raw Data section of this report.

QC Notes

The analyses of the field and laboratory reagent blanks contained no sulfuric acid at concentrations greater than the detection limit.

Duplicate matrix spikes were prepared using aliquots of sample ***8A-Condensate Rinse - Run 1***. The matrix spikes were analyzed in the same manner as the samples and exhibited spike recovery values of 94.0% and 90.8%. All sample preparation and analytical holding times specified in the method were met.

ENTHALPY
ANALYTICAL

Enthalpy Analytical Narrative Summary
(continued)

QC Notes (continued)	The analyses of the second source standard served as the laboratory control samples and exhibited spike recovery values within 10% of the expected value.
Reporting Notes	The samples were analyzed for sulfate but were reported as sulfuric acid mist. The sulfuric acid mist results were calculated using a conversion factor of 1.021 to account for the additional mass. The results presented in this report are representative of the samples as provided to the laboratory. These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

ENTHALPY
ANALYTICAL

General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, Inc. data reports, unless specifically noted otherwise.

- Any analysis which refers to the method as ***"Type"*** represents a planned deviation from the reference method. For instance a Hydrogen Sulfide assay from a Tedlar bag would be labeled as "EPA Method 16-Type" because Tedlar bags are not mentioned as one of the collection options in EPA Method 16.
- The acronym ***MDL*** represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym ***LOQ*** represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym ***ND*** following a value indicates a non-detect or analytical result below the MDL.
- The letter ***J*** in the Qualifier or Flag column in the results indicates that the value is between the MDL and the LOQ. The laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter ***E*** in the Qualifier or Flag column indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym ***DF*** represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of ***MS*** to the Sample ID represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. The MS analysis indicates what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).
- The addition of ***MSD*** to the Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as a MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.
- The addition of ***LD*** to the Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).

ENTHALPY
ANALYTICAL

General Reporting Notes

(continued)

- The addition of ***AD*** to the Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.
- The Sample ID ***LCS*** represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. The LCS is used to assess the control of the laboratory's analytical system. Whenever spikes are prepared for our client projects, two spikes are retained as LCSs. The LCSs are labeled with the associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may have been affected by source matrix, sample collection and/or sample transport.
- **Significant Figures**: Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits.
- **Manual Integration**: The data systems used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations on sample chromatograms, if provided in the report. The peak was ***not integrated*** by the software **"NI"**, the peak was ***integrated incorrectly*** by the software **"II"** or the ***wrong peak*** was integrated by the software **"WP"**. These codes will accompany the analyst's manual integration stamp placed next to the compound name on the chromatogram.

Sample Custody

ENTHALPY
ANALYTICAL

C.E.M. SOLUTIONS
1183 E. Overdrive Circle • Hernando, FL 34442 • Ph: (352) 489-4337 • Fax: (352) 489-4801
www.cem-solutions.com

Chain of Custody Record

Project #	Project Name:	# of Containers	MM26 Impinger 1 and 2 + BH		NH3 Impinger 1 + BH	NH3 Impinger 2		SAM Condenser Rinse	Audit Sample	Blank	Comments
11542	GREC Boiler Compliance										
Samplers: CRH/MB/TC/AL											

Sample ID	Date	Test Method	Comp.	Grab	Sample Location
Run 1	3/22/2017	MM26	X		Boiler Stack
Run 2	3/22/2017	MM26	X		Boiler Stack
Run 3	3/23/2017	MM26	X		Boiler Stack
Audit	3/23/2017	MM26		X	ERA Project #101315B
Run 1	3/24/2017	CTM-027	X		Boiler Stack
Run 2	3/24/2017	CTM-027	X		Boiler Stack
Run 3	3/24/2017	CTM-027	X		Boiler Stack
Run 1	3/24/2017	8A	X		Boiler Stack
Run 2	3/24/2017	8A	X		Boiler Stack
Run 3	3/24/2017	8A	X		Boiler Stack
Blank	3/24/2017	MM26	X		0.1N H2SO4 + DI H20
Blank	3/24/2017	8A	X		DI H20
Blank	3/24/2017	CTM-027	X		0.1N H2SO4 + Impinger rinse

Relinquished by:	Date:	Time:	Received By:	Relinquished By:	Date:	Time:	Received By:
	3/27/17	9:40			3/28/17	9:05	
Relinquished by:	Date:	Time:	Received By:	Relinquished By:	Date:	Time:	Received By:
					3/28/17	9:05	
Received for Lab By:	Date:	Time:	Remarks: CTM-027 Stored on Ice				

Received in good condition.
Samples onice received at 2.8°C (G2)
on wetice
MWH 3/28/17

Raw Data

ENTHALPY
ANALYTICAL

EPA Method 26A
Hydrogen Chloride
Hydrogen Fluoride
Raw Data

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 1. EPA Method 26A

Client No.: 11542

Chloride -- Calibration Standards, Laboratory Blanks and Controls

Sample ID	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Standard Tag (ug/mL)	%Tag
HPLCStds420 #5	005-0201.D	005-0202.D	Nelson725.M	4.14	4.13	0.1	30.0	29.8	0.3	29.9	30.0	99.6
HPLCStds420 #4	004-0301.D	004-0302.D	Nelson725.M	4.14	4.14	0.0	15.0	15.0	0.1	15.0	15.0	100
HPLCStds420 #3	003-0401.D	003-0402.D	Nelson725.M	4.14	4.14	0.0	10.0	10.1	0.2	10.1	10.0	101
HPLCStds420 #2	002-0501.D	002-0502.D	Nelson725.M	4.15	4.15	0.0	4.99	4.95	0.4	4.97	5.00	99.4
HPLCStds420 #1	001-0601.D	001-0602.D	Nelson725.M	4.17	4.17	0.0	1.00	0.999	0.1	1.00	1.00	100
HPLCStds420 #SS	006-0701.D	006-0702.D	Nelson725.M	4.13	4.13	0.0	7.44	7.45	0.1	7.45	7.50	99.3
HPLCStds420 #NIST	007-0801.D	007-0802.D	Nelson725.M	4.15	4.14	0.1	10.2	10.1	0.0	10.1	9.99	102
HPLCStds420 #RB	008-0901.D	008-0902.D	Nelson725.M	NA	NA	NA	0.100	0.100	NA	0.100	NA	NA
HPLCStds420 #3	101-2001.D	101-2002.D	Nelson725.M	4.14	4.14	0.0	10.1	10.0	0.4	10.1	10.0	101
HPLCStds420 #5	005-3701.D	005-3702.D	Nelson725.M	4.12	4.12	0.0	30.0	30.0	0.0	30.0	30.0	99.9
HPLCStds420 #4	004-3801.D	004-3802.D	Nelson725.M	4.14	4.13	0.0	15.1	15.0	0.1	15.1	15.0	100
HPLCStds420 #3	003-3901.D	003-3902.D	Nelson725.M	4.14	4.14	0.0	10.1	10.1	0.1	10.1	10.0	101
HPLCStds420 #2	002-4001.D	002-4002.D	Nelson725.M	4.15	4.15	0.0	4.95	4.92	0.3	4.94	5.00	98.7
HPLCStds420 #1	001-4101.D	001-4102.D	Nelson725.M	4.16	4.16	0.0	1.01	0.991	1.1	1.00	1.00	100

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 1. EPA Method 26A

Client No.: 11542

Fluoride -- Calibration Standards, Laboratory Blanks and Controls

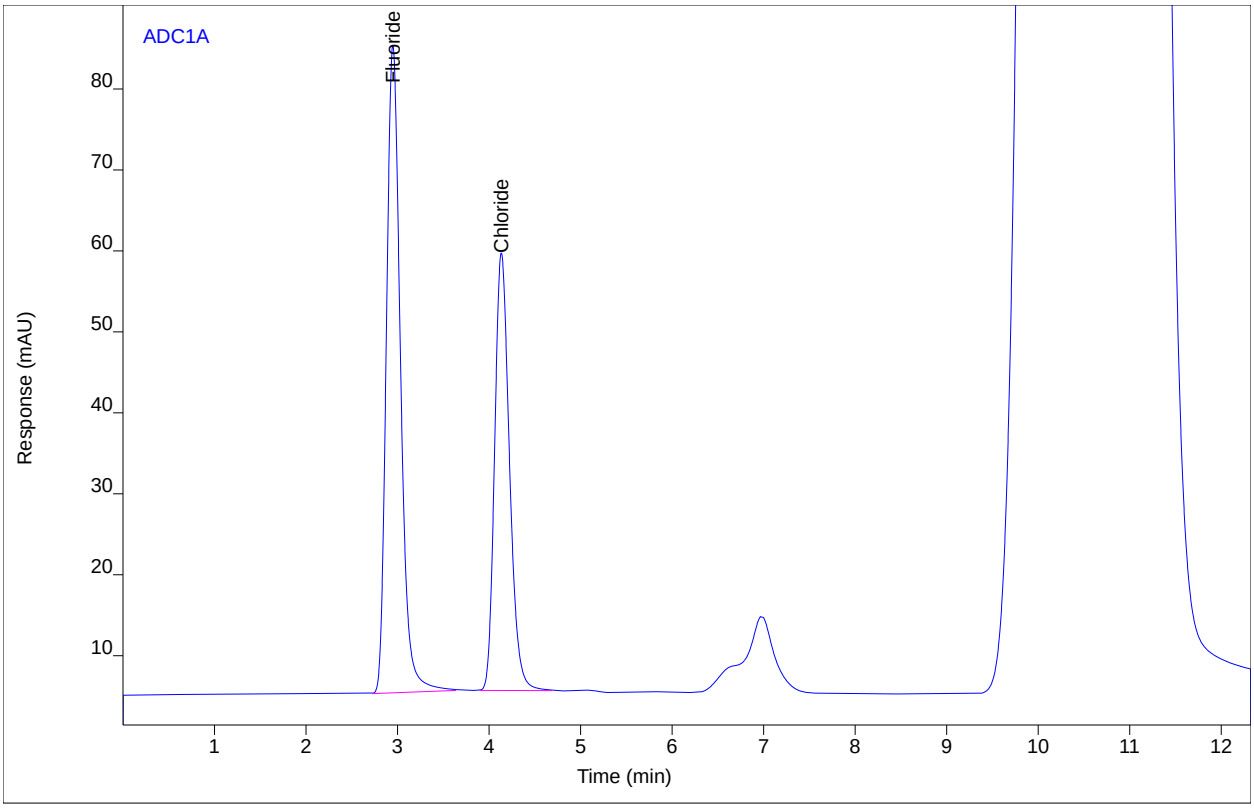
Sample ID	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Standard Tag	%Tag
HPLCStds420 #5	005-0201.D	005-0202.D	Nelson725.M	2.95	2.94	0.1	29.6	30.2	0.9	29.9	30.0	99.8
HPLCStds420 #4	004-0301.D	004-0302.D	Nelson725.M	2.93	2.93	0.0	14.9	14.8	0.1	14.9	15.0	99.0
HPLCStds420 #3	003-0401.D	003-0402.D	Nelson725.M	2.91	2.92	0.2	10.4	9.94	2.4	10.2	10.0	102
HPLCStds420 #2	002-0501.D	002-0502.D	Nelson725.M	2.92	2.91	0.2	4.85	5.22	3.6	5.04	5.00	101
HPLCStds420 #1	001-0601.D	001-0602.D	Nelson725.M	2.93	2.93	0.0	1.00	0.996	0.2	0.998	1.00	99.8
HPLCStds420 #SS	006-0701.D	006-0702.D	Nelson725.M	2.91	2.92	0.2	3.92	3.58	4.5	3.75	3.75	99.9
HPLCStds420 #NIST	007-0801.D	007-0802.D	Nelson725.M	NA	NA	NA	0.100	0.100	NA	0.100	NA	NA
HPLCStds420 #RB	008-0901.D	008-0902.D	Nelson725.M	NA	NA	NA	0.100	0.100	NA	0.100	NA	NA
HPLCStds420 #3	101-2001.D	101-2002.D	Nelson725.M	2.93	2.92	0.2	9.77	10.3	2.5	10.0	10.0	100.2
HPLCStds420 #5	005-3701.D	005-3702.D	Nelson725.M	2.95	2.95	0.1	30.2	30.0	0.3	30.1	30.0	100.4
HPLCStds420 #4	004-3801.D	004-3802.D	Nelson725.M	2.93	2.93	0.1	14.8	15.2	1.4	15.0	15.0	100.2
HPLCStds420 #3	003-3901.D	003-3902.D	Nelson725.M	2.93	2.93	0.0	9.92	9.84	0.4	9.88	10.0	98.8
HPLCStds420 #2	002-4001.D	002-4002.D	Nelson725.M	2.91	2.93	0.2	5.16	4.78	3.8	4.97	5.00	99.4
HPLCStds420 #1	001-4101.D	001-4102.D	Nelson725.M	2.93	2.91	0.4	0.973	1.06	4.2	1.02	1.00	102

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #5
Sequence Name	Nelson725 ver.4
Inj Data File	005-0201.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 4:24 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	5
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



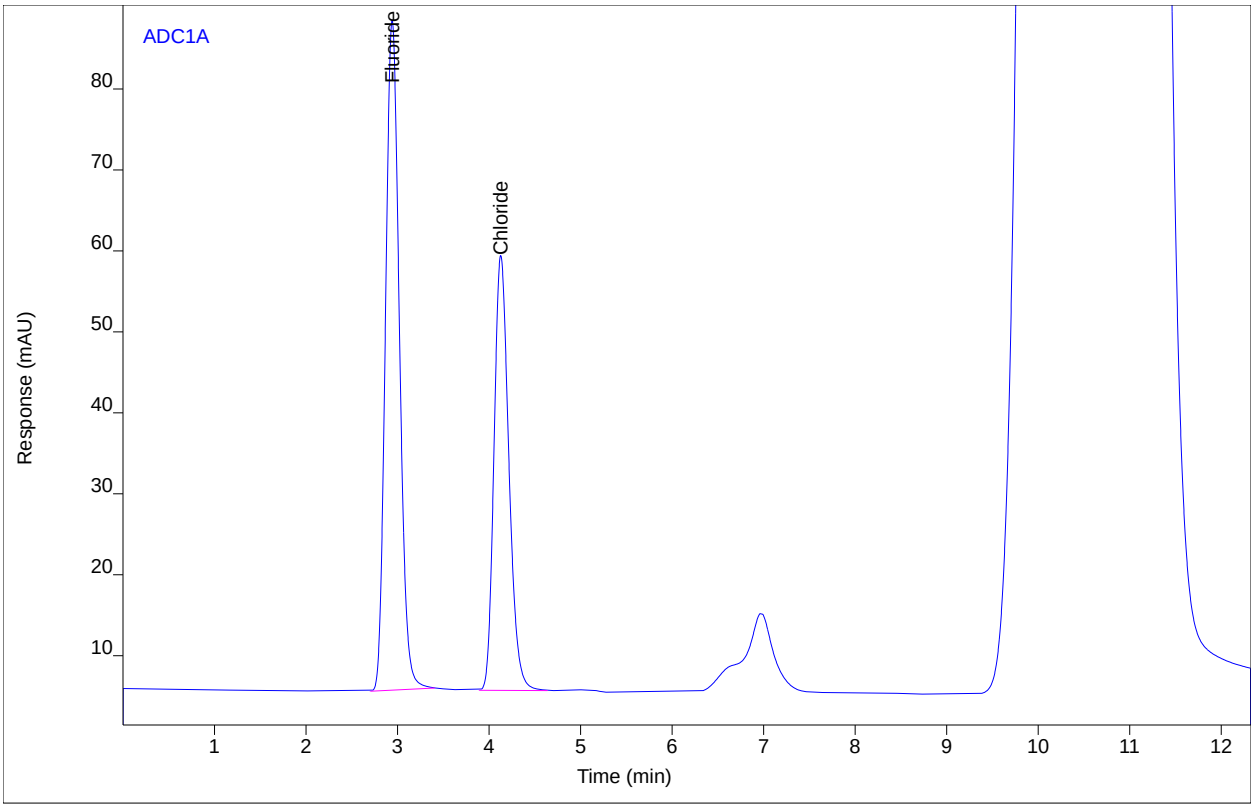
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.95	856.805	79.9957	29.6491	1	29.6491	ug/mL
Chloride	BB	4.14	609.265	54.0677	29.9545	1	29.9545	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #5
Sequence Name	Nelson725 ver.4
Inj Data File	005-0202.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 4:38 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	5
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.94	871.624	82.8075	30.2086	1	30.2086	ug/mL
Chloride	BB	4.13	605.814	53.7591	29.7968	1	29.7968	ug/mL

Analyst Peak Integration Comments

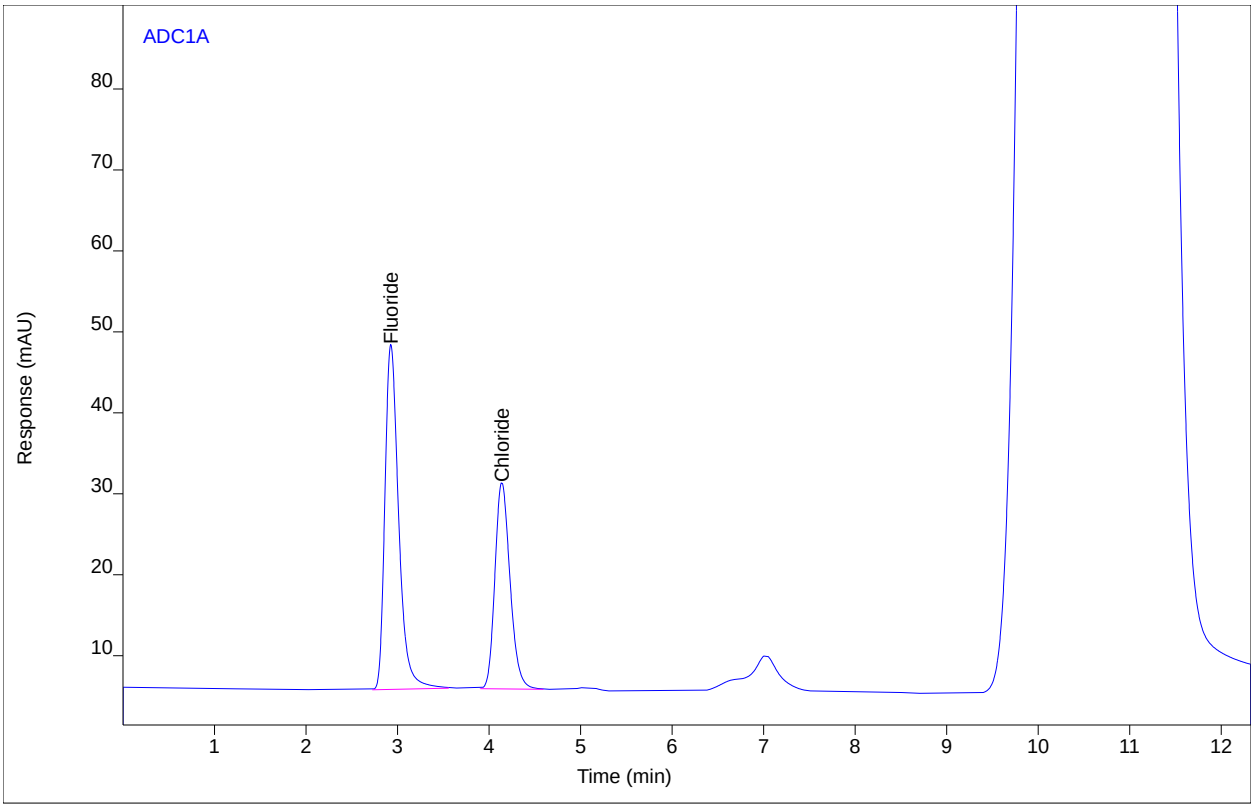
15:24:34 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #4
Sequence Name	Nelson725 ver.4
Inj Data File	004-0301.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 4:53 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	4
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



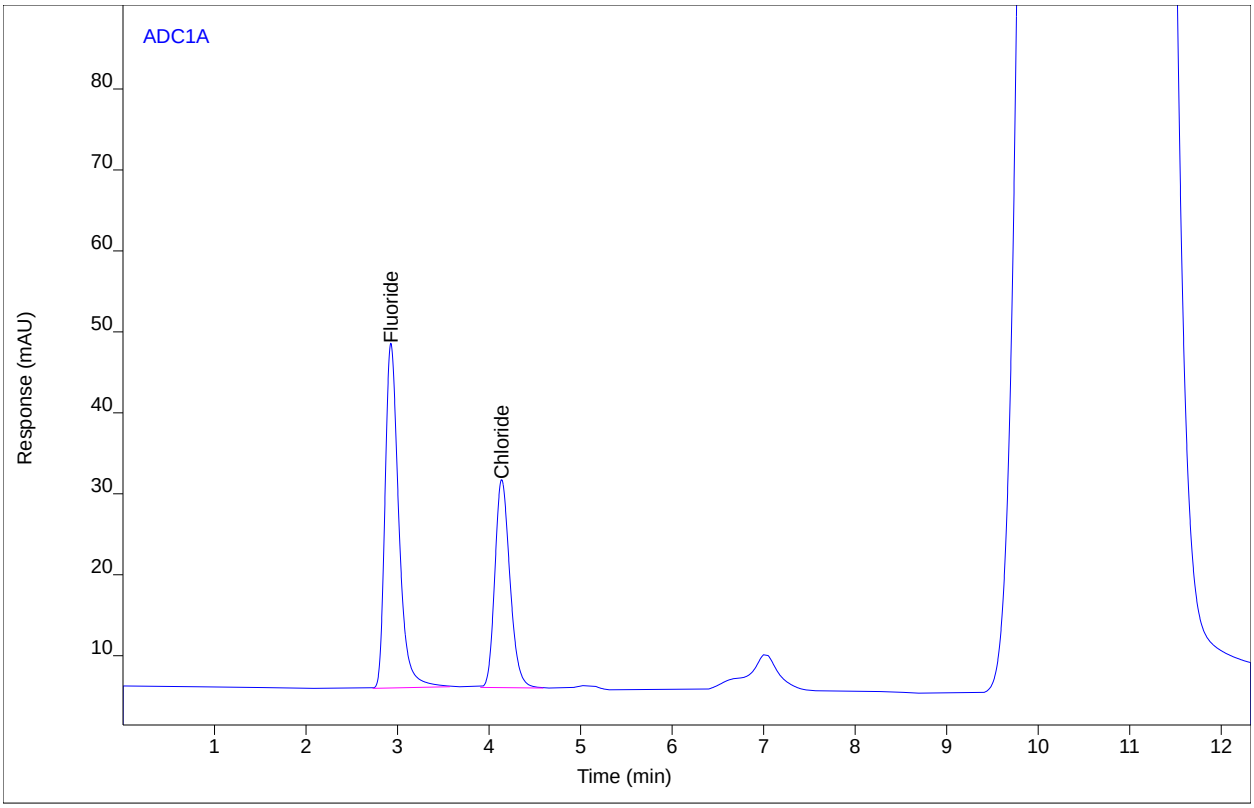
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	444.894	42.6290	14.8652	1	14.8652	ug/mL
Chloride	BB	4.14	292.651	25.5406	14.9953	1	14.9953	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #4
Sequence Name	Nelson725 ver.4
Inj Data File	004-0302.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 5:08 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	4
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



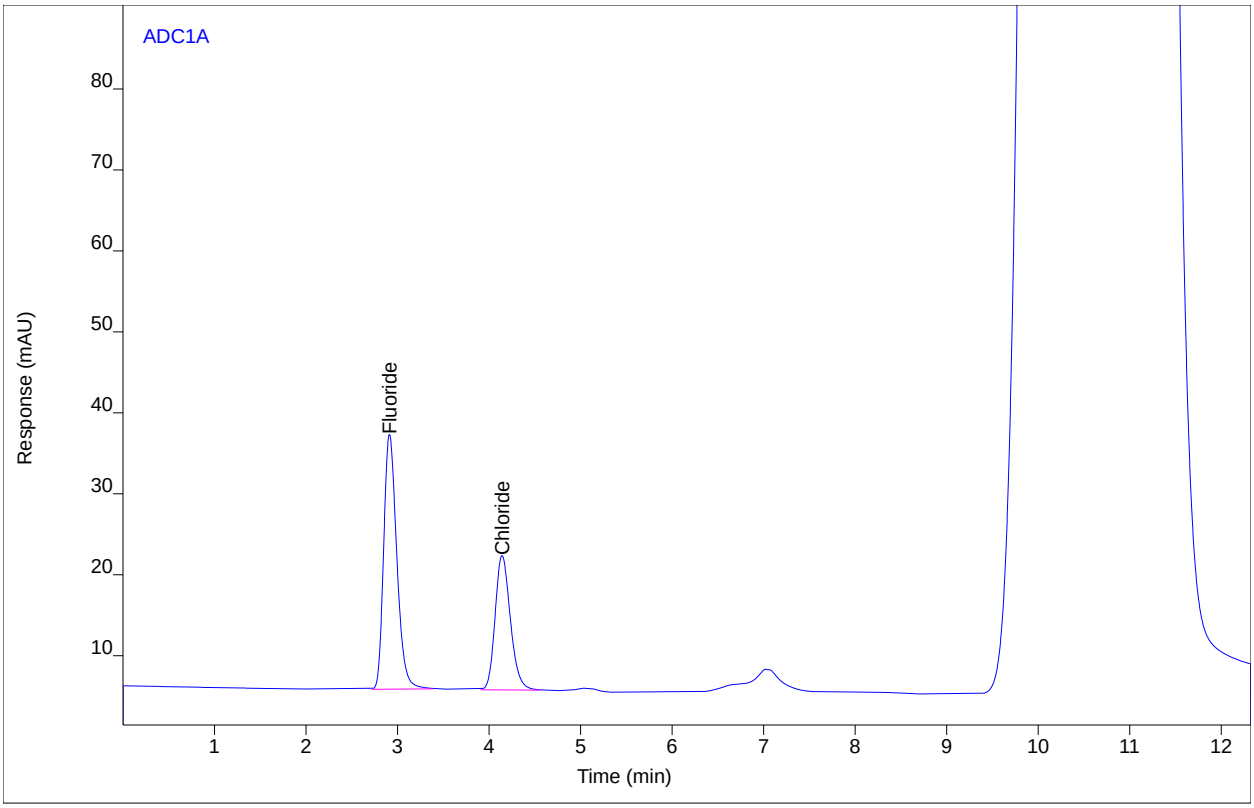
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	444.044	42.6022	14.8361	1	14.8361	ug/mL
Chloride	BB	4.14	293.288	25.7294	15.0265	1	15.0265	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #3
Sequence Name	Nelson725 ver.4
Inj Data File	003-0401.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 5:23 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	3
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



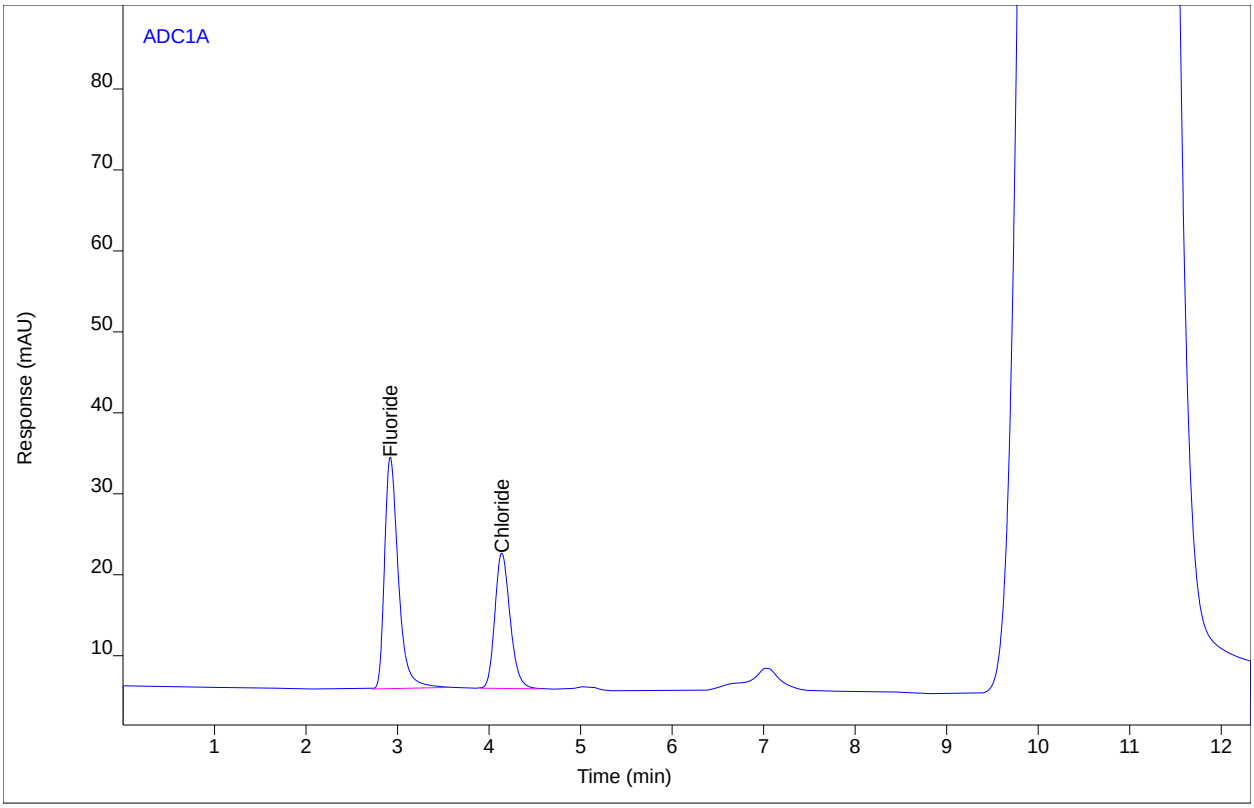
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.91	313.295	31.5081	10.4177	1	10.4177	ug/mL
Chloride	BB	4.14	192.671	16.6237	10.0476	1	10.0476	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #3
Sequence Name	Nelson725 ver.4
Inj Data File	003-0402.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 5:37 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	3
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.92	298.874	28.6333	9.93758	1	9.93758	ug/mL
Chloride	BB	4.14	193.410	16.7453	10.0846	1	10.0846	ug/mL

Analyst Peak Integration Comments

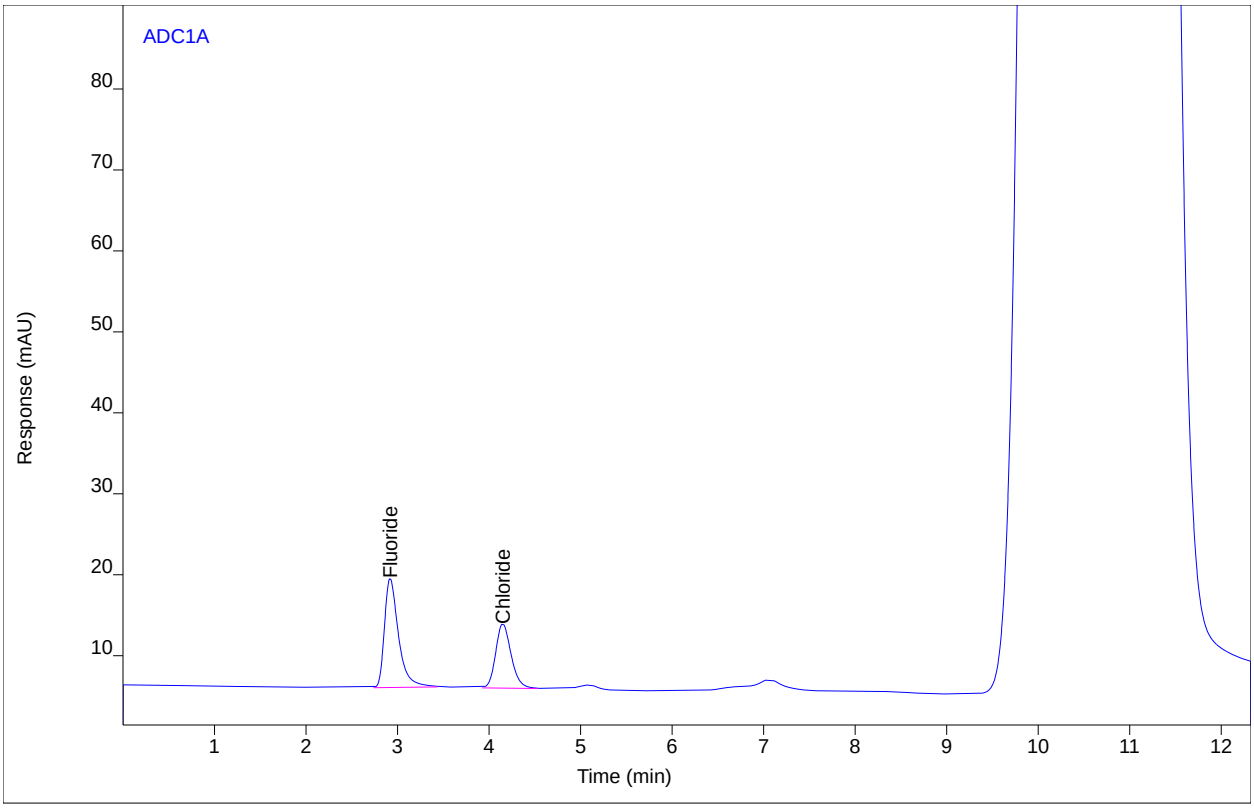
15:25:02 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #2
Sequence Name	Nelson725 ver.4
Inj Data File	002-0501.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 5:52 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	2
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



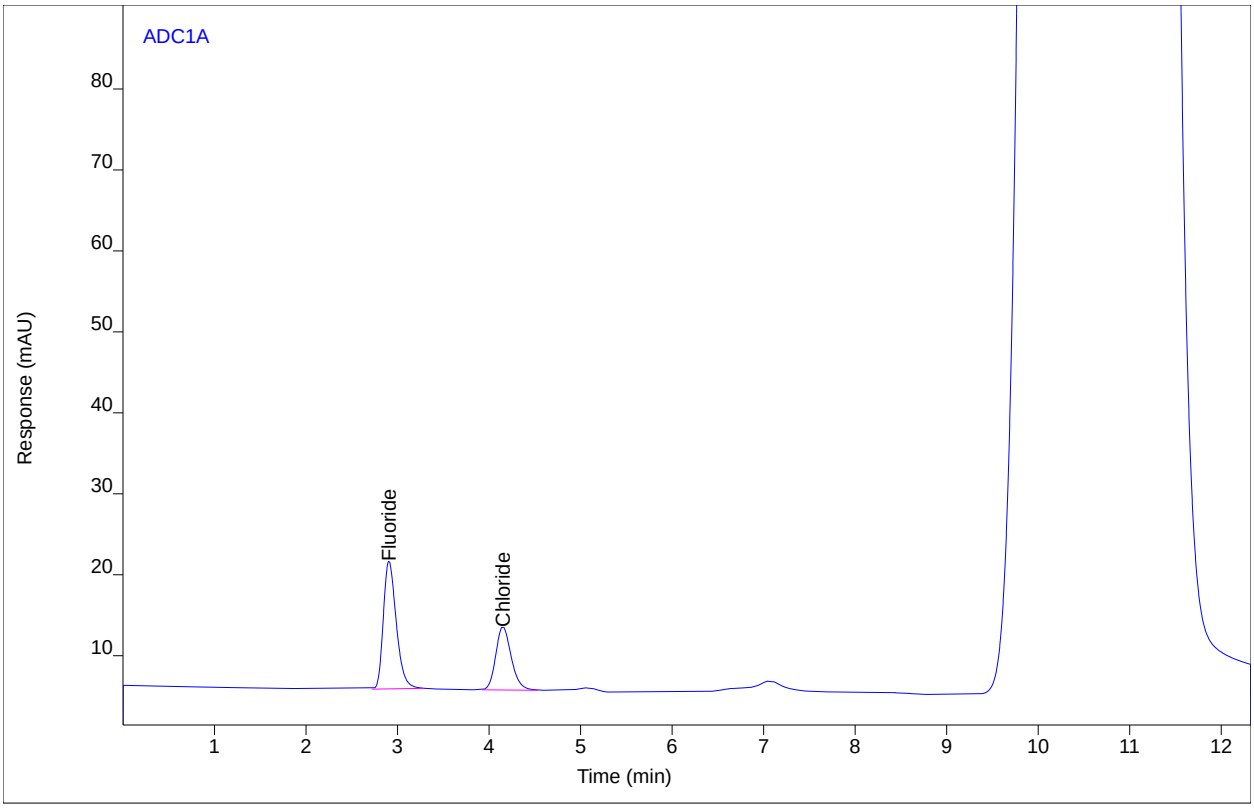
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.92	143.634	13.4610	4.85310	1	4.85310	ug/mL
Chloride	BB	4.15	92.9138	7.94562	4.99045	1	4.99045	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #2
Sequence Name	Nelson725 ver.4
Inj Data File	002-0502.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 6:07 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	2
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.91	154.903	15.7726	5.21713	1	5.21713	ug/mL
Chloride	BB	4.15	92.0512	7.81881	4.94618	1	4.94618	ug/mL

Analyst Peak Integration Comments

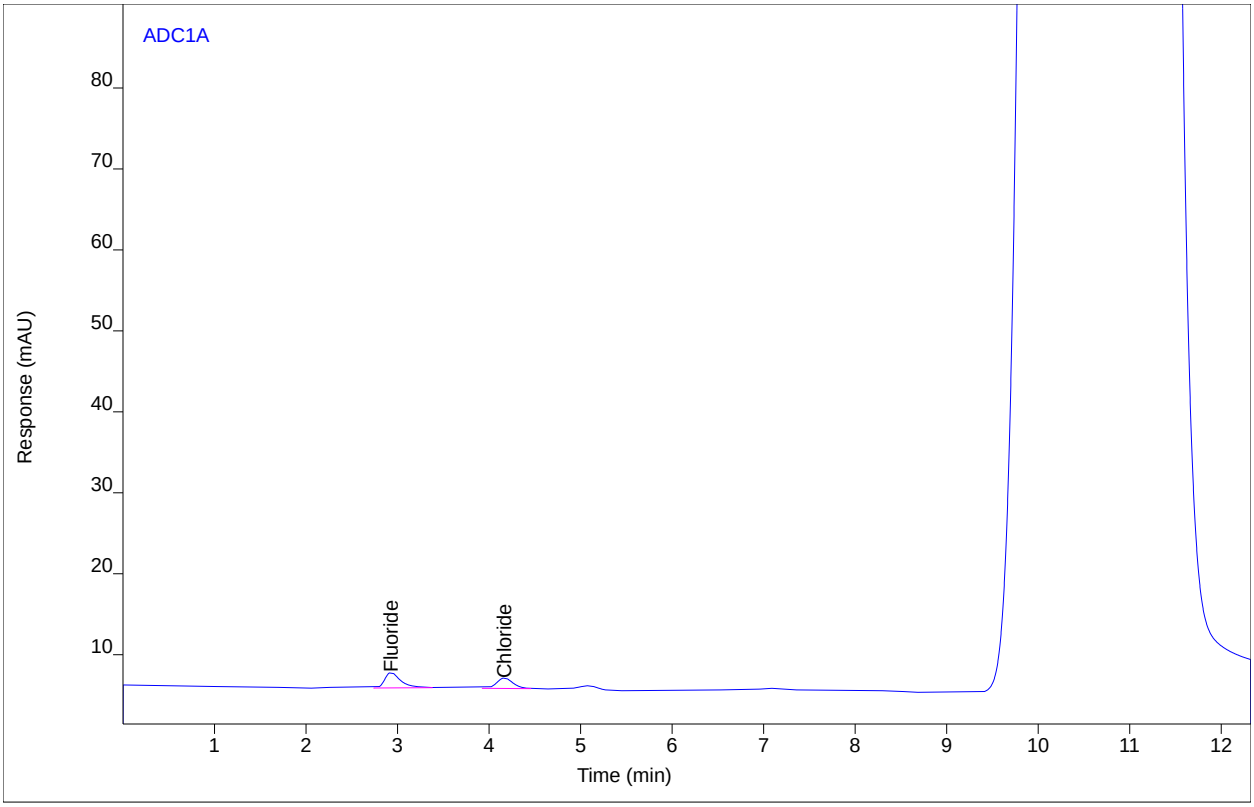
15:25:26 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #1
Sequence Name	Nelson725 ver.4
Inj Data File	001-0601.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 6:22 PM
File Modified	4/6/2017 3:51 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	1
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:51 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.93	23.1789	1.90740	0.99997	1	0.99997	ug/mL
Chloride	MM	4.17	15.9241	1.29662	1.00072	1	1.00072	ug/mL

Analyst Peak Integration Comments

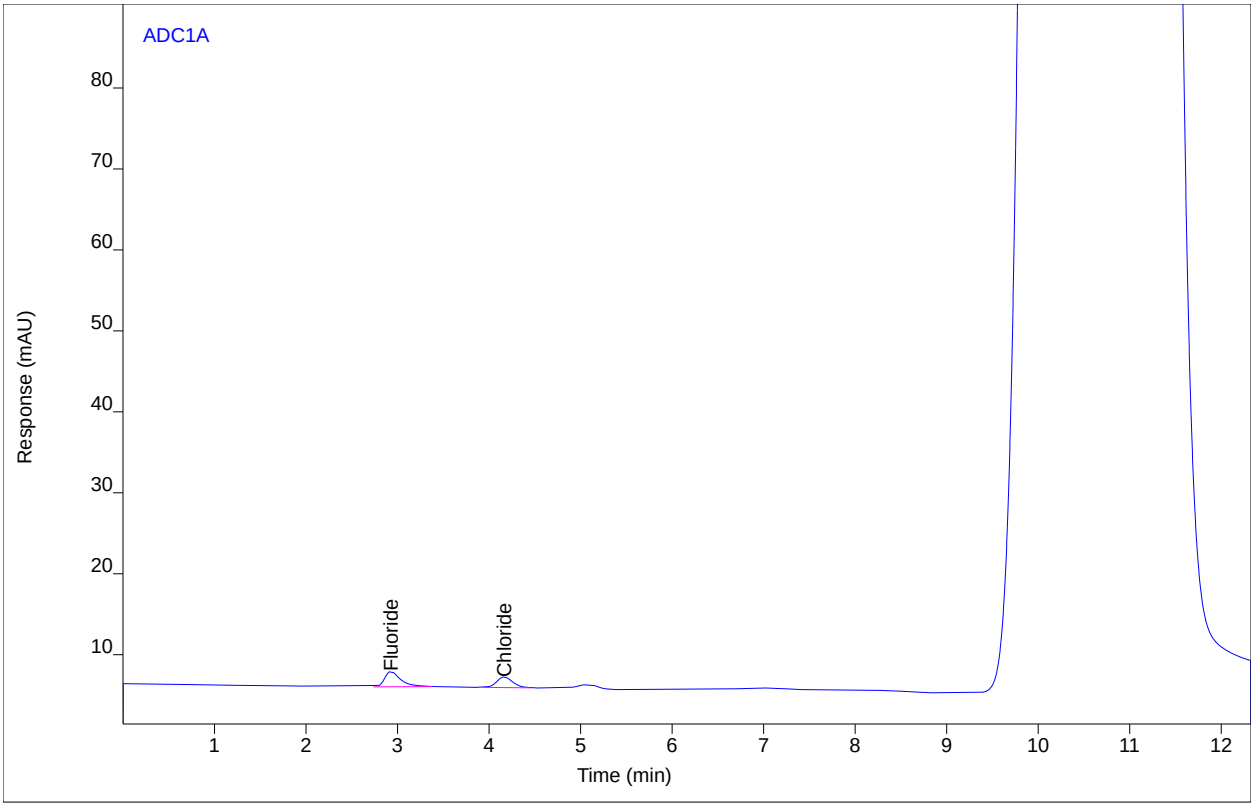
15:26:12 04/06/17 Scott Wilson II
15:51:09 04/06/17 Scott Wilson II

Chromatogram Report

Sample Name	HPLCStds420 #1
Sequence Name	Nelson725 ver.4
Inj Data File	001-0602.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 6:36 PM
File Modified	4/6/2017 3:51 PM
Instrument	Nelson
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	1
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:51 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.93	22.9843	1.89464	0.99574	1	0.99574	ug/mL
Chloride	MM	4.17	15.8506	1.31343	0.99853	1	0.99853	ug/mL

Analyst Peak Integration Comments

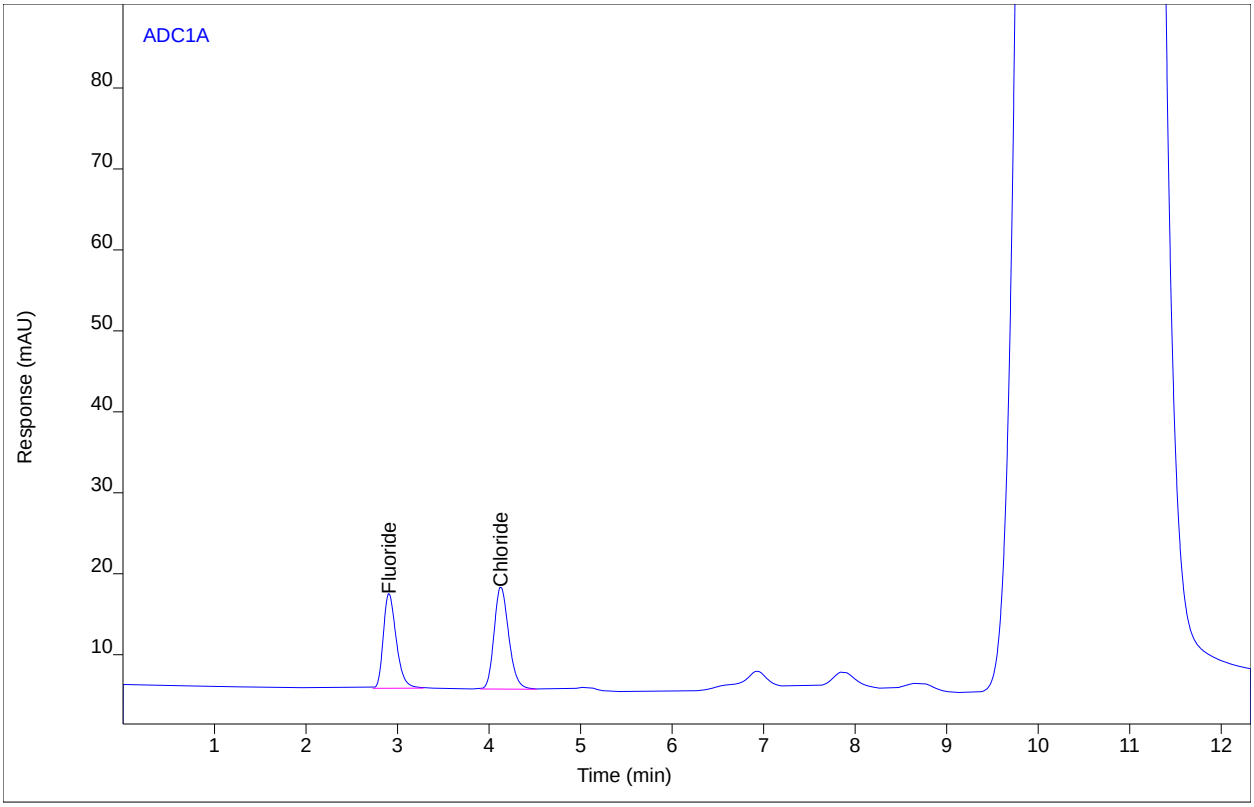
15:26:55 04/06/17 Scott Wilson II
15:51:22 04/06/17 Scott Wilson II

Chromatogram Report

Sample Name	HPLCStds420 #SS
Sequence Name	Nelson725 ver.4
Inj Data File	006-0701.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 6:51 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Control
Vial Number	6
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



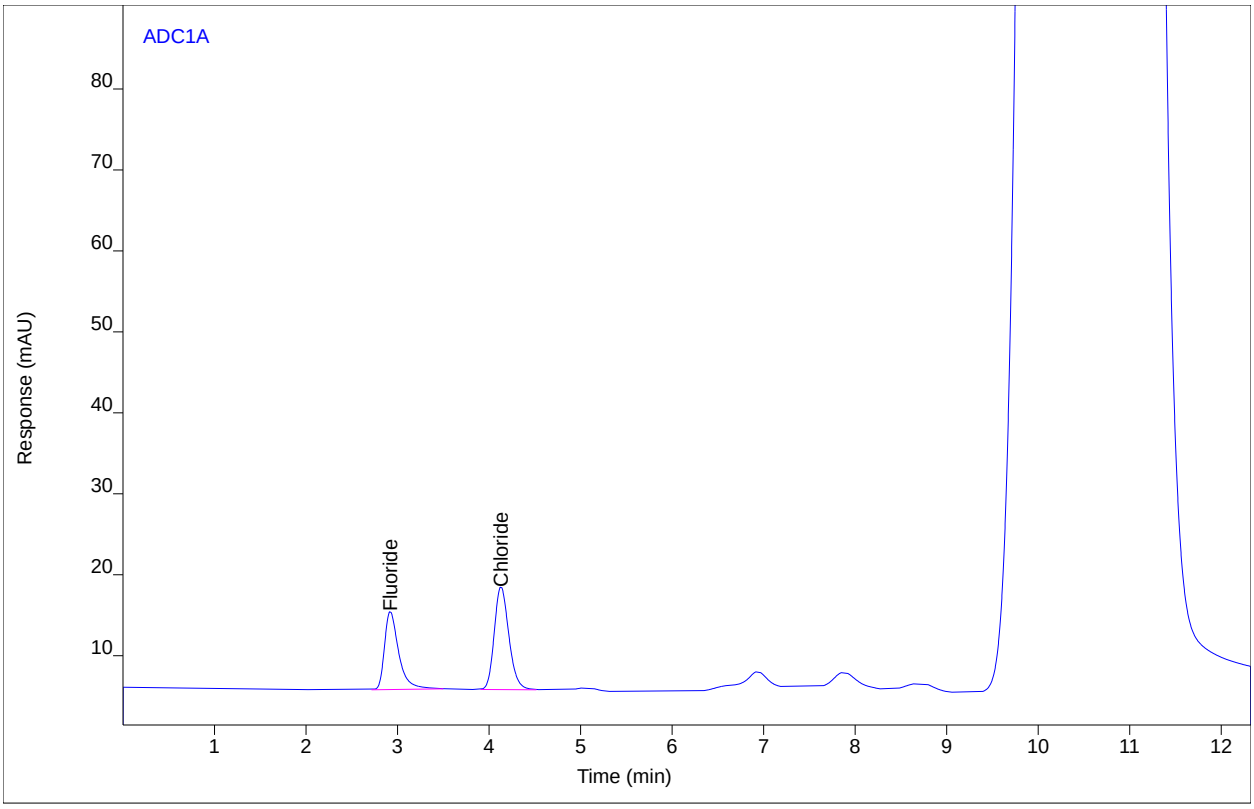
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.91	114.549	11.6891	3.91706	1	3.91706	ug/mL
Chloride	BB	4.13	140.942	12.6661	7.44082	1	7.44082	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #SS
Sequence Name	Nelson725 ver.4
Inj Data File	006-0702.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 7:06 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Control
Vial Number	6
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.92	103.942	9.64631	3.57696	1	3.57696	ug/mL
Chloride	BB	4.13	141.142	12.7300	7.45097	1	7.45097	ug/mL

Analyst Peak Integration Comments

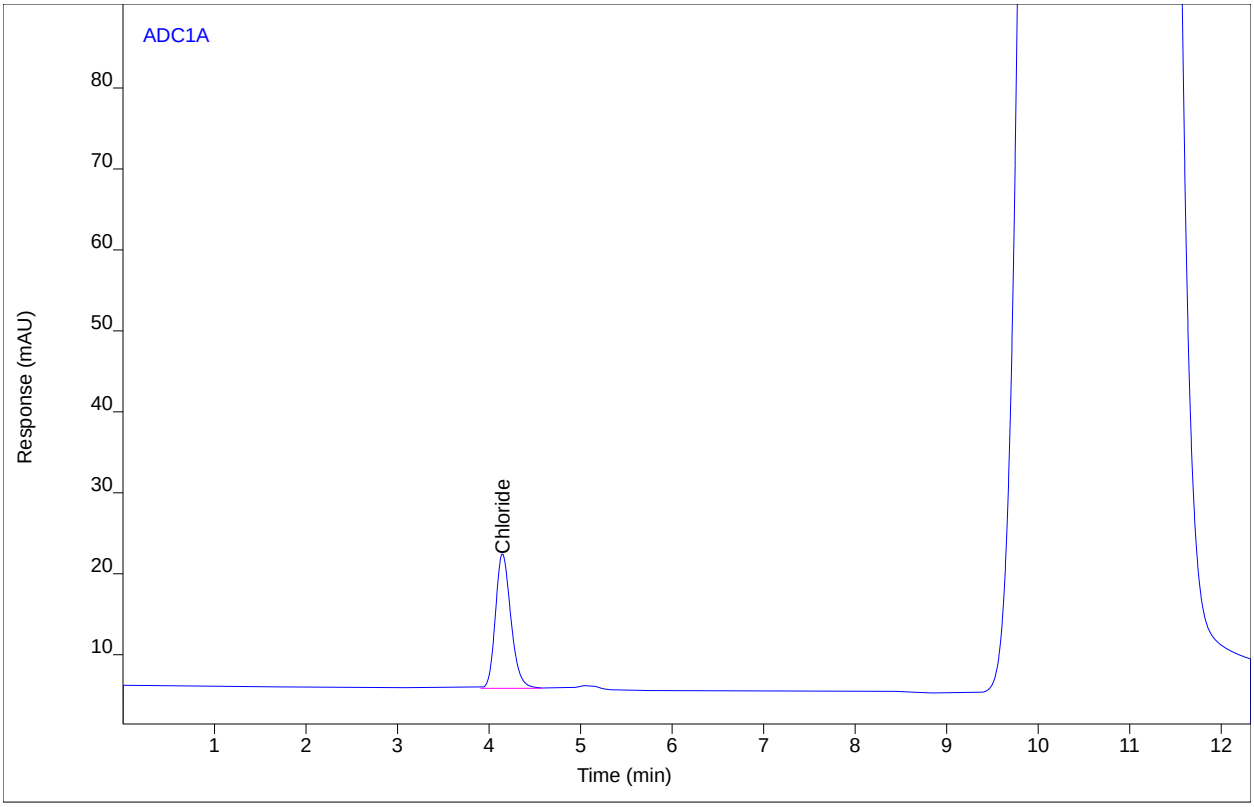
15:34:52 04/06/17 Scott Wilson II

Chromatogram Report

Sample Name	HPLCStds420 #NIST
Sequence Name	Nelson725 ver.4
Inj Data File	007-0801.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 7:21 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Control
Vial Number	7
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



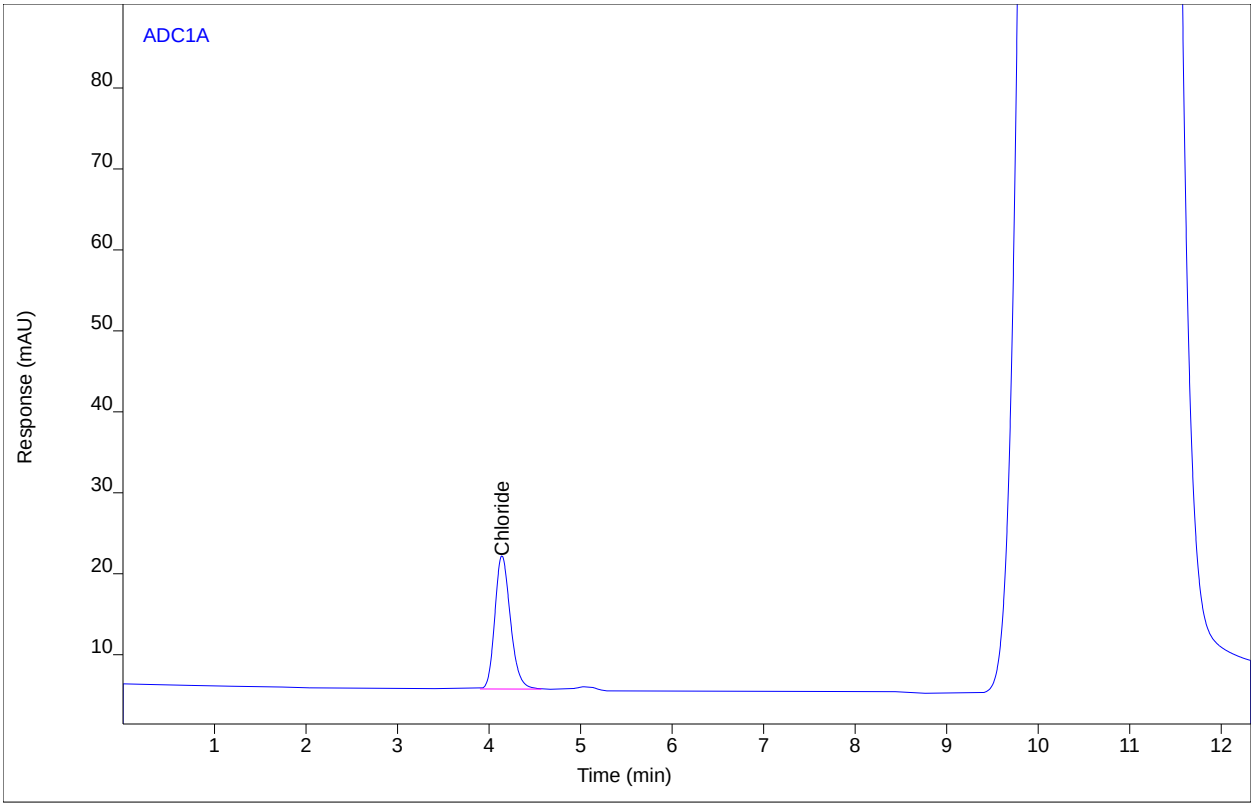
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	BB	4.15	194.742	16.6210	10.1513	1	10.1513	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #NIST
Sequence Name	Nelson725 ver.4
Inj Data File	007-0802.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 7:35 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Control
Vial Number	7
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



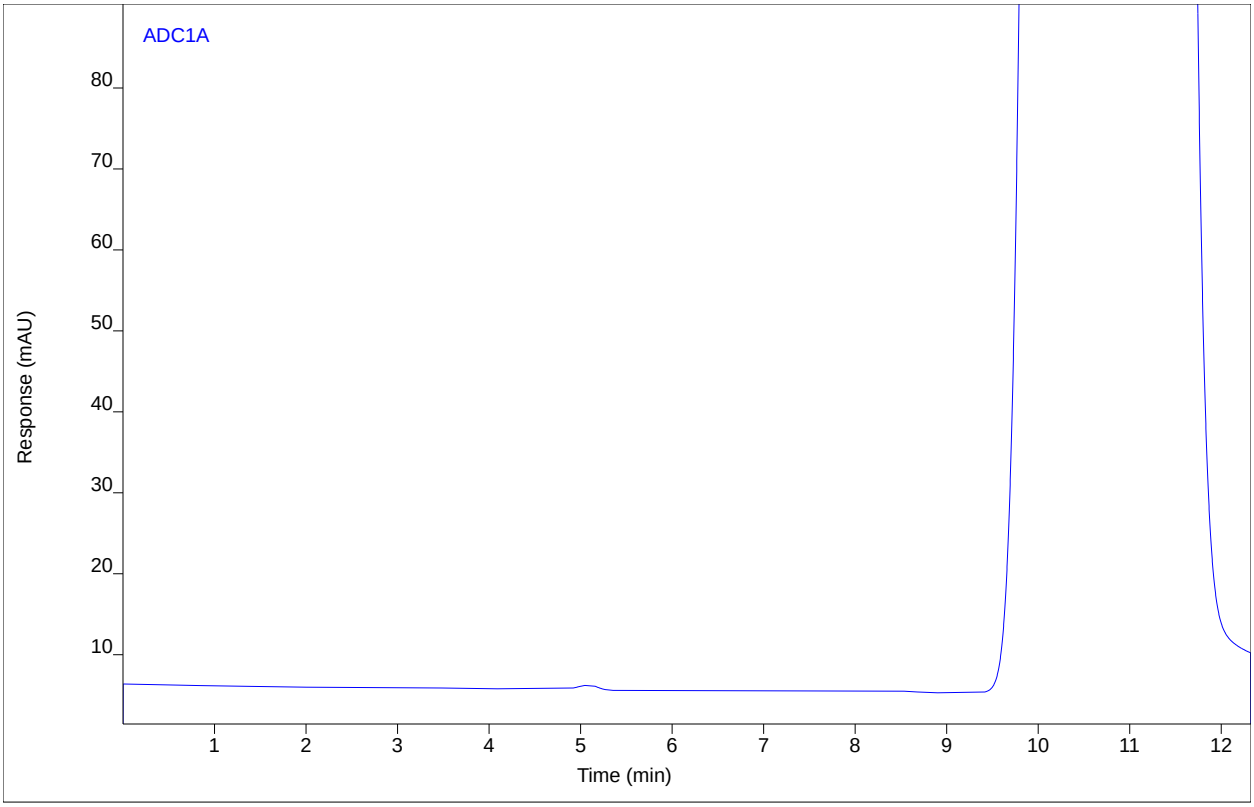
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	BB	4.14	194.655	16.4914	10.1469	1	10.1469	ug/mL

Chromatogram Report

Sample Name	HPLCStds420 #RB
Sequence Name	Nelson725 ver.4
Inj Data File	008-0901.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 7:50 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Control
Vial Number	8
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



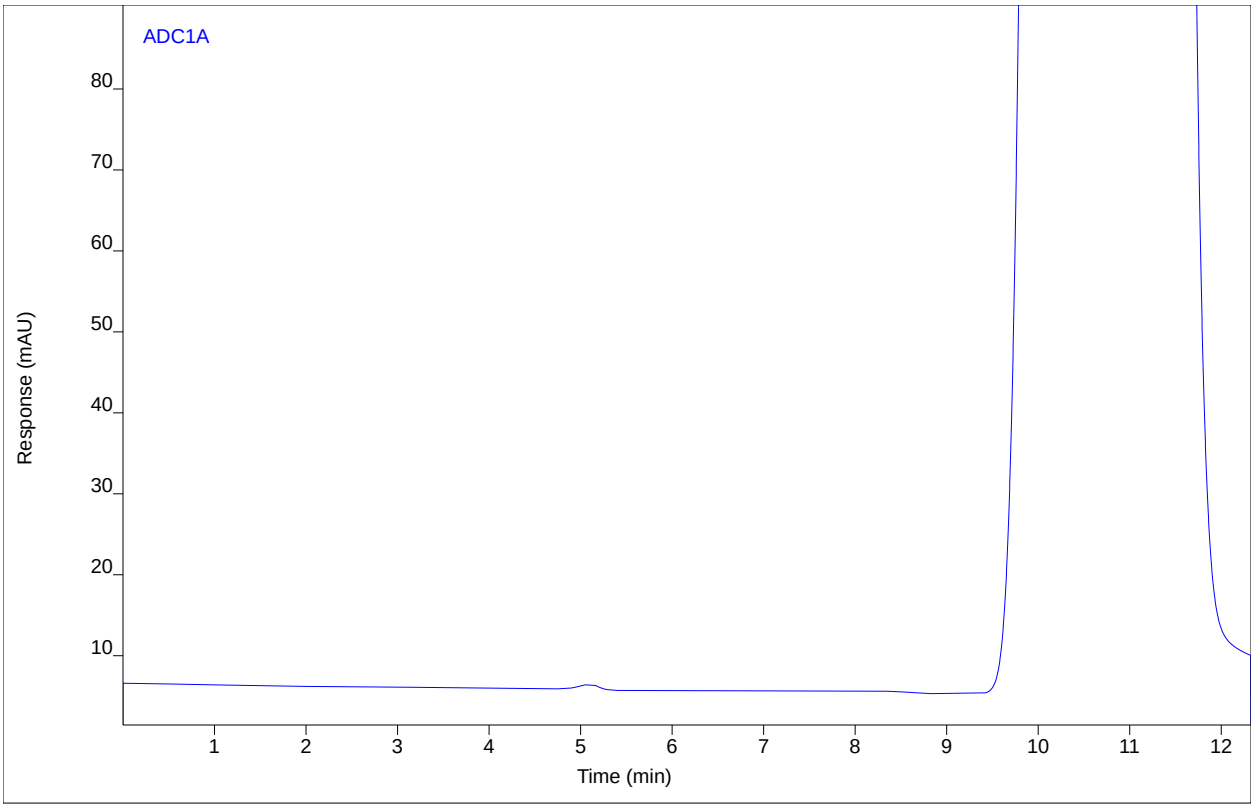
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride		(4.16)				1		ug/mL

Chromatogram Report

Sample Name	HPLCStds420 #RB
Sequence Name	Nelson725 ver.4
Inj Data File	008-0902.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 8:05 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Control
Vial Number	8
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



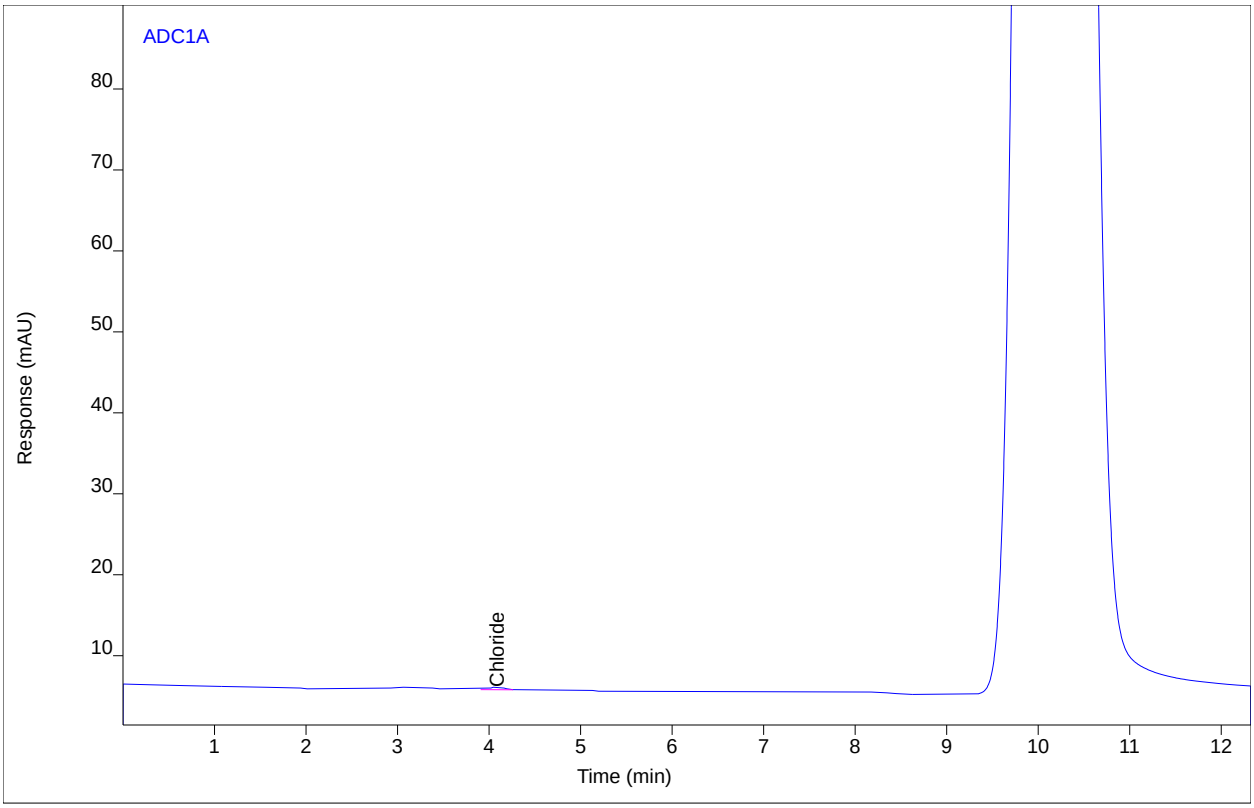
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride		(4.16)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R1.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	023-1001.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 8:20 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	23
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	MM	4.09	3.47077	0.37087	0.21781	1	0.21781	ug/mL

Analyst Peak Integration Comments

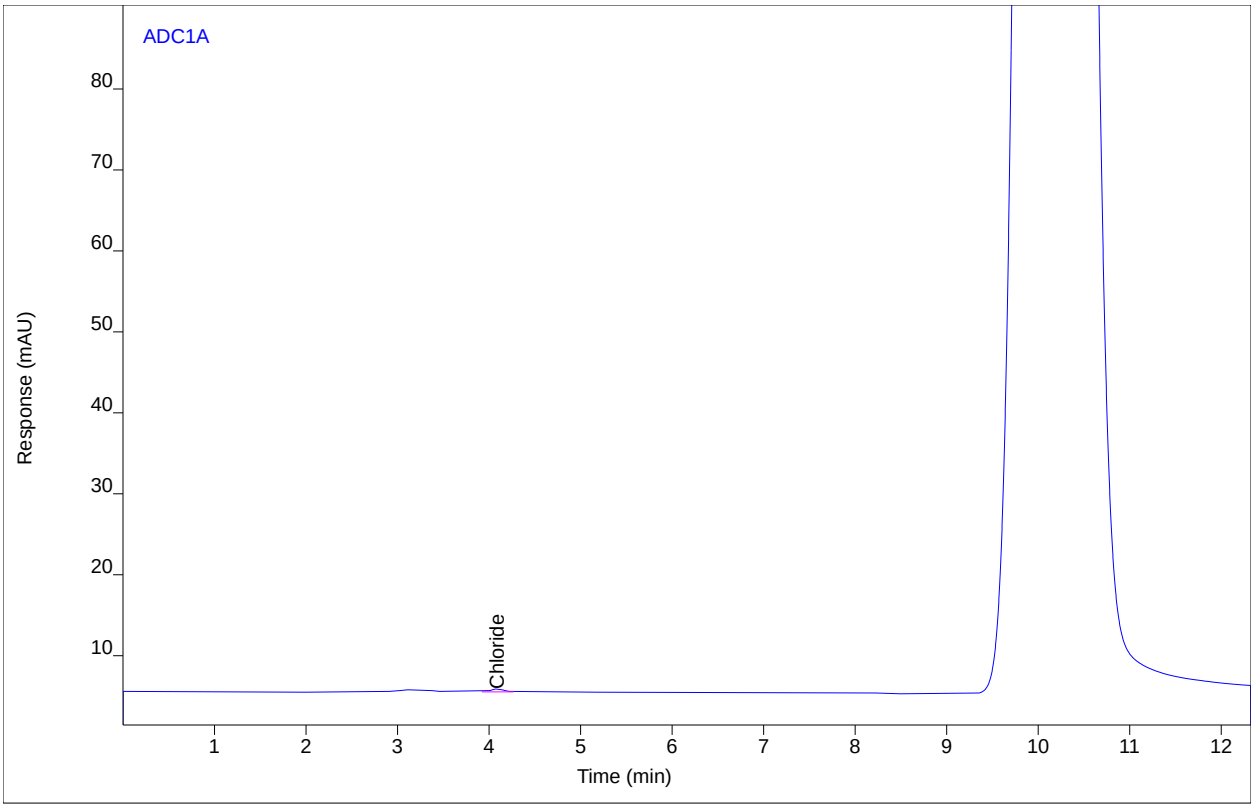
15:35:25 04/06/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R1.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	023-1002.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 8:34 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	23
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	MM	4.09	3.52659	0.36958	0.22131	1	0.22131	ug/mL

Analyst Peak Integration Comments

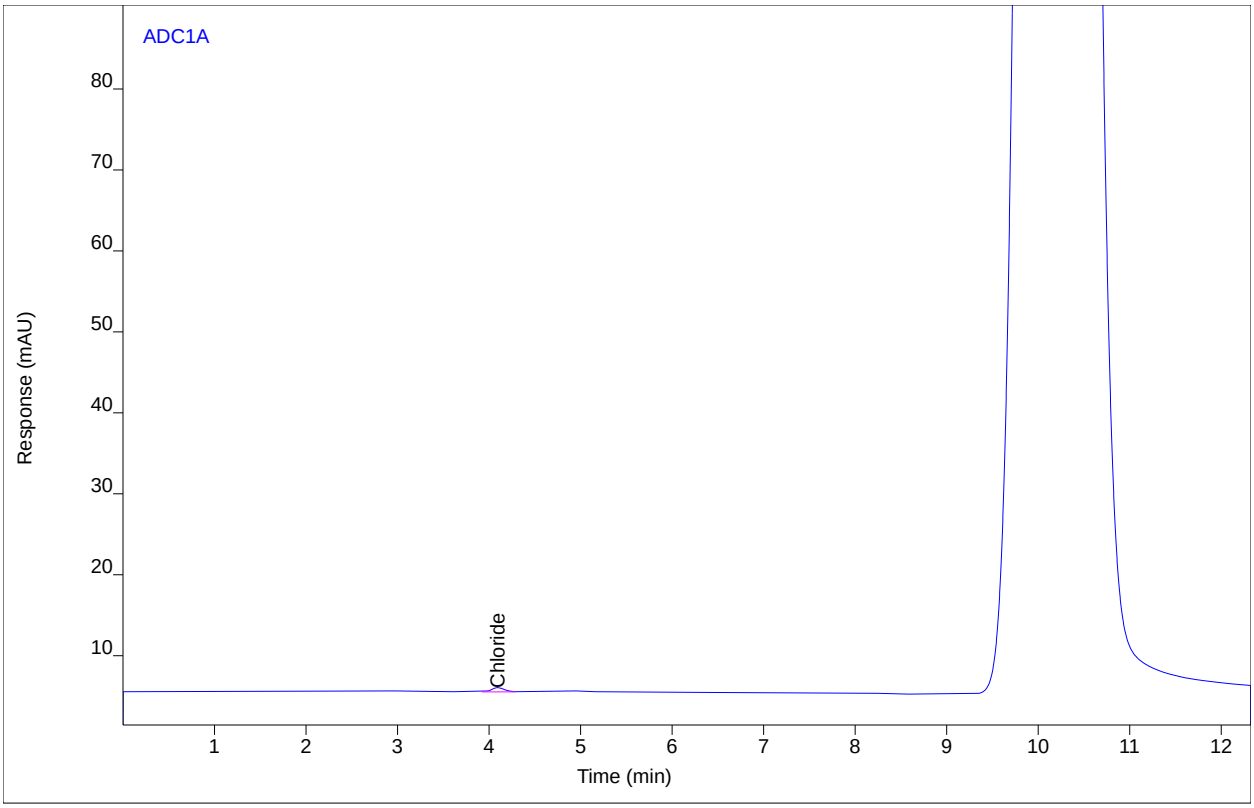
15:35:38 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R2.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	024-1101.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 8:49 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	24
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	MM	4.09	5.06114	0.52610	0.31761	1	0.31761	ug/mL

Analyst Peak Integration Comments

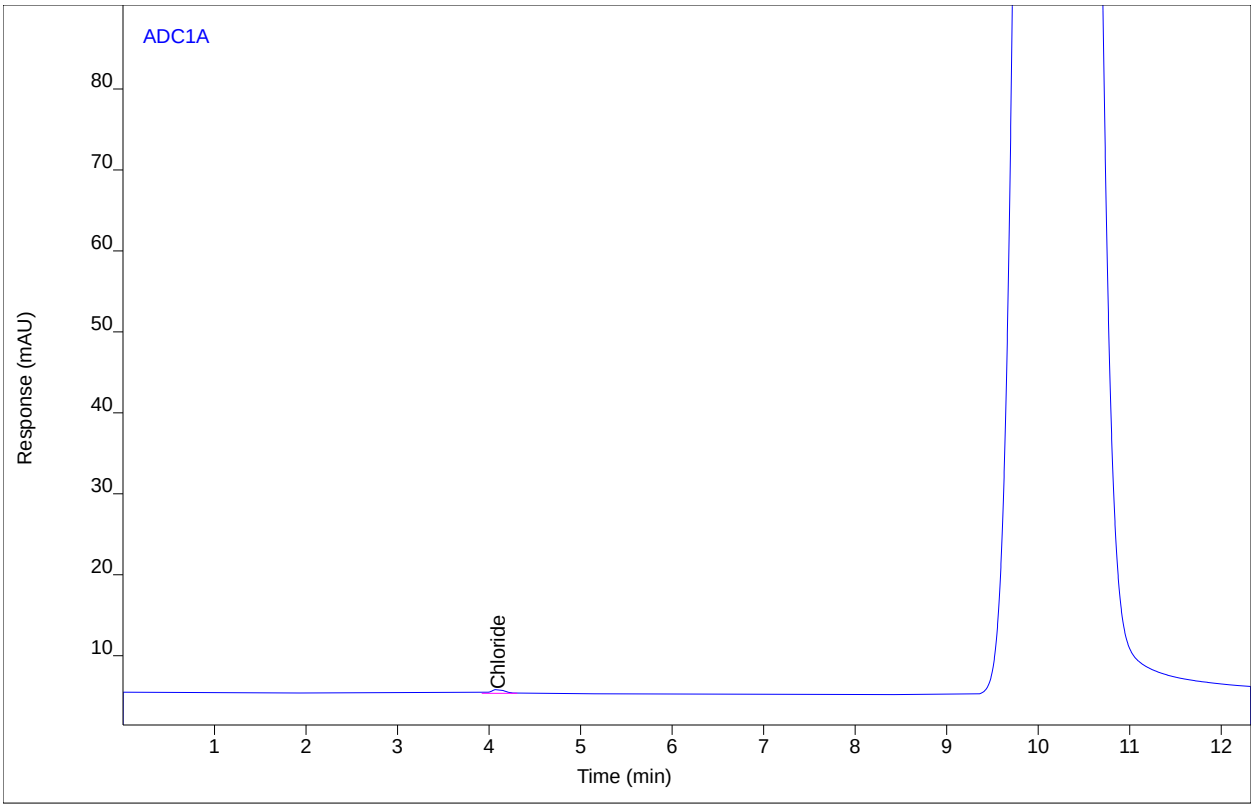
15:36:17 04/06/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R2.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	024-1102.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 9:04 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	24
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	MM	4.10	4.80809	0.49737	0.30173	1	0.30173	ug/mL

Analyst Peak Integration Comments

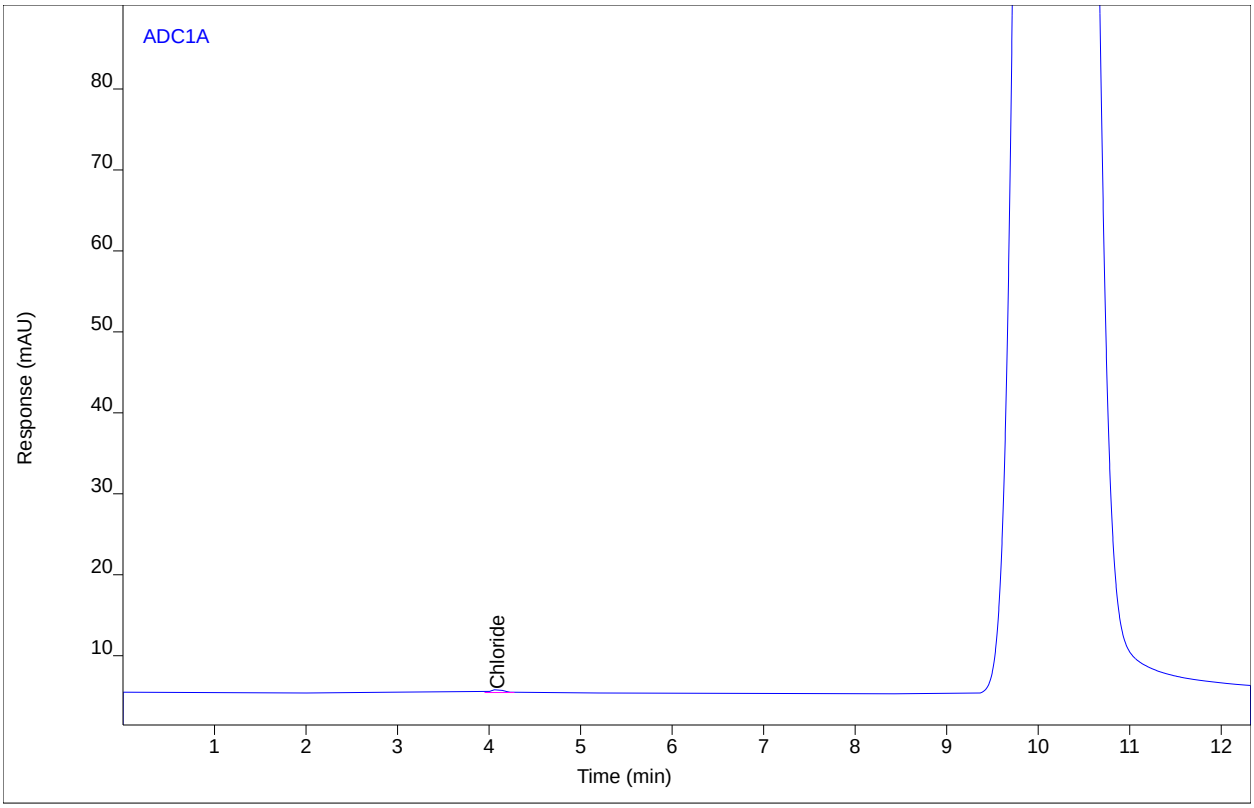
15:36:30 04/06/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	025-1201.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 9:19 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	25
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	MM	4.09	3.69093	0.39016	0.23162	1	0.23162	ug/mL

Analyst Peak Integration Comments

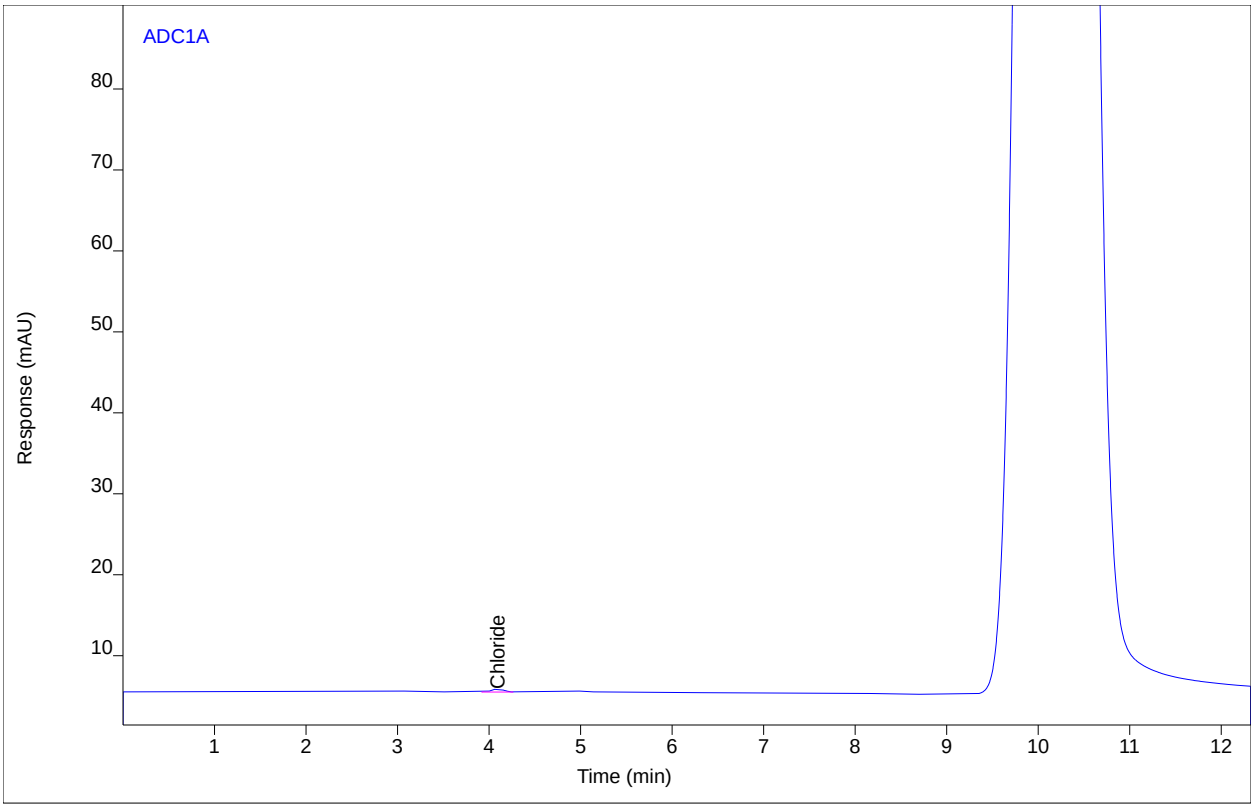
15:36:45 04/06/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	025-1202.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 9:33 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	25
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride	MM	4.09	3.62387	0.39033	0.22741	1	0.22741	ug/mL

Analyst Peak Integration Comments

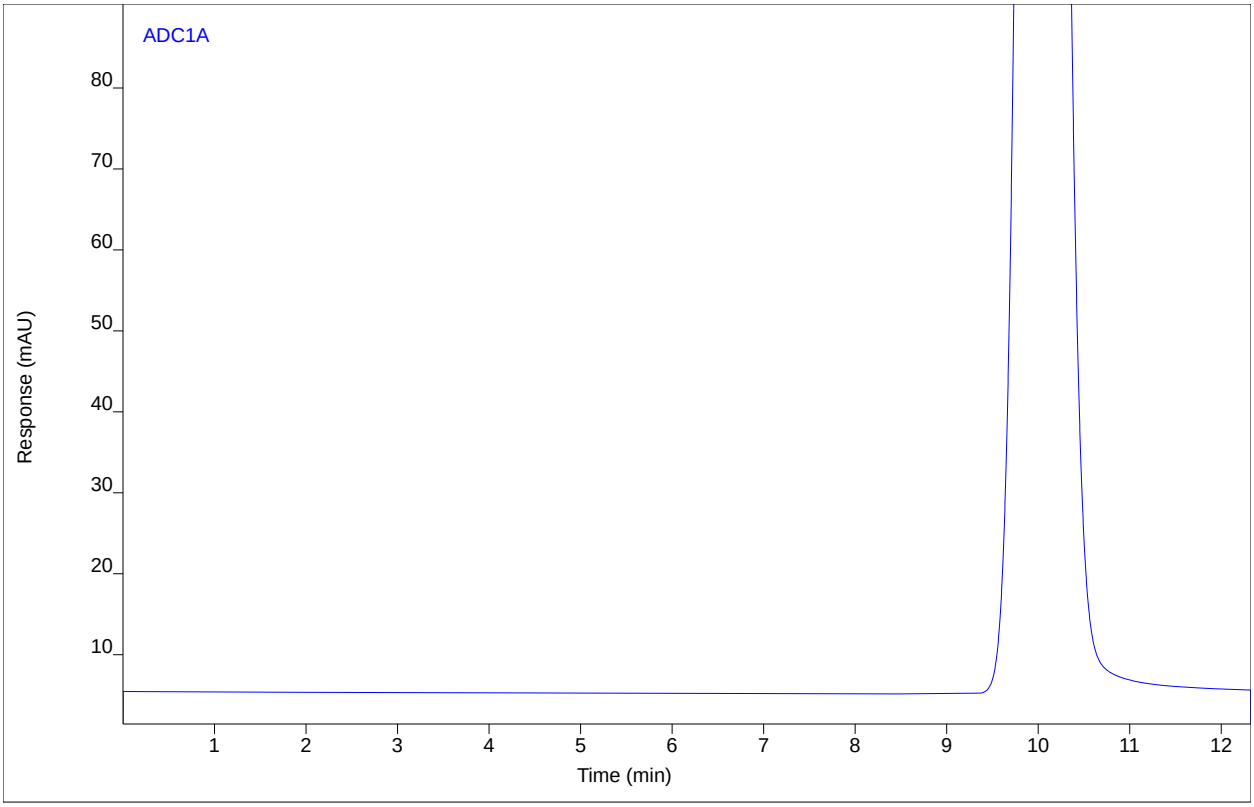
15:36:56 04/06/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.BLANK.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	026-1301.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 9:48 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	26
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



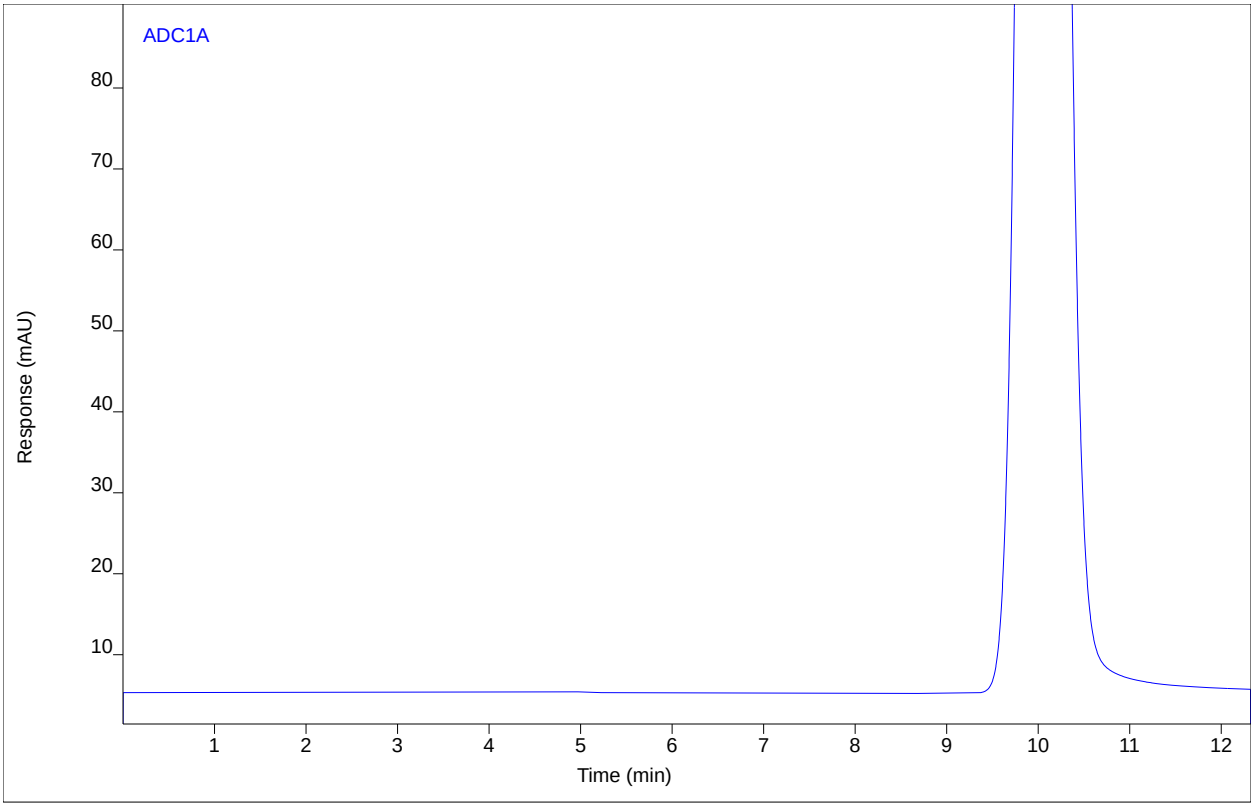
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride		(4.16)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.BLANK.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	026-1302.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 10:03 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	26
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



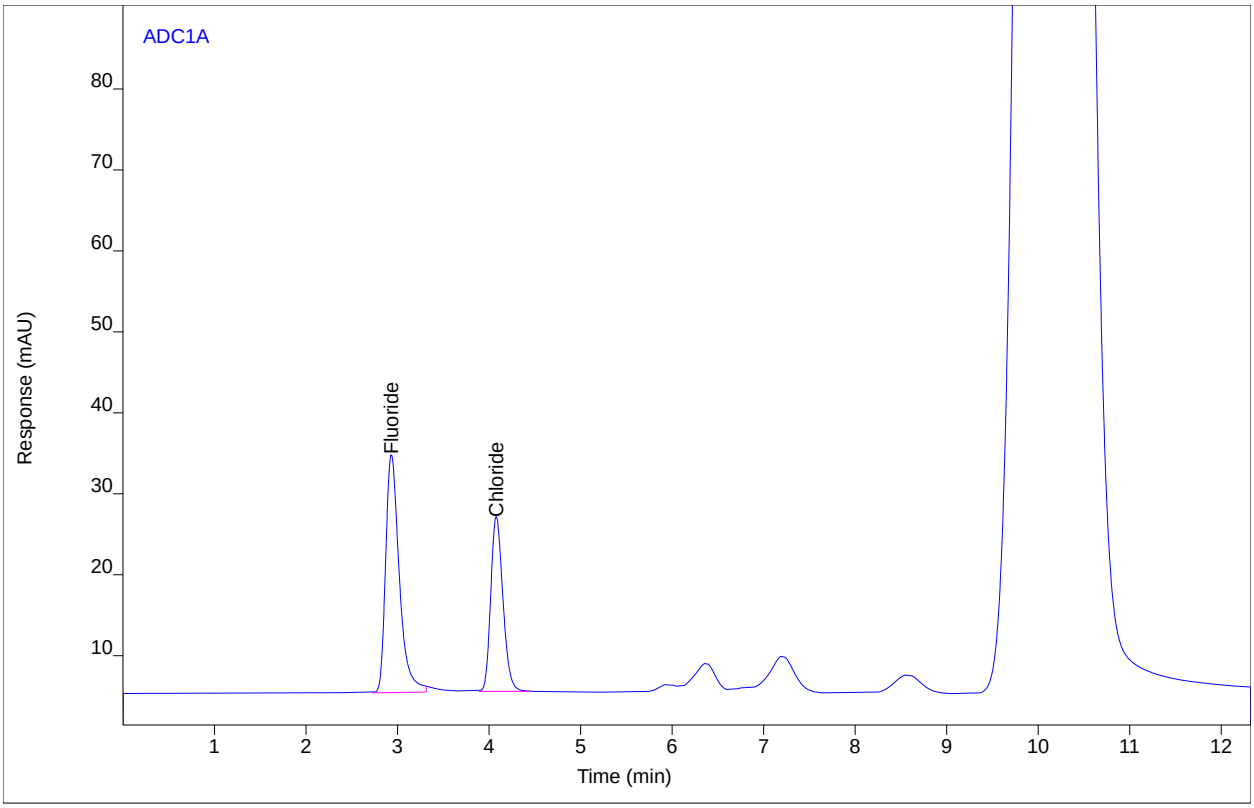
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride		(2.92)				1		ug/mL
Chloride		(4.16)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MS-R1.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	027-1401.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 10:18 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	27
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MF	2.93	304.785	29.4320	10.1342	1	10.1342	ug/mL
Chloride	BB	4.08	199.637	21.5927	10.3961	1	10.3961	ug/mL

Analyst Peak Integration Comments

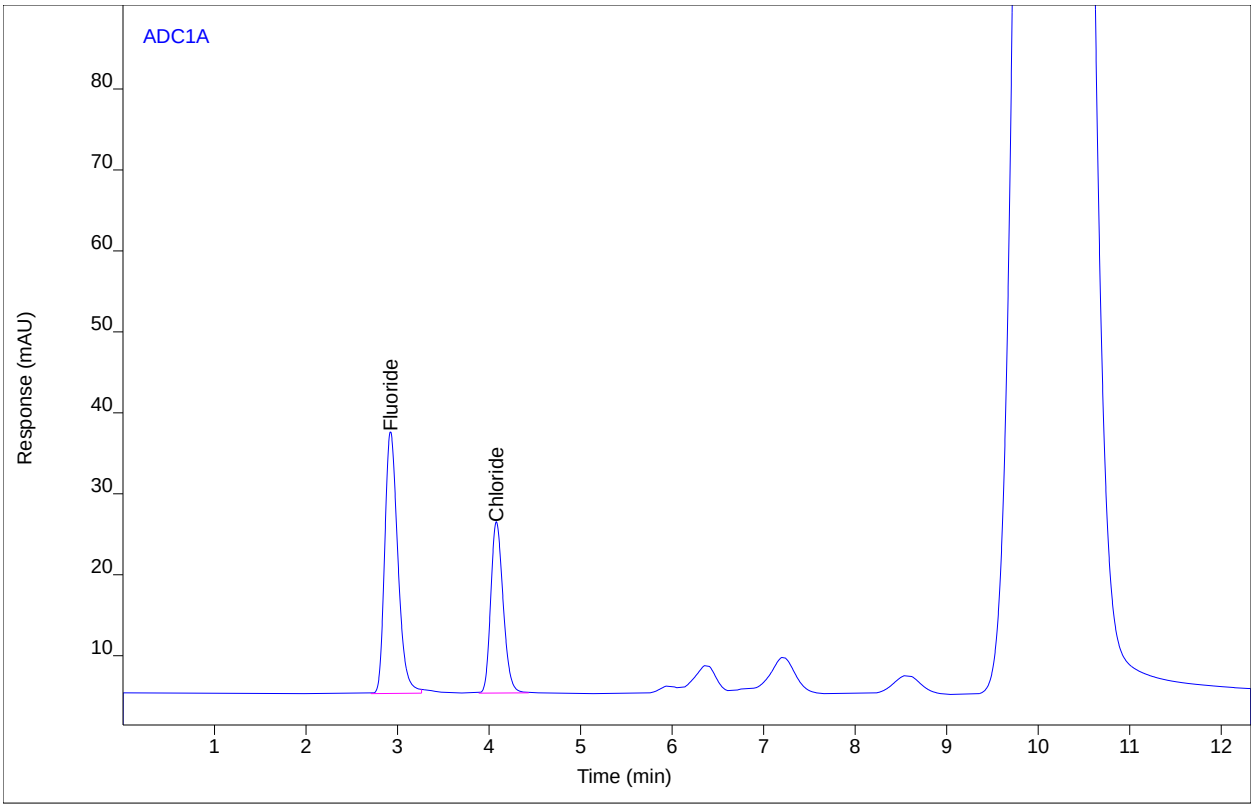
15:37:49 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MS-R1.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	027-1402.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 10:32 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	27
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MF	2.92	321.710	32.3808	10.6986	1	10.6986	ug/mL
Chloride	BB	4.08	198.523	21.1726	10.3405	1	10.3405	ug/mL

Analyst Peak Integration Comments

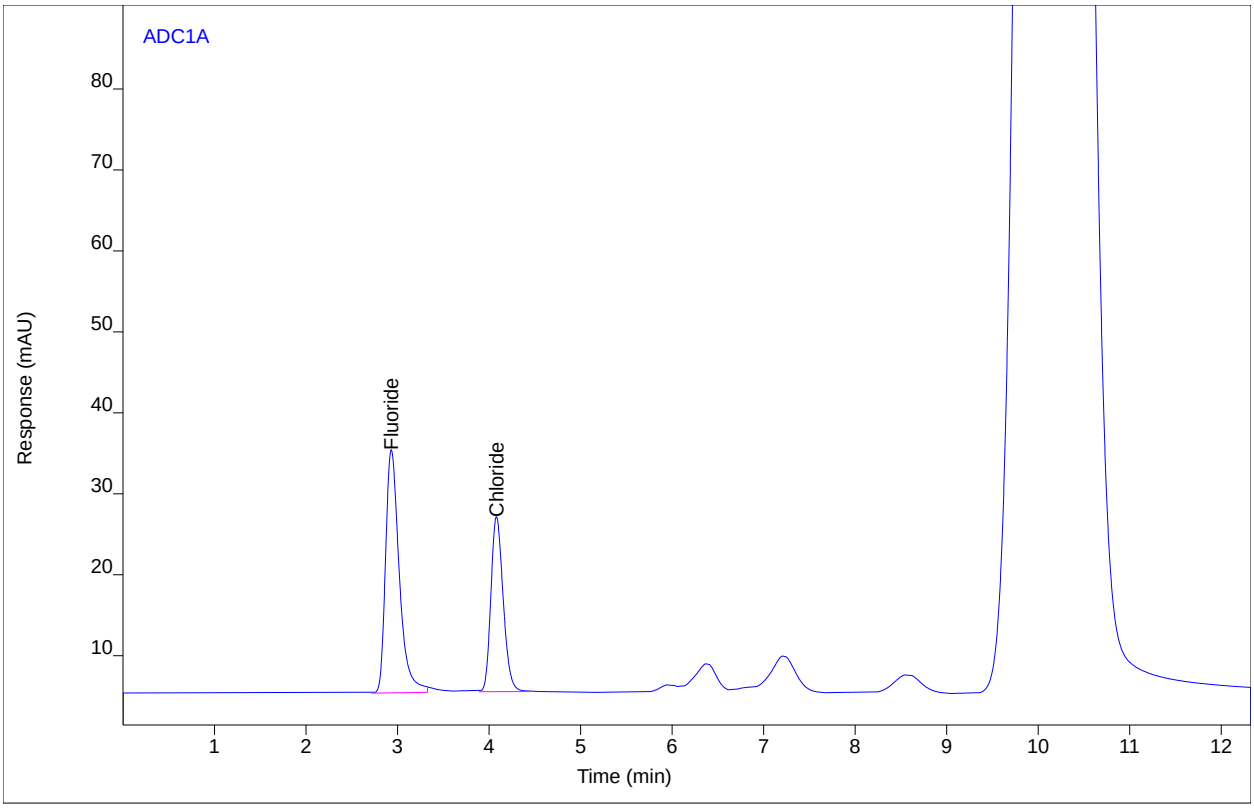
15:37:35 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MSD-R1.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	028-1501.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 10:47 PM
File Modified	4/6/2017 3:47 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	28
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MF	2.93	312.955	30.0485	10.4064	1	10.4064	ug/mL
Chloride	BB	4.08	201.422	21.6181	10.4854	1	10.4854	ug/mL

Analyst Peak Integration Comments

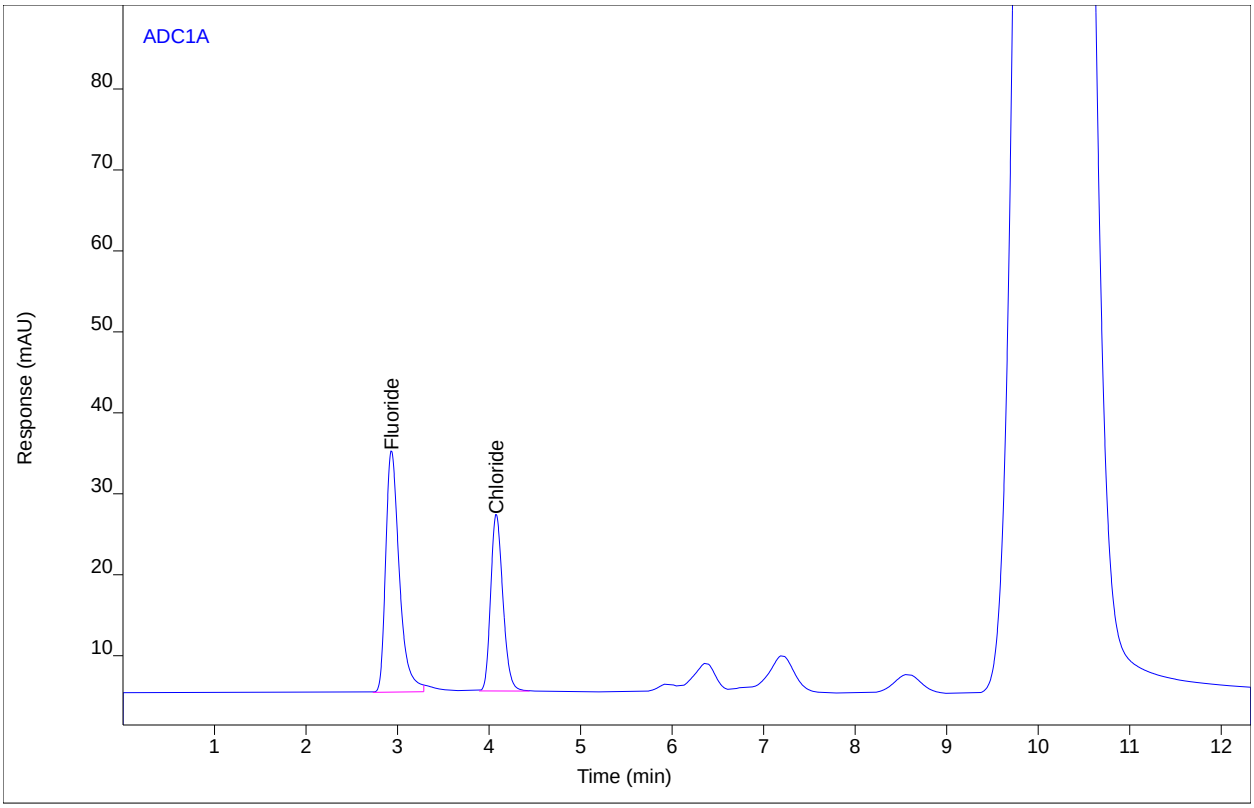
15:38:05 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MSD-R1.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	028-1502.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 11:02 PM
File Modified	4/6/2017 3:48 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	28
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MF	2.93	308.771	29.8801	10.2670	1	10.2670	ug/mL
Chloride	BB	4.08	202.028	21.8457	10.5157	1	10.5157	ug/mL

Analyst Peak Integration Comments

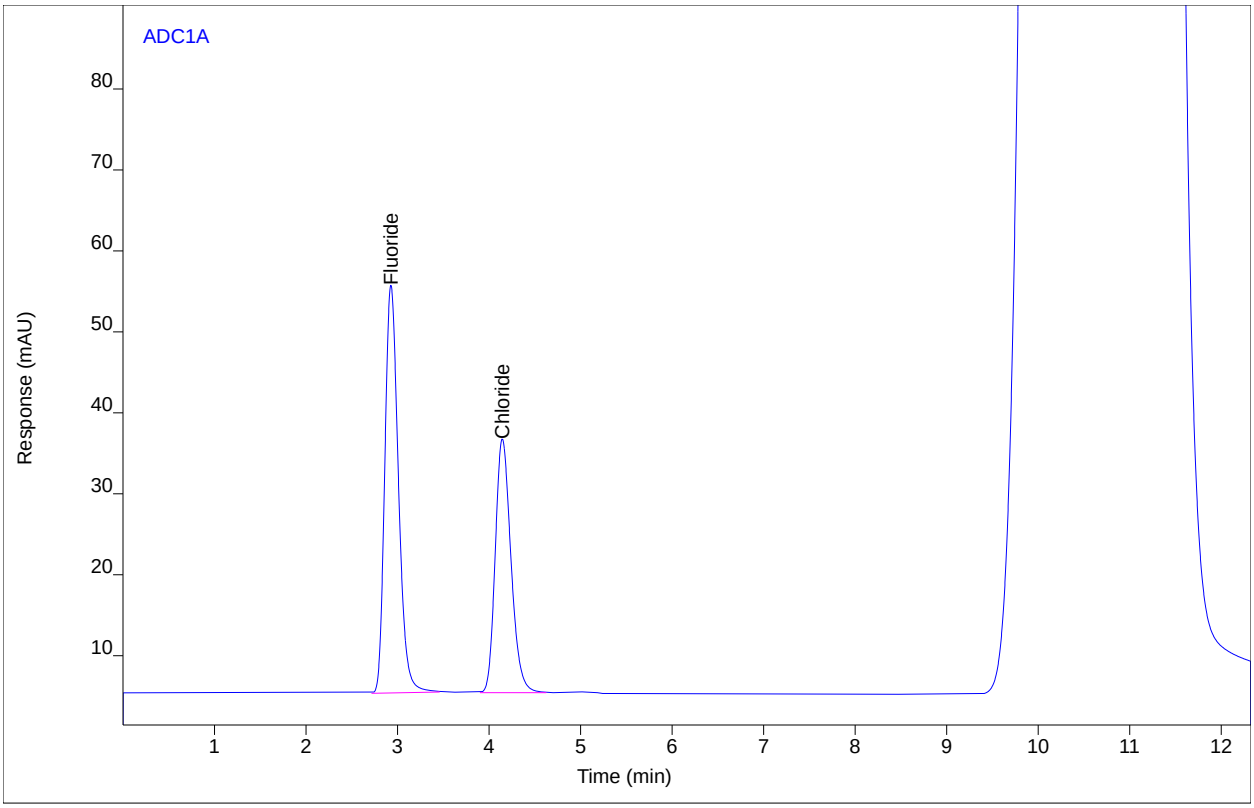
15:38:20 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.Audit 101315B.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	029-1601.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 11:17 PM
File Modified	4/6/2017 3:48 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	29
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



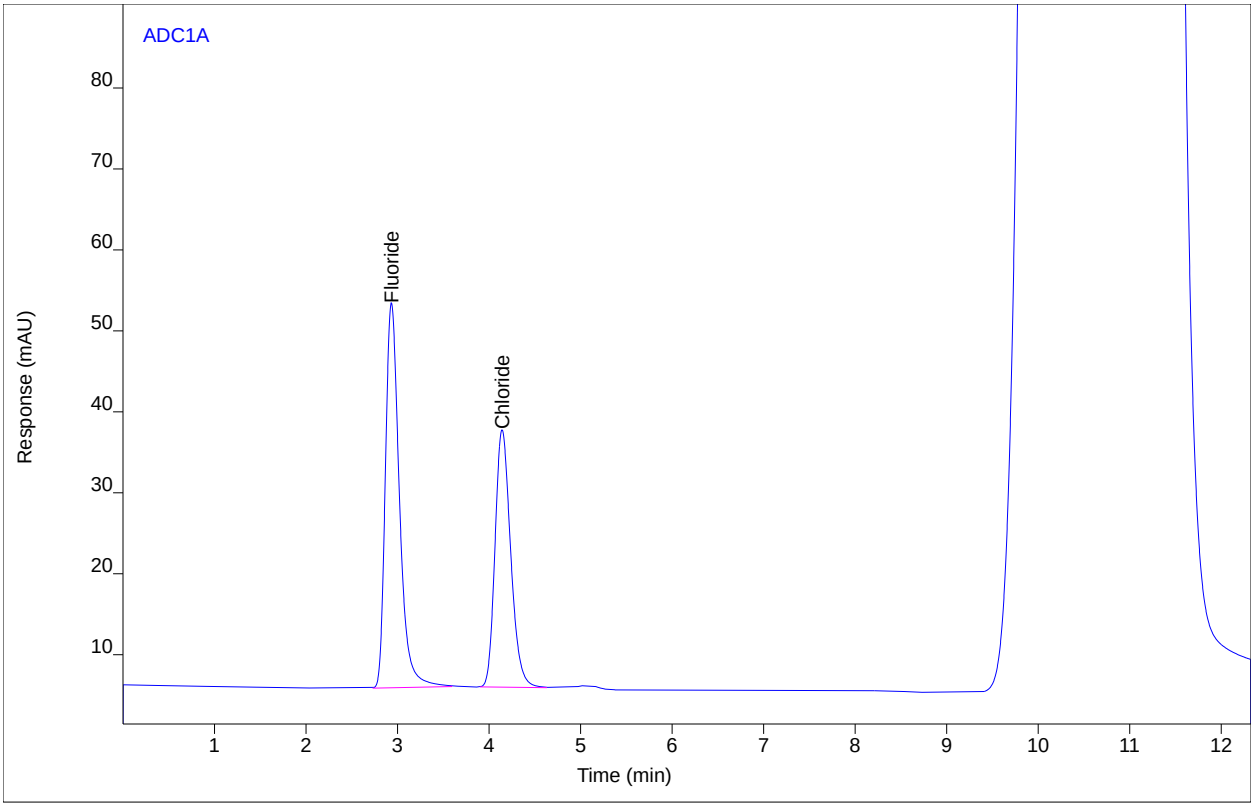
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	519.588	50.3961	17.4446	1	17.4446	ug/mL
Chloride	BB	4.15	373.718	31.3848	18.9240	1	18.9240	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.Audit 101315B.H2SO4
Sequence Name	Nelson725 ver.4
Inj Data File	029-1602.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/5/2017 11:31 PM
File Modified	4/6/2017 3:48 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Sample
Vial Number	29
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



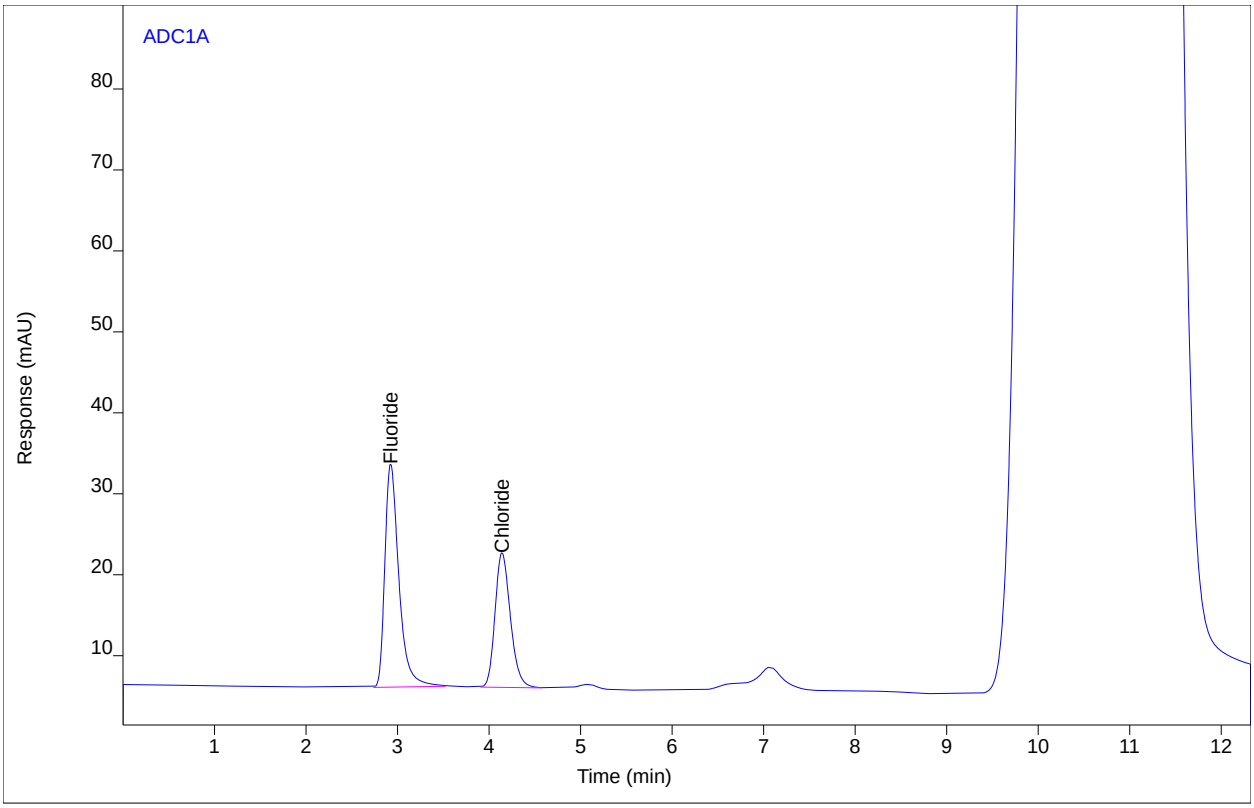
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	506.800	47.5640	17.0000	1	17.0000	ug/mL
Chloride	BB	4.14	377.682	31.8377	19.1143	1	19.1143	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #3
Sequence Name	Nelson725 ver.4
Inj Data File	101-2001.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 1:15 AM
File Modified	4/6/2017 3:48 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	101
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



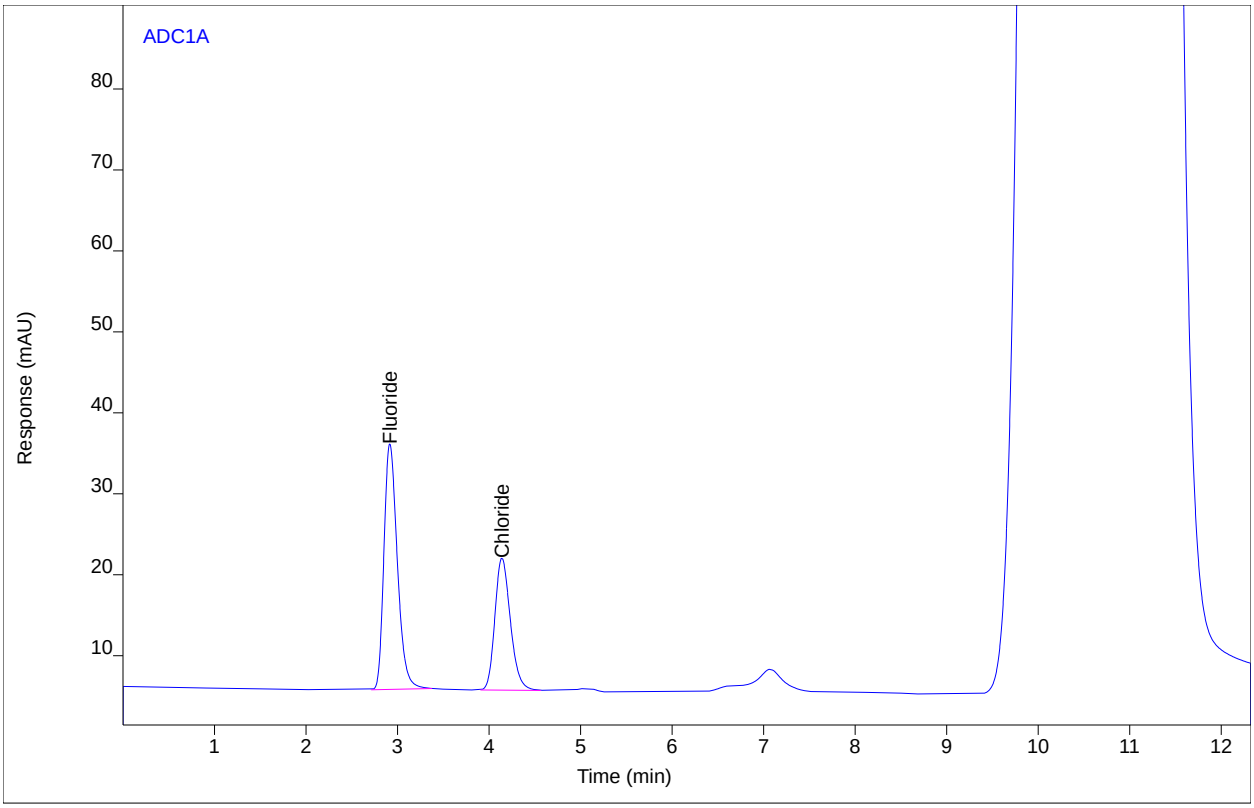
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	293.765	27.5787	9.76779	1	9.76779	ug/mL
Chloride	BB	4.14	193.942	16.6210	10.1112	1	10.1112	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #3
Sequence Name	Nelson725 ver.4
Inj Data File	101-2002.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 1:29 AM
File Modified	4/6/2017 3:48 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	101
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.92	308.712	30.3891	10.2650	1	10.2650	ug/mL
Chloride	BB	4.14	192.375	16.3408	10.0328	1	10.0328	ug/mL

Analyst Peak Integration Comments

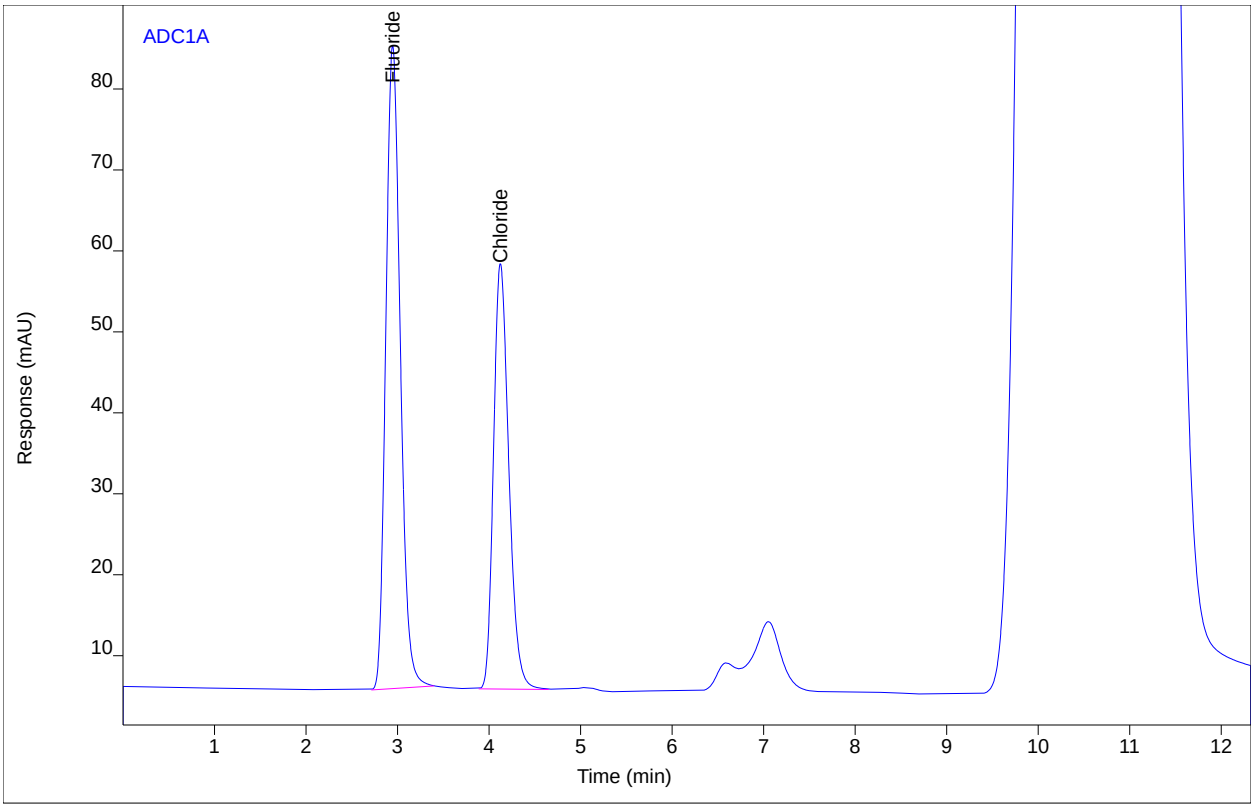
15:39:33 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #5
Sequence Name	Nelson725 ver.4
Inj Data File	005-3701.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 9:36 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	5
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.95	871.999	79.4534	30.2228	1	30.2228	ug/mL
Chloride	BB	4.12	609.428	52.5778	29.9620	1	29.9620	ug/mL

Analyst Peak Integration Comments

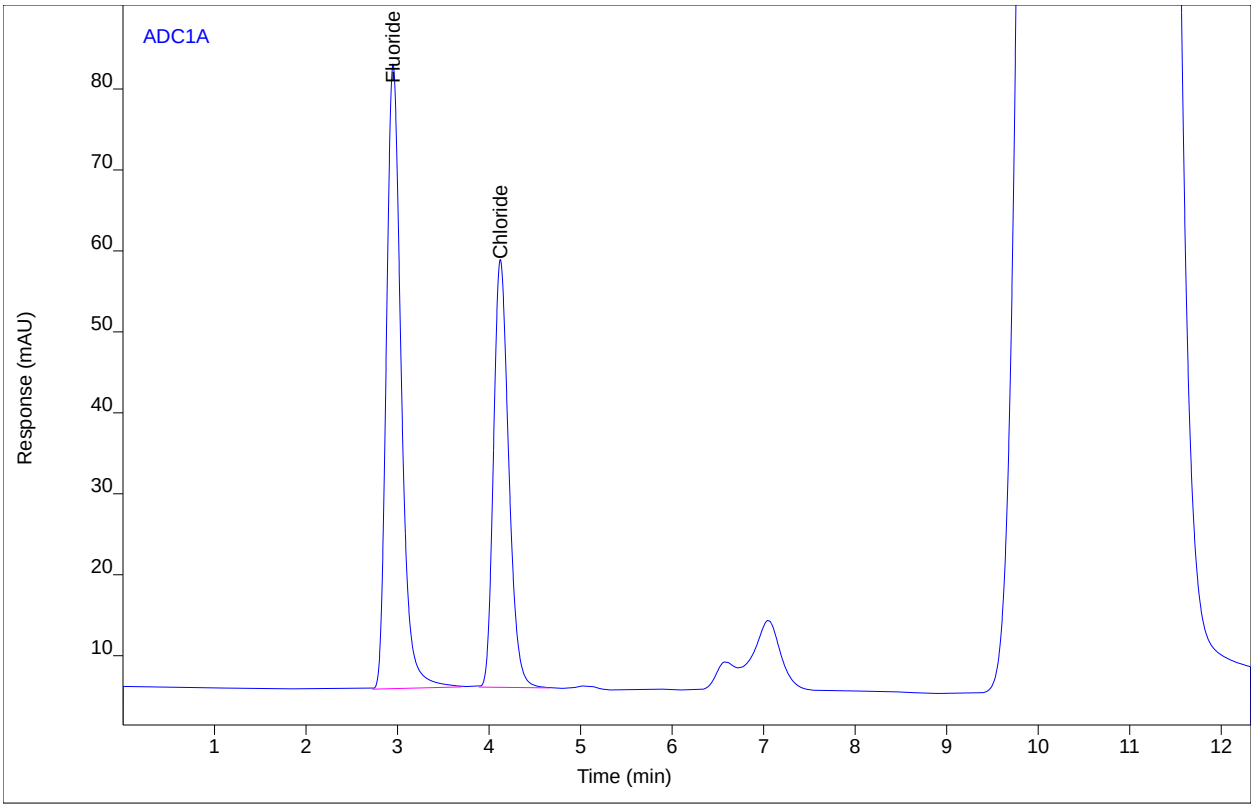
15:43:21 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #5
Sequence Name	Nelson725 ver.4
Inj Data File	005-3702.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 9:51 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	5
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



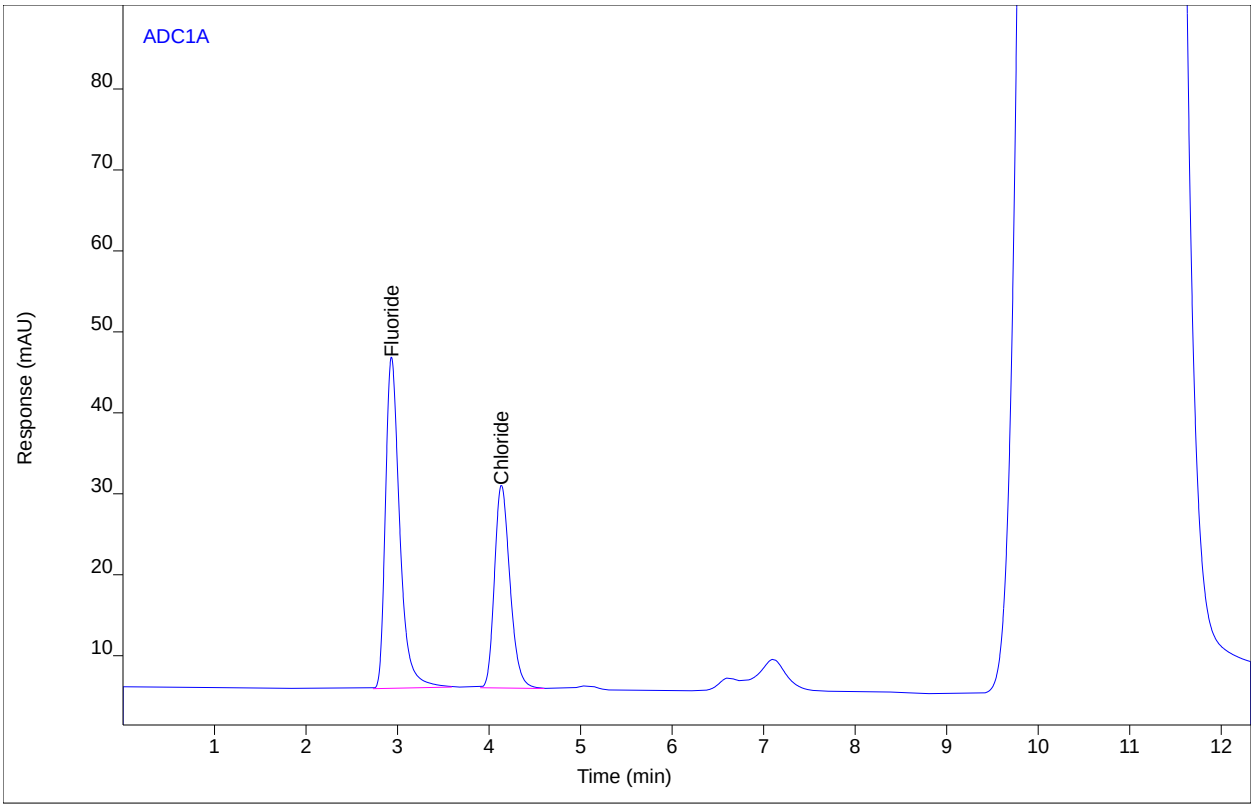
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.95	867.342	77.1637	30.0467	1	30.0467	ug/mL
Chloride	BB	4.12	609.545	52.8763	29.9673	1	29.9673	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #4
Sequence Name	Nelson725 ver.4
Inj Data File	004-3801.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 10:06 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	4
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



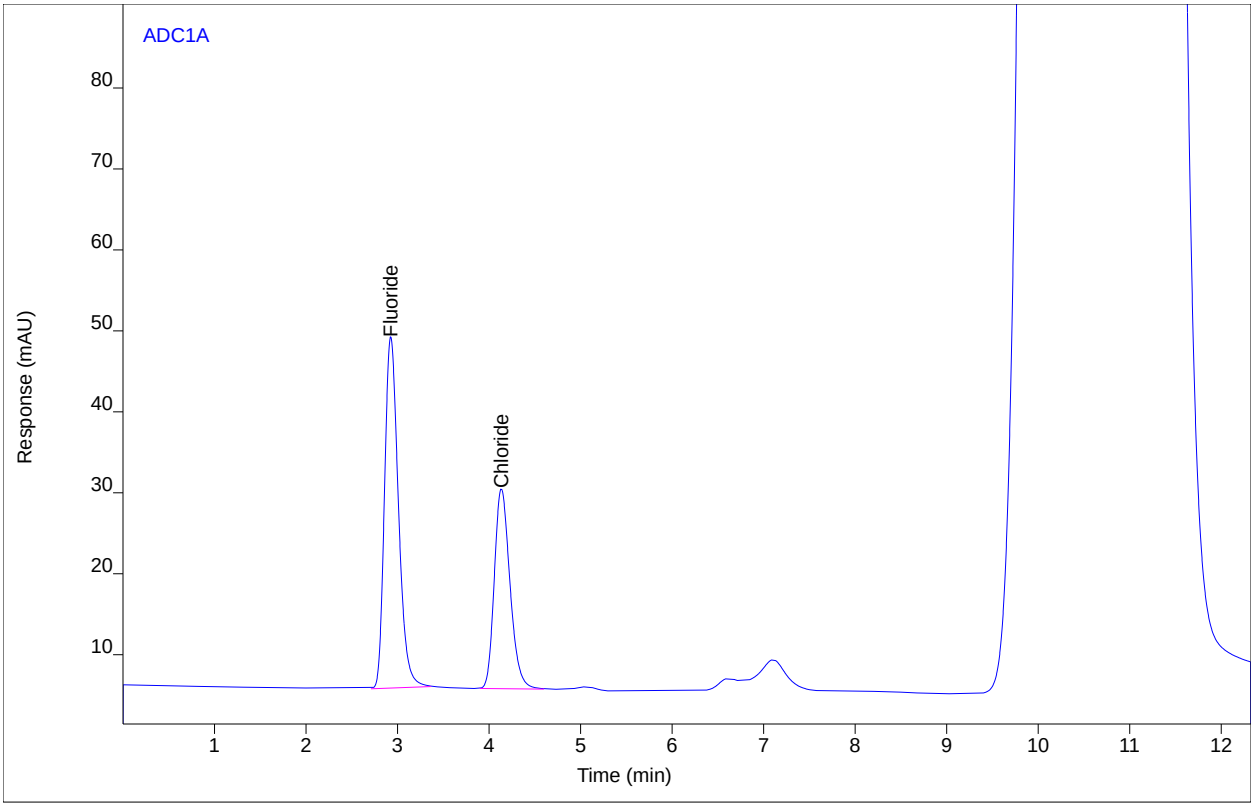
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	443.495	40.9337	14.8173	1	14.8173	ug/mL
Chloride	BB	4.14	294.159	25.0939	15.0691	1	15.0691	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #4
Sequence Name	Nelson725 ver.4
Inj Data File	004-3802.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 10:20 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	4
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.93	455.909	43.4166	15.2430	1	15.2430	ug/mL
Chloride	BB	4.13	293.639	24.7348	15.0436	1	15.0436	ug/mL

Analyst Peak Integration Comments

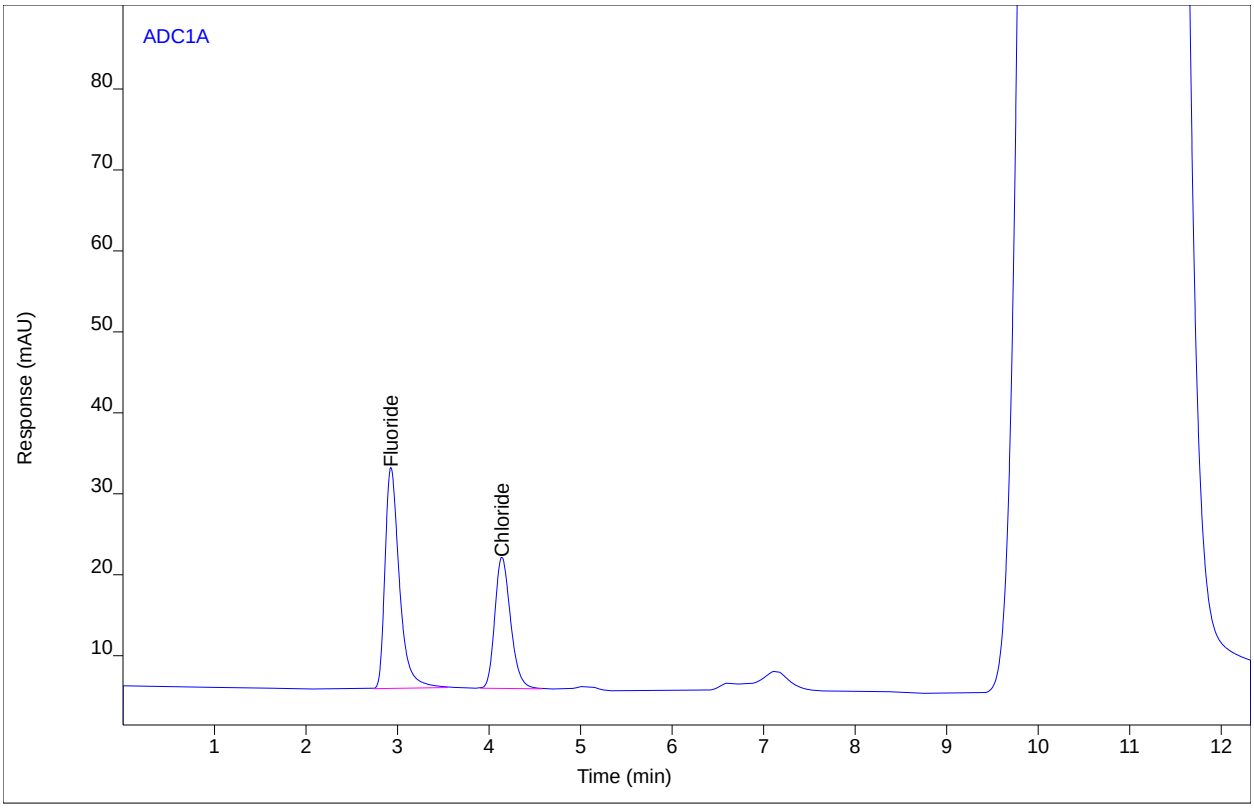
15:43:35 04/06/17 Scott Wilson II

Chromatogram Report

Sample Name	HPLCStds420 #3
Sequence Name	Nelson725 ver.4
Inj Data File	003-3901.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 10:35 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	3
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



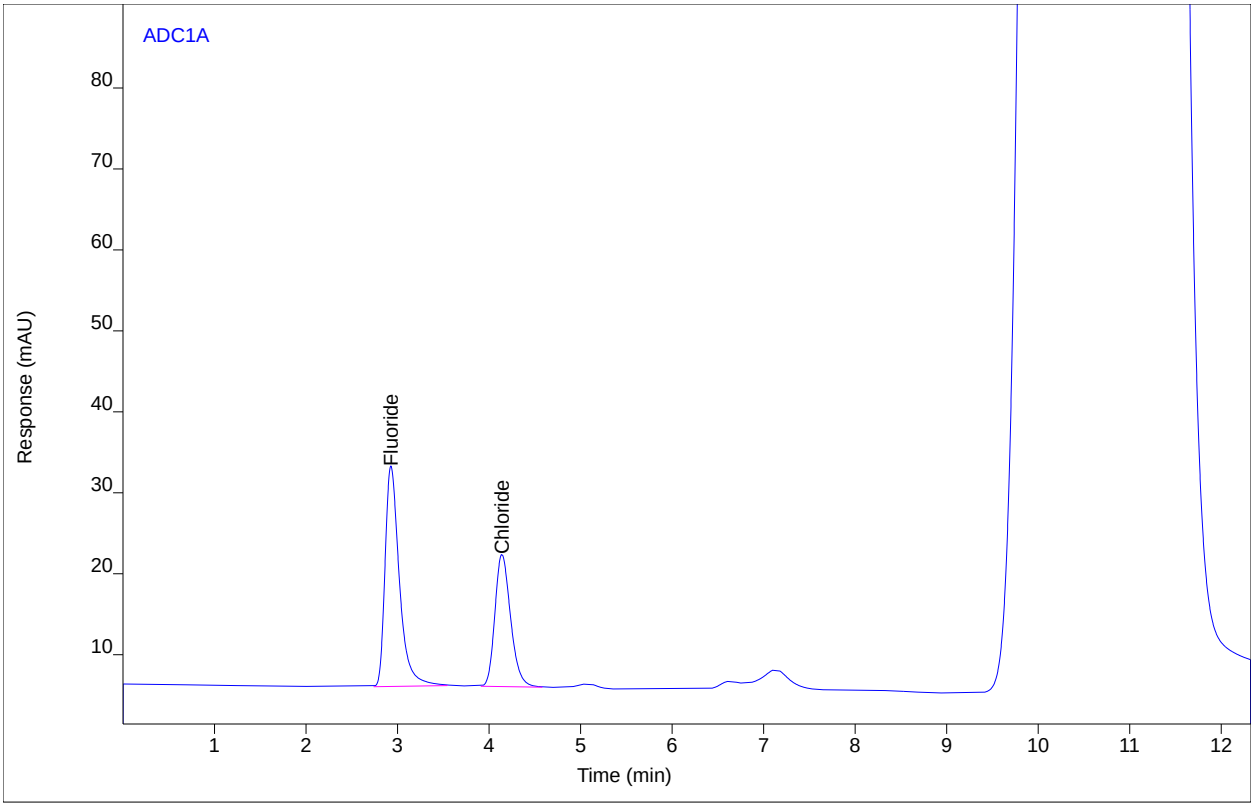
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	298.267	27.3177	9.91738	1	9.91738	ug/mL
Chloride	BB	4.14	194.030	16.2308	10.1156	1	10.1156	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #3
Sequence Name	Nelson725 ver.4
Inj Data File	003-3902.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 10:50 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	3
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



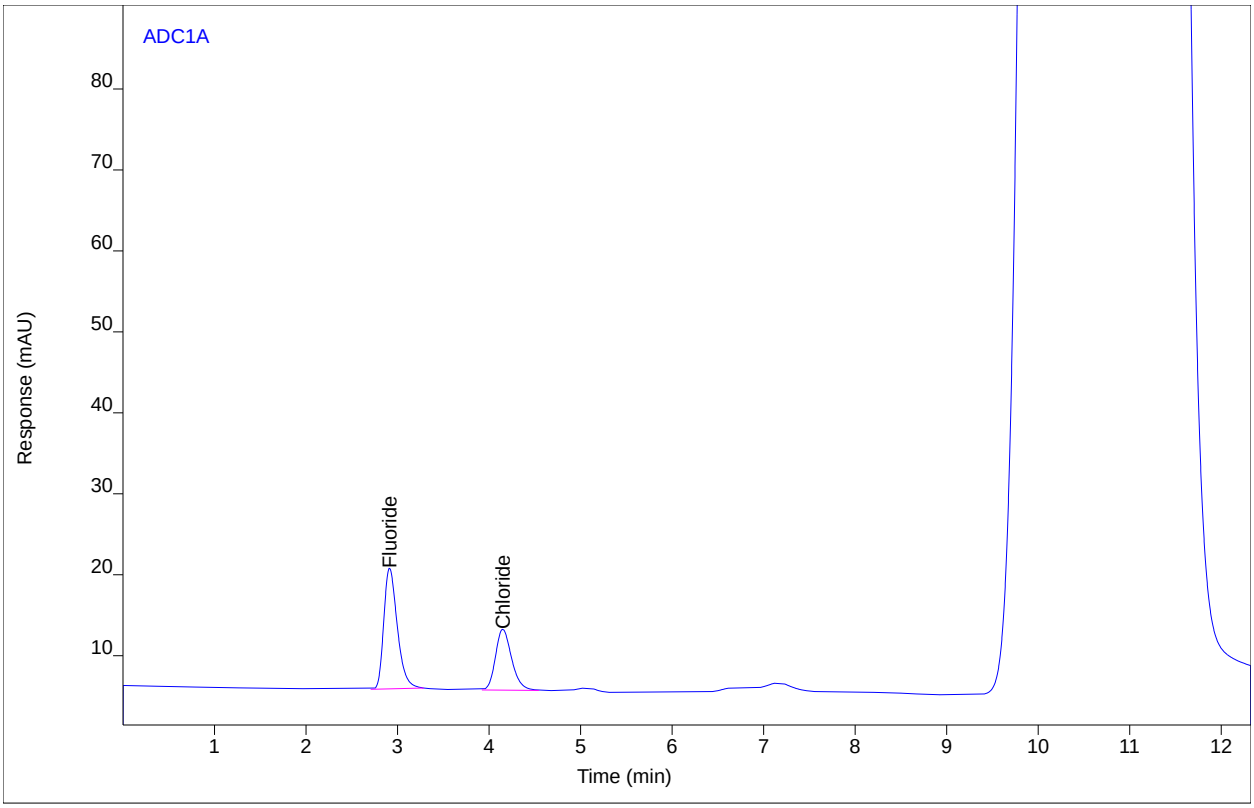
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	295.901	27.2316	9.83873	1	9.83873	ug/mL
Chloride	BB	4.14	194.452	16.3437	10.1368	1	10.1368	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #2
Sequence Name	Nelson725 ver.4
Inj Data File	002-4001.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 11:05 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	2
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.91	153.010	14.9277	5.15594	1	5.15594	ug/mL
Chloride	BB	4.15	92.1755	7.52665	4.95255	1	4.95255	ug/mL

Analyst Peak Integration Comments

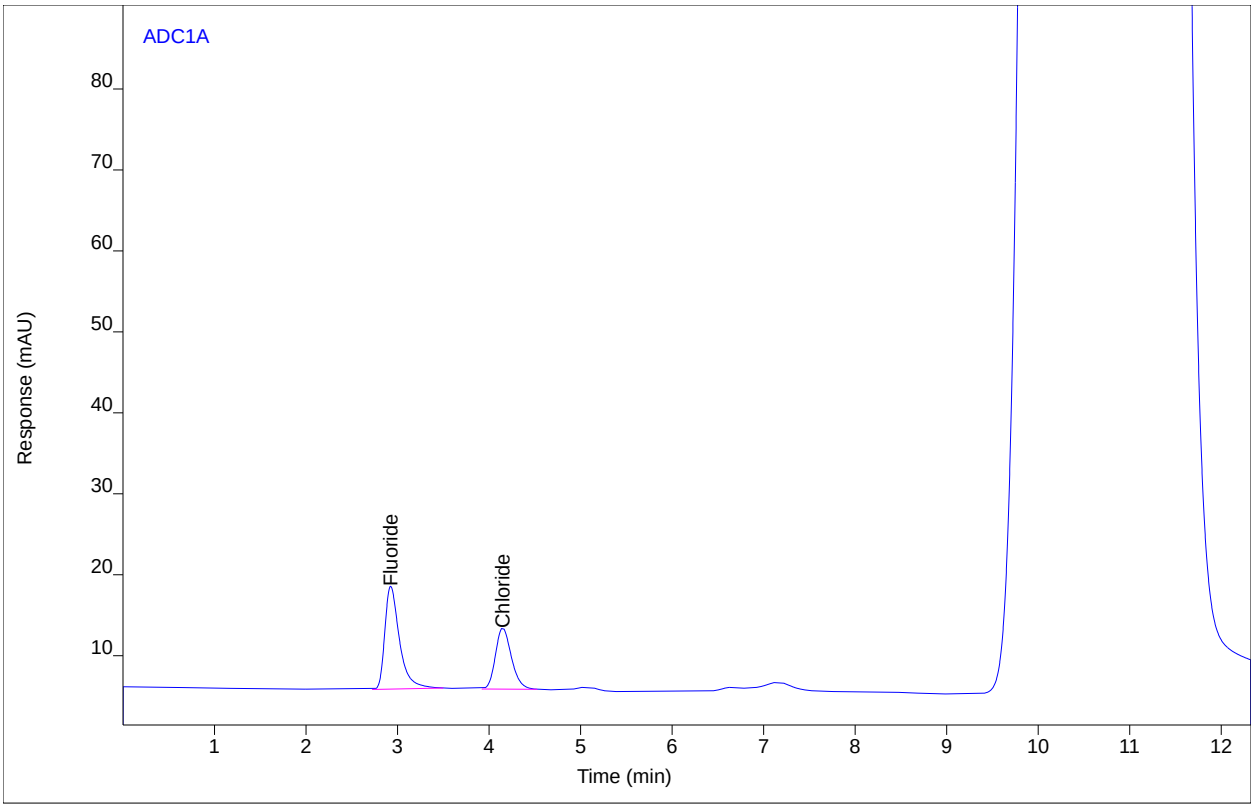
15:44:13 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #2
Sequence Name	Nelson725 ver.4
Inj Data File	002-4002.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 11:19 AM
File Modified	4/6/2017 3:49 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	2
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:47 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.93	141.349	12.7125	4.77939	1	4.77939	ug/mL
Chloride	BB	4.15	91.5569	7.56997	4.92080	1	4.92080	ug/mL

Analyst Peak Integration Comments

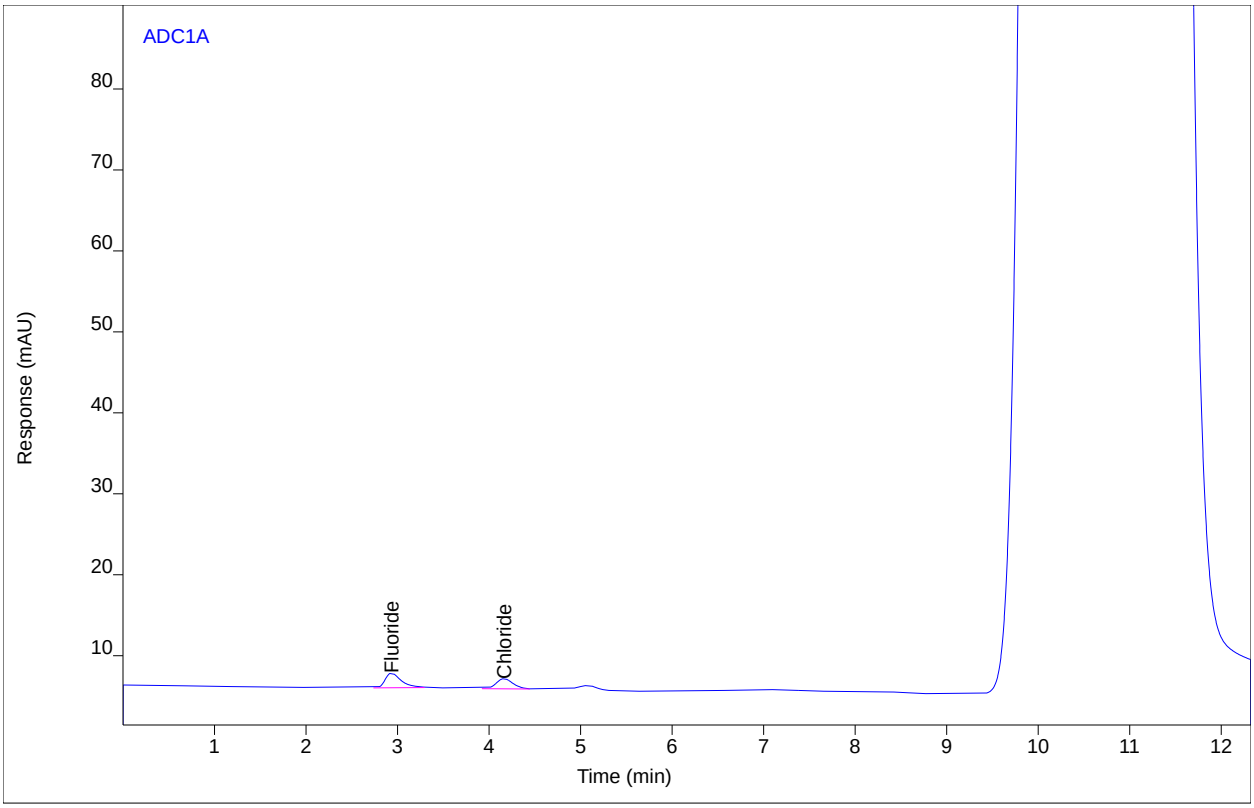
15:44:01 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #1
Sequence Name	Nelson725 ver.4
Inj Data File	001-4101.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 11:34 AM
File Modified	4/6/2017 3:52 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	1
Injection Volume	NA
Injection	1 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:52 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	BB	2.93	22.1570	1.82795	0.97284	1	0.97284	ug/mL
Chloride	MM	4.16	16.2256	1.26763	1.01255	1	1.01255	ug/mL

Analyst Peak Integration Comments

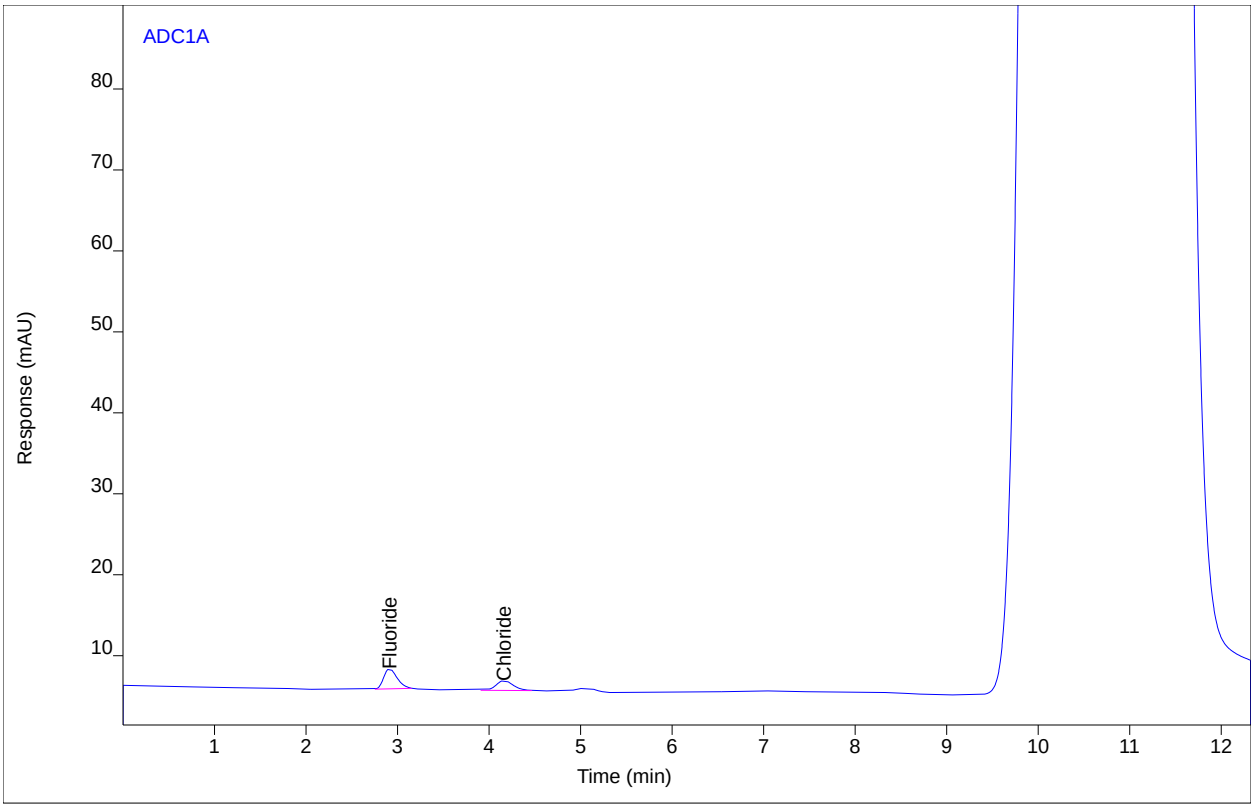
15:44:27 04/06/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds420 #1
Sequence Name	Nelson725 ver.4
Inj Data File	001-4102.D
File Location	HPLC/2017/Nelson/Quarter 2
Injection Date	4/6/2017 11:49 AM
File Modified	4/6/2017 3:52 PM
Instrument	Nelson
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	1
Injection Volume	NA
Injection	2 of 2
Acquisition Method	METROHM.M
Analysis Method	Nelson725.M
Method Modified	4/6/2017 3:52 PM
Printed	4/7/2017 9:07 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Fluoride	MM	2.91	25.2596	2.48888	1.05906	1	1.05906	ug/mL
Chloride	MM	4.16	15.7957	1.22397	0.99125	1	0.99125	ug/mL

Analyst Peak Integration Comments

15:45:00 04/06/17 Scott Wilson II

Calibration Table

General Calibration Setting

Calib. Data Modified : Thursday, April 06, 2017 3:52:29 PM
Signals calculated separately : No

Rel. Reference Window : 5.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 5.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Linear (some peaks differ, see below)
Origin : Included (some peaks differ, see below)
Weight : Equal (some peaks differ, see below)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 A, ADC1 CHANNEL A

Overview Table

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD	#	Compound
2.917	1	1	1.00000	23.39497	4.27442e-2	No	No		Fluoride
		2	5.00000	148.22427	3.37327e-2				
		3	10.00000	301.58406	3.31583e-2				
		4	15.00000	447.08547	3.35506e-2				
		5	30.00000	866.94218	3.46044e-2				
4.164	1	1	1.00000	15.94899	6.26999e-2	No	No		Chloride
		2	5.00000	92.17435	5.42450e-2				
		3	10.00000	193.64059	5.16421e-2				
		4	15.00000	293.43437	5.11188e-2				
		5	30.00000	608.51315	4.93005e-2				

More compound-specific settings

Compound: Fluoride
  Curve Type : Quadratic
  Origin : Connected
  Calibration Level Weights:/
    Level 1 : 1
    Level 2 : 0.024912
    Level 3 : 0.006018
    Level 4 : 0.002738
    Level 5 : 0.000728

Compound: Chloride
  Curve Type : Quadratic
  Origin : Connected
  Calibration Level Weights:/
    Level 1 : 1
    Level 2 : 0.02994
    Level 3 : 0.006784
    Level 4 : 0.002954
    Level 5 : 0.000687

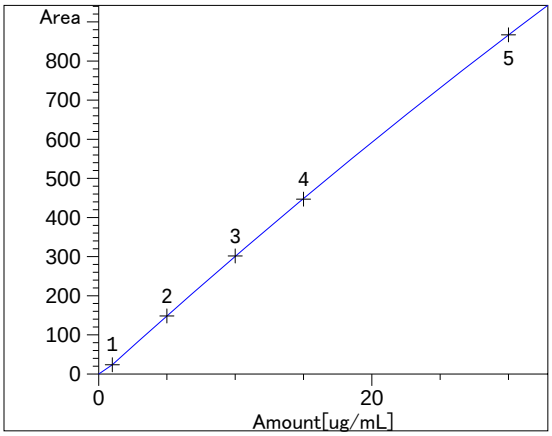
Peak Sum Table

No Entries in table

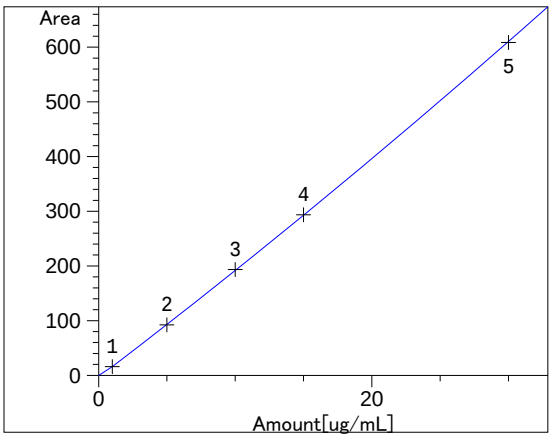
==========

Calibration Curves

==========



Fluoride at exp. RT: 2.917
ADC1 A, ADC1 CHANNEL A
Correlation: 1.00000
Residual Std. Dev.: 1.06142
Formula: $y = ax^2 + bx + c$
a: -8.65103e-2
b: 31.75104
c: -8.26960
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.024912
Level 3 : 0.006018
Level 4 : 0.002738
Level 5 : 0.000728



Chloride at exp. RT: 4.164
ADC1 A, ADC1 CHANNEL A
Correlation: 0.99997
Residual Std. Dev.: 1.63998
Formula: $y = ax^2 + bx + c$
a: 4.81128e-2
b: 19.00248
c: -3.11546
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.02994
Level 3 : 0.006784
Level 4 : 0.002954
Level 5 : 0.000687

==========

Method Information

Method: C:\Chem32\1\DATA\Nelson637\Nelson637.M
Modified: 12/27/2016 at 10:29:53 AM

Column: Metrosep A Supp 5
Mobile Phase: 4.8mM Na2CO3/1.5mM NaHCO3
Flow Rate: 0.70mL/min
Suppressed Ion Conductivity

Method Audit Trail

Operator : Matthew Collier
Date : 12/27/2016 9:14:07 AM
Change Info: This method was created at 12/27/2016 9:14:07 AM and based on method C:\Chem32\1\DATA\Nelson637\Nelson603.M

Operator : Matthew Collier
Date : 12/27/2016 9:14:11 AM
Change Info: Method saved. User comment: "averaged"

Operator : Matthew Collier
Date : 12/27/2016 9:14:22 AM
Change Info: Method C:\Chem32\1\METHODS\Nelson637 copied to result set

Operator : Matthew Collier
Date : 12/27/2016 10:29:53 AM
Change Info: Method replaced with master method C:\Chem32\1\METHODS\Nelson637

Run Time Checklist

Pre-Run Cmd/Macro: off

Data Acquisition: on

Standard Data Analysis: on

Customized Data Analysis: off

Save GLP Data: off

Post-Run Cmd/Macro: off

Save Method with Data: off

==========

Data File : c:\Chem32\2\Data\Nelson637\001-4202.D

Acq. Method: METROHM.M

The Acq. Method's Instrument Parameters for the Run were :

The Data Analysis Parameters of the used Method are :

Integration Events

Non signal specific Integration Events

Event	Value
Tangent Skim Mode	Standard
Tail Peak Skim Height Ratio	0.000
Front Peak Skim Height Ratio	0.000
Skim Valley Ratio	20.000
Baseline Correction	Classical
Peak to Valley Ratio	500.000

Default Integration Event Table "Event"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.040	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_FLD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.040	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_ECD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.040	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_MWD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.040	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_VWD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.040	Initial
Initial Area Reject	0.500	Initial
Initial Height Reject	1.000	Initial
Initial Shoulders	OFF	Initial
Integration	OFF	0.135
Integration	ON	1.787
Integration	OFF	2.454
Integration	ON	3.399
Integration	OFF	4.141

Detector Default Integration Event Table "Event_DAD"

Event	Value	Time
Initial Slope Sensitivity	2.000	Initial
Initial Peak Width	0.050	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	0.500	Initial
Initial Shoulders	OFF	Initial
Integration	OFF	0.094
Integration	ON	2.798
Integration	OFF	18.598

Detector Default Integration Event Table "Event_ADC"

Event	Value	Time
Initial Slope Sensitivity	1.500	Initial
Initial Peak Width	0.050	Initial
Initial Area Reject	0.100	Initial
Initial Height Reject	0.010	Initial
Initial Shoulders	OFF	Initial
Integration	OFF	0.000
Integration	ON	2.500

Method's Manual Integration Event table "ManInt_ADC1B"

Manual Integ. Event	Time1	Offset1	Time2	Offset2
Draw Baseline	6.074	0.000	7.214	0.010
Delete Peaks	7.342		8.575	

Apply Method's Manual Integration Events: No

==========

Specify Report

==========

Calculate: External Standard
Based on: Peak Area
Use Multiplier & Dilution Factor with ISTDs

Use Sample Data from Data File
Report mode: Classic
Destination: File (Prefix: Report)
Destination File Types: .TXT, .PDF, Unique PDF Name
Quantitative Results sorted by: Signal
Report Style: Short
Sample info on each page: No
Add Chromatogram Output: Yes
Chromatogram Output: Portrait
Size in Time direction: 80 % of Page
Size in Response direction: 29 % of Page
Uncalibrated Peaks: Do Not Report

==========

Signal Options

==========

Include: Axes, Compound Names, Retention Times, Baselines, Tick Marks
Font: Arial, Size: 8

Ranges: Use Ranges

	Min Value	Max Value

Time	0.000	15.000
Response	0.000	55.000

Multi Chromatograms: Overlaid, All the same Scale

Calibration Table

General Calibration Setting

Calib. Data Modified : Tuesday, December 27, 2016 10:26:26 AM
Signals calculated separately : No

Rel. Reference Window : 10.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 10.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Quadratic
Origin : Connected
Weight : Quadratic (Resp)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 A, ADC1 CHANNEL A

Overview Table

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD	#	Compound
2.900	1	1	1.00000	13.20074	7.57533e-2	No	No		Fluoride
		2	5.00000	74.79366	6.68506e-2				
		3	10.00000	169.26157	5.90802e-2				
		4	15.00000	256.73203	5.84267e-2				
		5	30.00000	515.21491	5.82281e-2				
4.048	1	1	1.00000	8.39894	1.19063e-1	No	No		Chloride
		2	5.00000	51.04410	9.79545e-2				
		3	10.00000	106.87830	9.35644e-2				
		4	15.00000	165.01843	9.08989e-2				
		5	30.00000	347.50523	8.63296e-2				

Identification Details Table

RT	From	To	Sig	+-	Pk Usage	Compound
2.900	2.755	3.045	1	0.0000	Main	Fluoride
4.048	3.845	4.250	1	0.0000	Main	Chloride

Peak Sum Table

No Entries in table

Component Details Table

RT	Sig	Grp	Lvl	Amount [ug/mL]	Low Limit	High Limit	Compound
2.900	1	1	1	1.00000	0.00000	0.00000	Fluoride
			2	5.00000			
			3	10.00000			
			4	15.00000			
			5	30.00000			
4.048	1	1	1	1.00000	0.00000	0.00000	Chloride
			2	5.00000			
			3	10.00000			

```
                 4    15.00000
                 5    30.00000
-----------------------------------------------------------------------


=========================================================================
                      Sample related custom fields
=========================================================================

Custom Field                    Type    Mand.  Default Value
-------------------------------------------------------------------------
None defined

=========================================================================
                     Compound related custom fields
=========================================================================

Custom Field                    Type    Mand.  Default Value
-------------------------------------------------------------------------
None defined
```

EPA CTM-027
Ammonia
Raw Data

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 2. EPA CTM-027

Client No.: 11542

Ammonia -- Calibration Standards, Laboratory Blanks and Controls

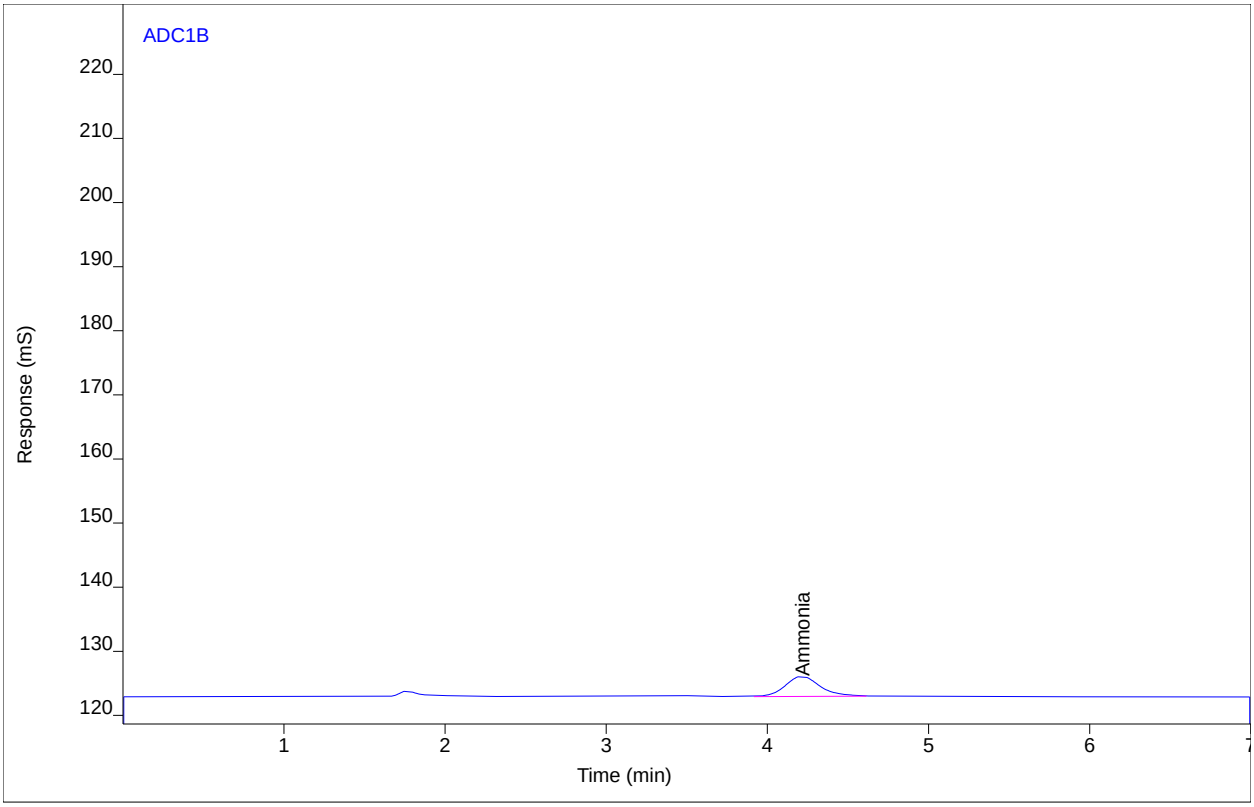
Sample ID	Sequence	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Standard Tag	%Tag
HPLCStds415 #1	Curly329.v4	001-0201.D	001-0202.D	Curly329.M	4.22	4.22	0.0	0.188	0.187	0.1	0.187	0.200	93.9
HPLCStds415 #2	Curly329.v4	002-0301.D	002-0302.D	Curly329.M	4.23	4.23	0.0	1.07	1.06	0.2	1.07	0.990	108
HPLCStds415 #3	Curly329.v4	003-0401.D	003-0402.D	Curly329.M	4.23	4.22	0.1	2.01	2.02	0.3	2.02	1.96	103
HPLCStds415 #4	Curly329.v4	004-0501.D	004-0502.D	Curly329.M	4.24	4.24	0.0	4.70	4.76	0.6	4.73	4.76	99.3
HPLCStds415 #5	Curly329.v4	005-0601.D	005-0602.D	Curly329.M	4.24	4.25	0.0	6.43	6.37	0.4	6.40	6.54	97.8
HPLCStds415 #6	Curly329.v4	006-0701.D	006-0702.D	Curly329.M	4.25	4.24	0.1	8.83	8.78	0.3	8.80	9.09	96.9
HPLCStds415 #7	Curly329.v4	007-0801.D	007-0802.D	Curly329.M	4.24	4.24	0.0	12.7	12.9	1.1	12.8	12.3	104
HPLCStds415 #SS	Curly329.v4	008-0901.D	008-0902.D	Curly329.M	4.24	4.24	0.0	3.91	3.90	0.1	3.91	3.98	98.0
HPLCStds415 #RB	Curly329.v4	009-1001.D	009-1002.D	Curly329.M	4.23	4.23	0.1	0.0259	0.0258	0.1	0.0259	NA	NA
HPLCStds415 #4	Curly329.v4	004-2001.D	004-2002.D	Curly329.M	4.24	4.24	0.0	4.75	4.77	0.3	4.76	4.76	100

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #1
Sequence Name	Curly329 ver.4
Inj Data File	001-0201.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:04 PM
File Modified	3/31/2017 9:07 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	1
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



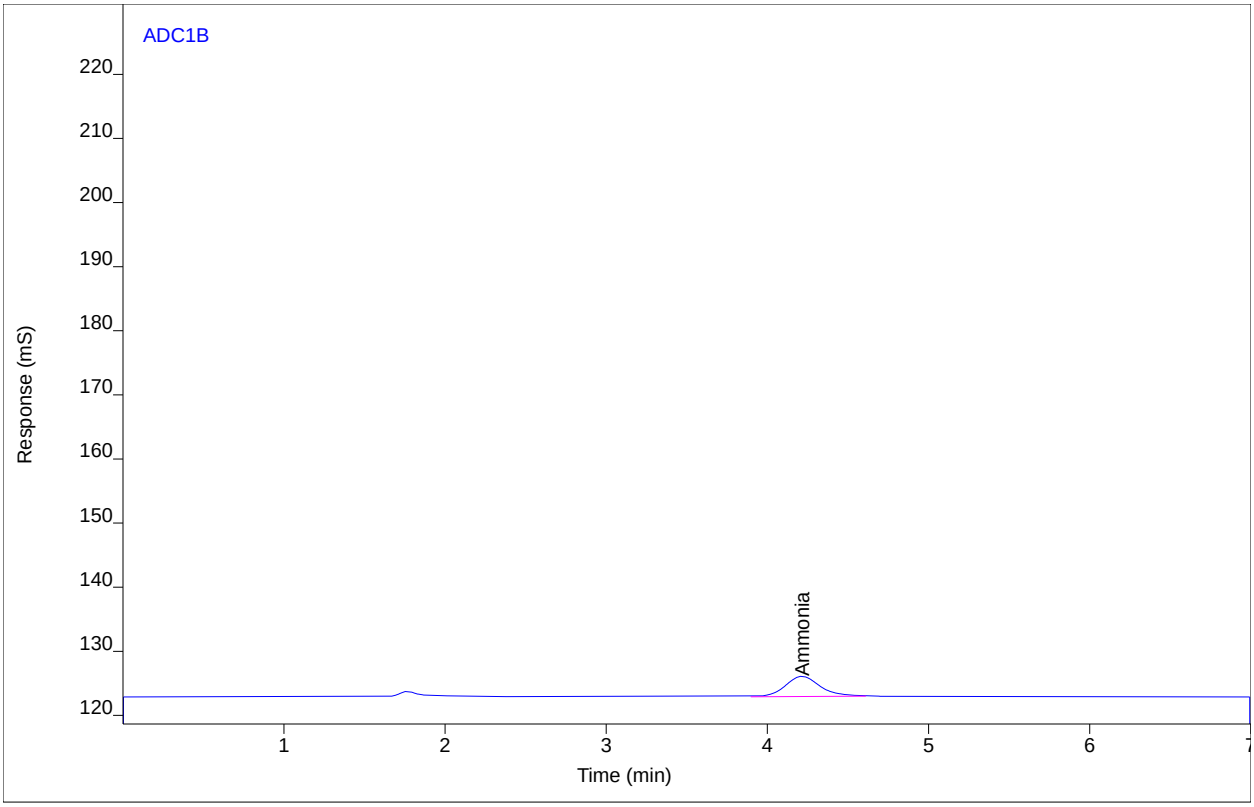
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	BB	4.22	47.3344	3.15116	0.18767	1	0.18767	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #1
Sequence Name	Curly329 ver.4
Inj Data File	001-0202.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:13 PM
File Modified	3/31/2017 9:07 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	1
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



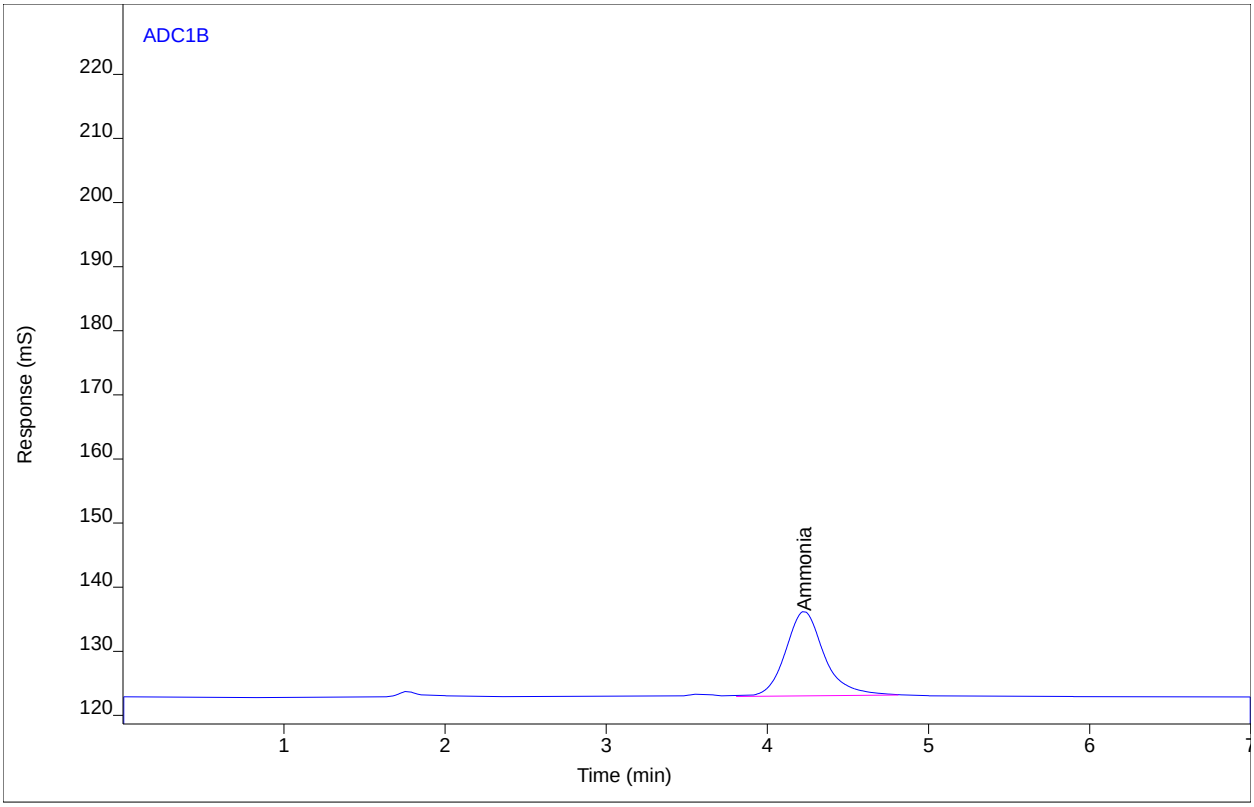
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	BB	4.22	47.2239	3.15192	0.18723	1	0.18723	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #2
Sequence Name	Curly329 ver.4
Inj Data File	002-0301.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:21 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	2
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



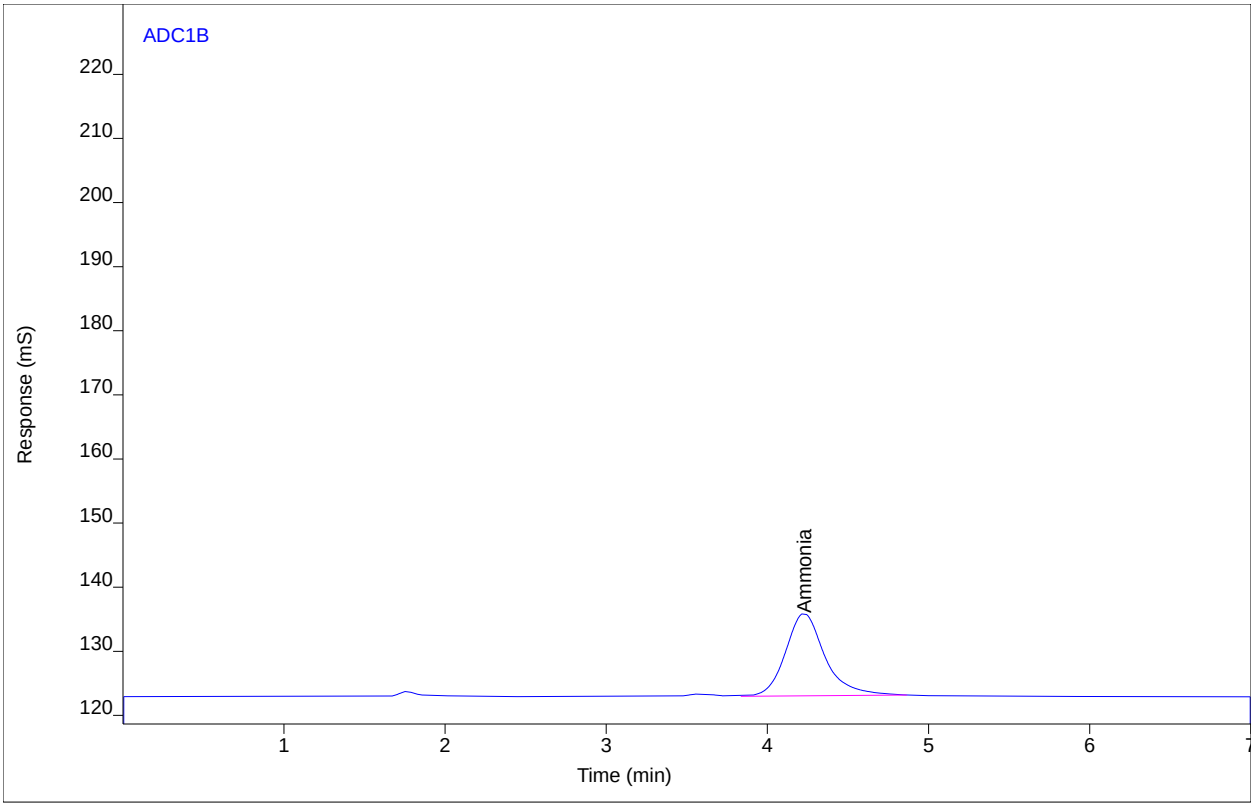
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.23	219.523	13.1828	1.06911	1	1.06911	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #2
Sequence Name	Curly329 ver.4
Inj Data File	002-0302.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:29 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	2
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	MM	4.23	218.517	12.8650	1.06381	1	1.06381	µg/ml

Analyst Peak Integration Comments

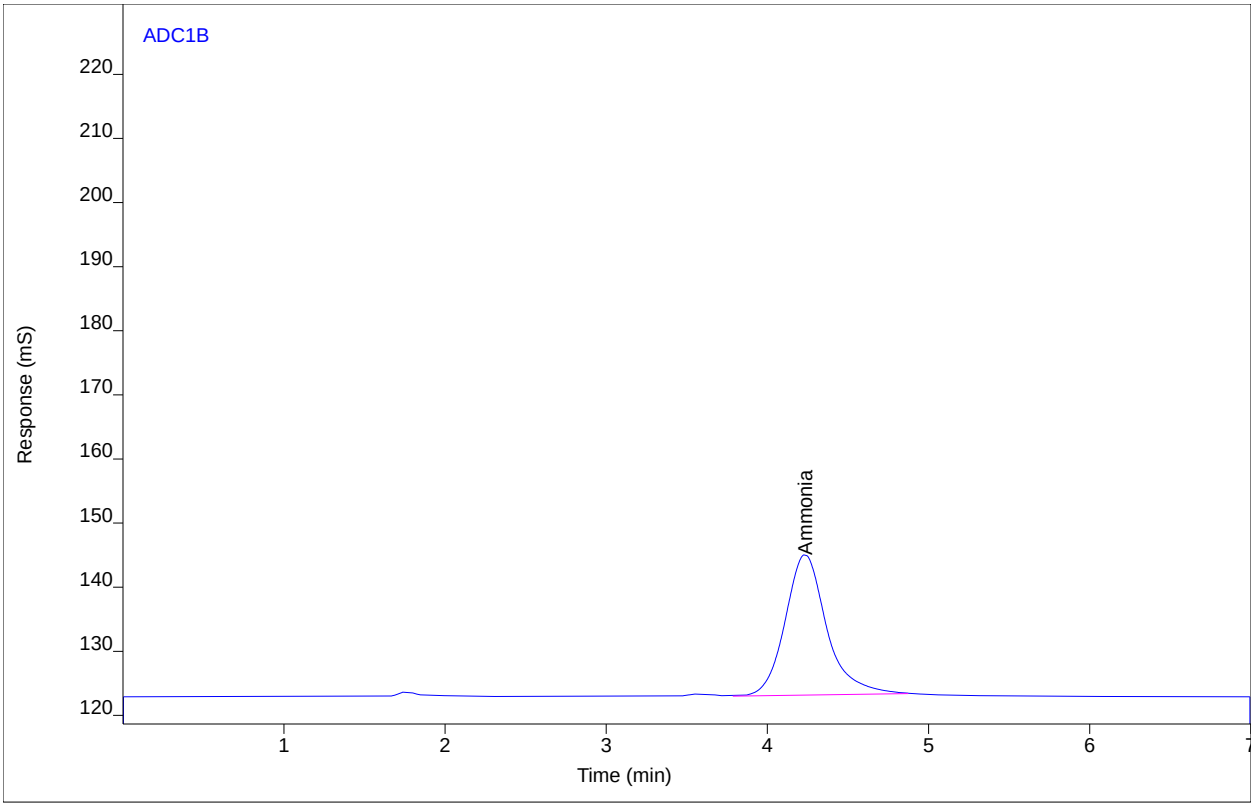
09:00:06 03/31/17 Scott Wilson II

Chromatogram Report

Sample Name	HPLCStds415 #3
Sequence Name	Curly329 ver.4
Inj Data File	003-0401.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:37 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	3
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



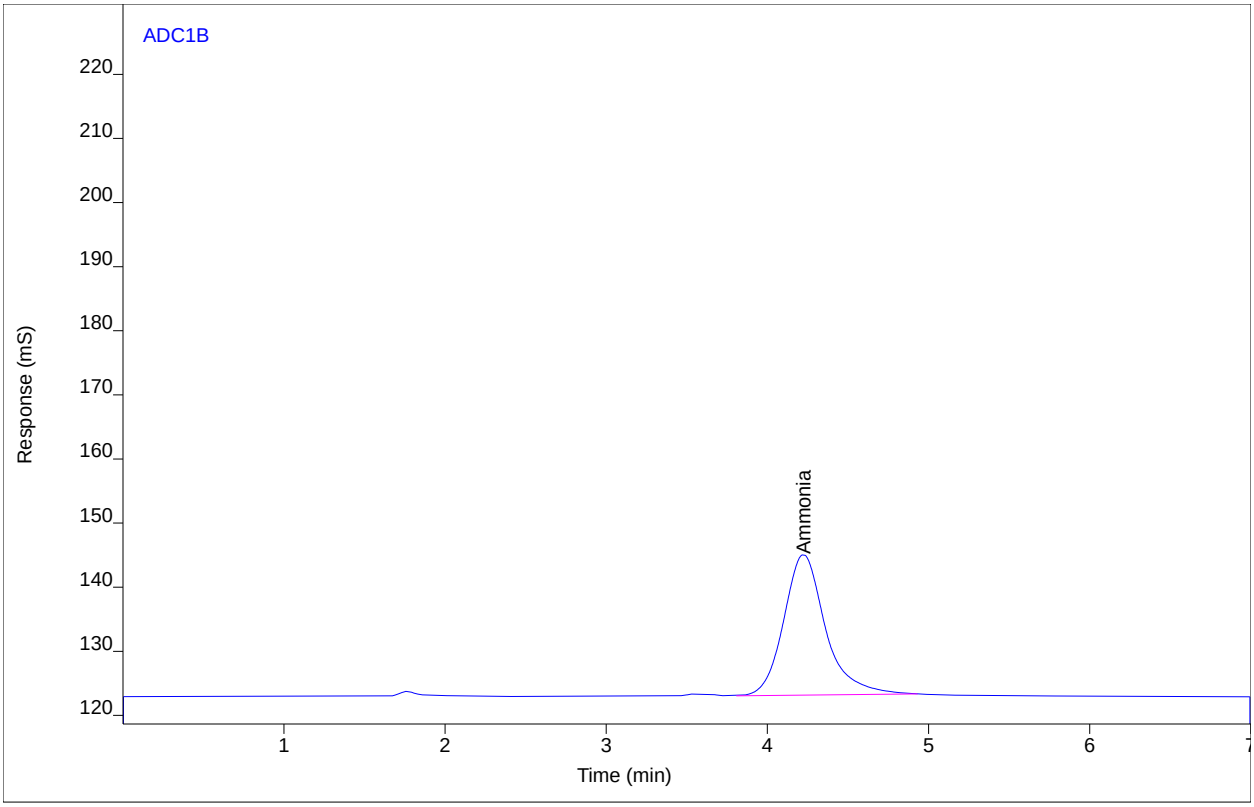
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.23	393.064	21.9366	2.01111	1	2.01111	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #3
Sequence Name	Curly329 ver.4
Inj Data File	003-0402.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:46 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	3
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	MM	4.22	395.412	21.9462	2.02425	1	2.02425	µg/ml

Analyst Peak Integration Comments

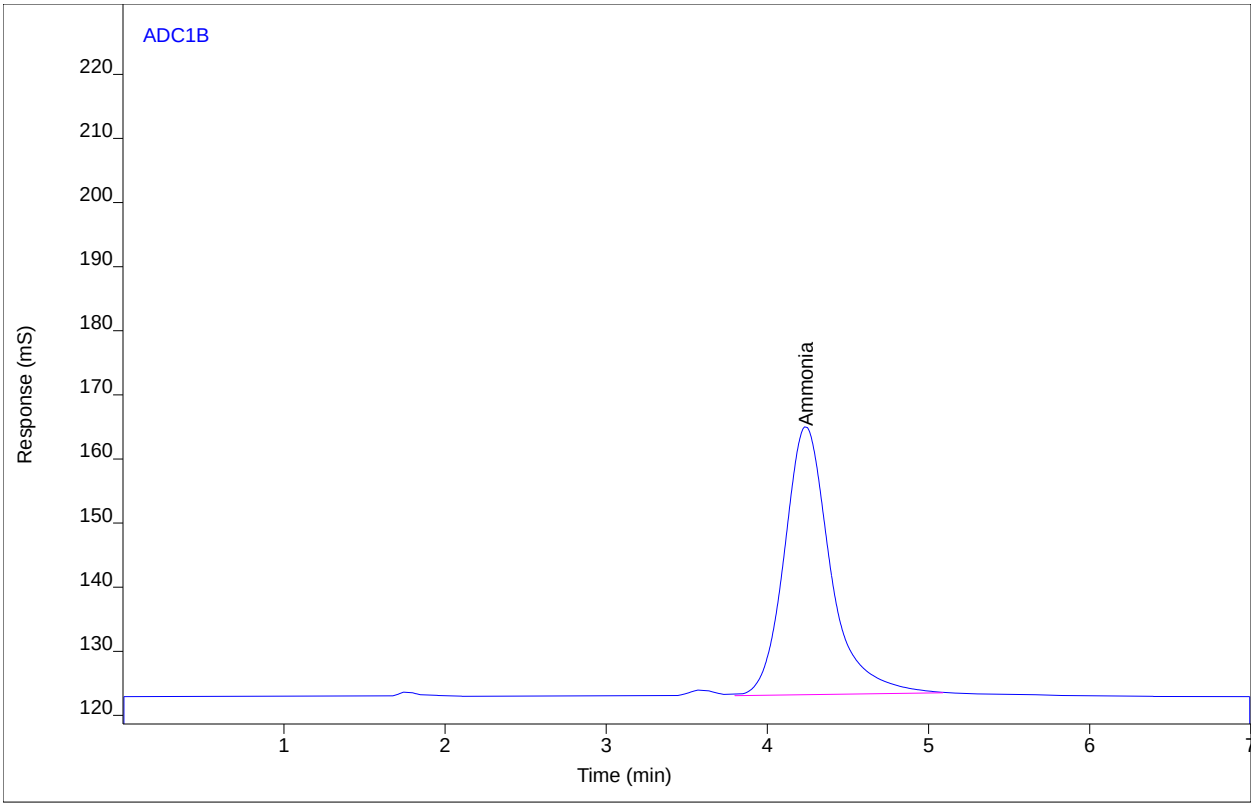
09:00:26 03/31/17 Scott Wilson II

Chromatogram Report

Sample Name	HPLCStds415 #4
Sequence Name	Curly329 ver.4
Inj Data File	004-0501.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 5:54 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	4
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



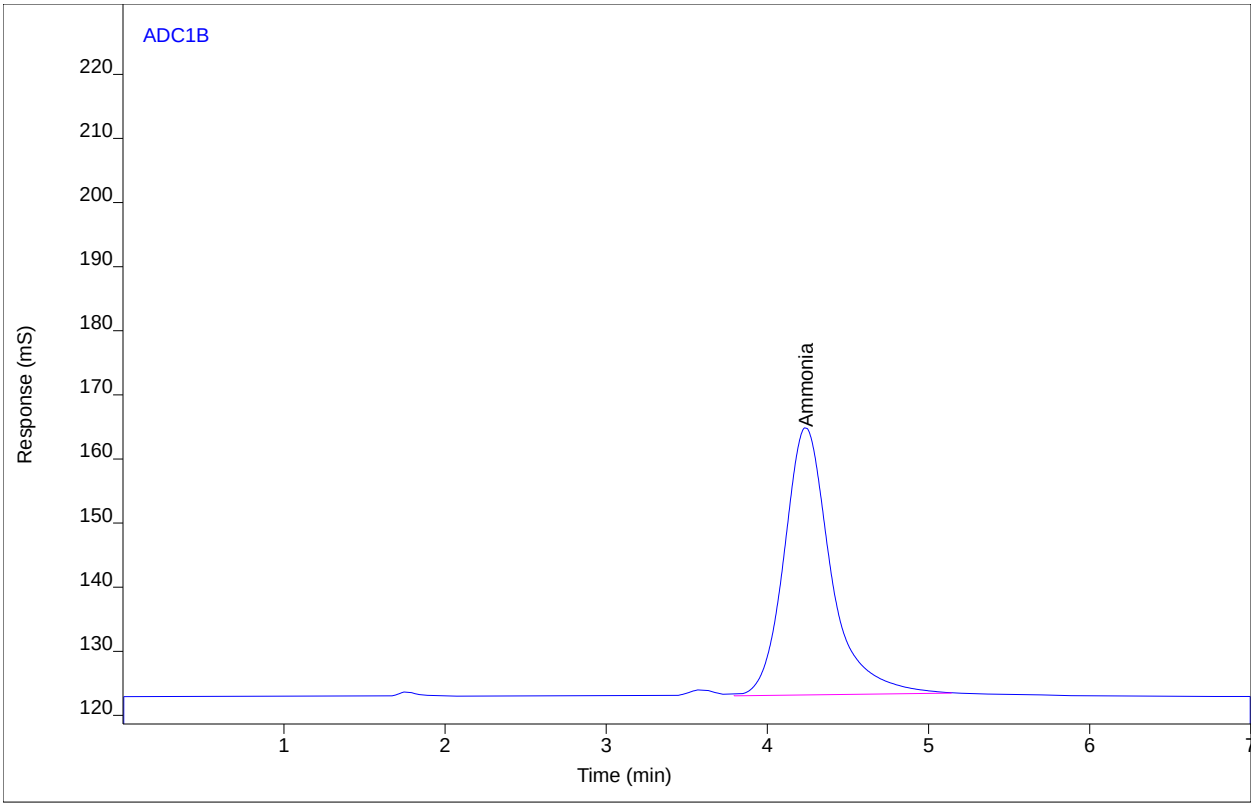
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	832.815	41.8450	4.70099	1	4.70099	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #4
Sequence Name	Curly329 ver.4
Inj Data File	004-0502.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:02 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	4
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



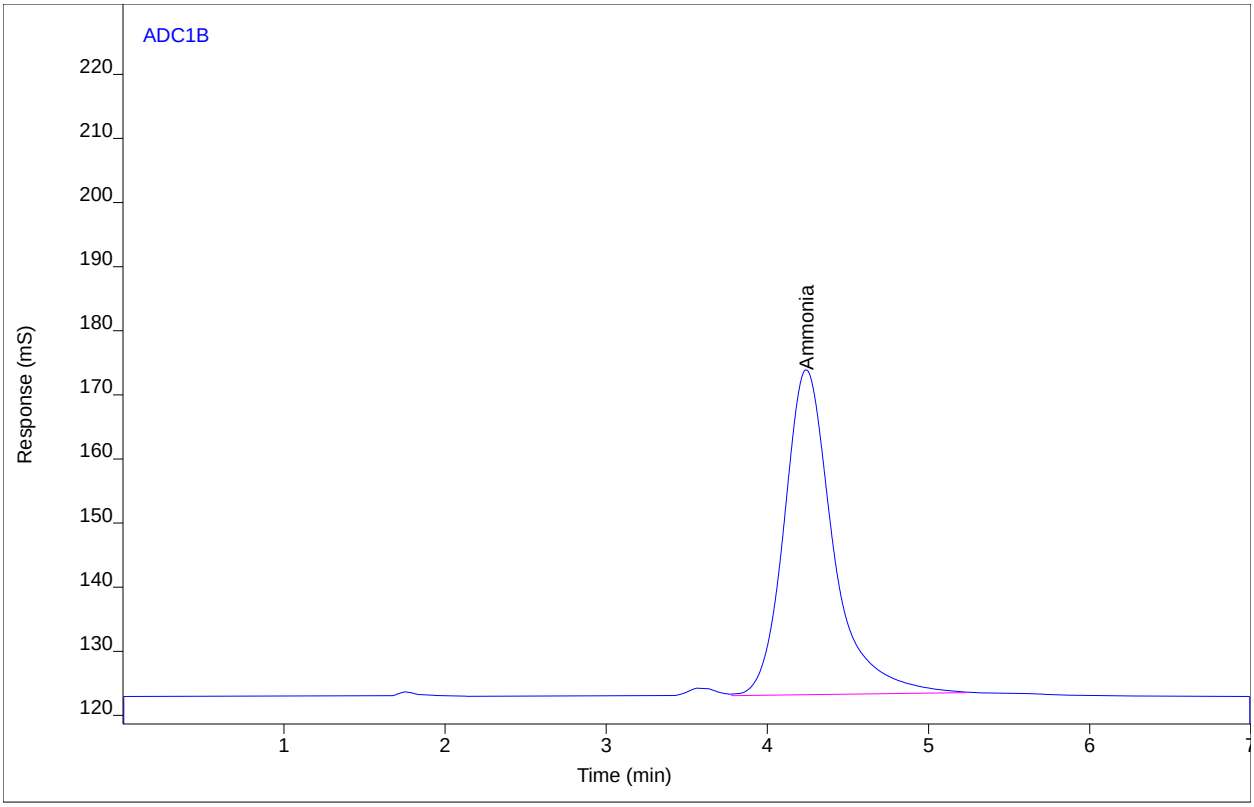
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	840.937	41.7319	4.75594	1	4.75594	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #5
Sequence Name	Curly329 ver.4
Inj Data File	005-0601.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:10 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	5
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



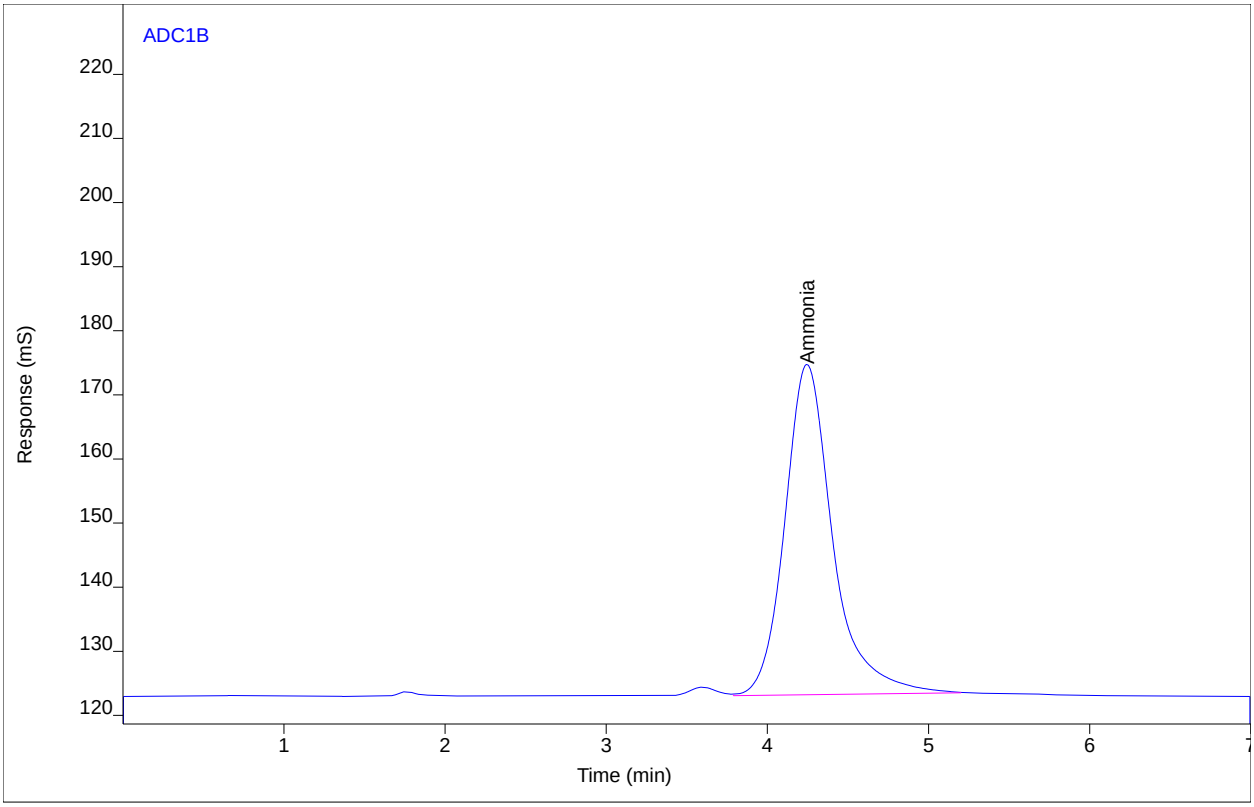
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	1071.62	50.7253	6.42825	1	6.42825	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #5
Sequence Name	Curly329 ver.4
Inj Data File	005-0602.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:19 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	5
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



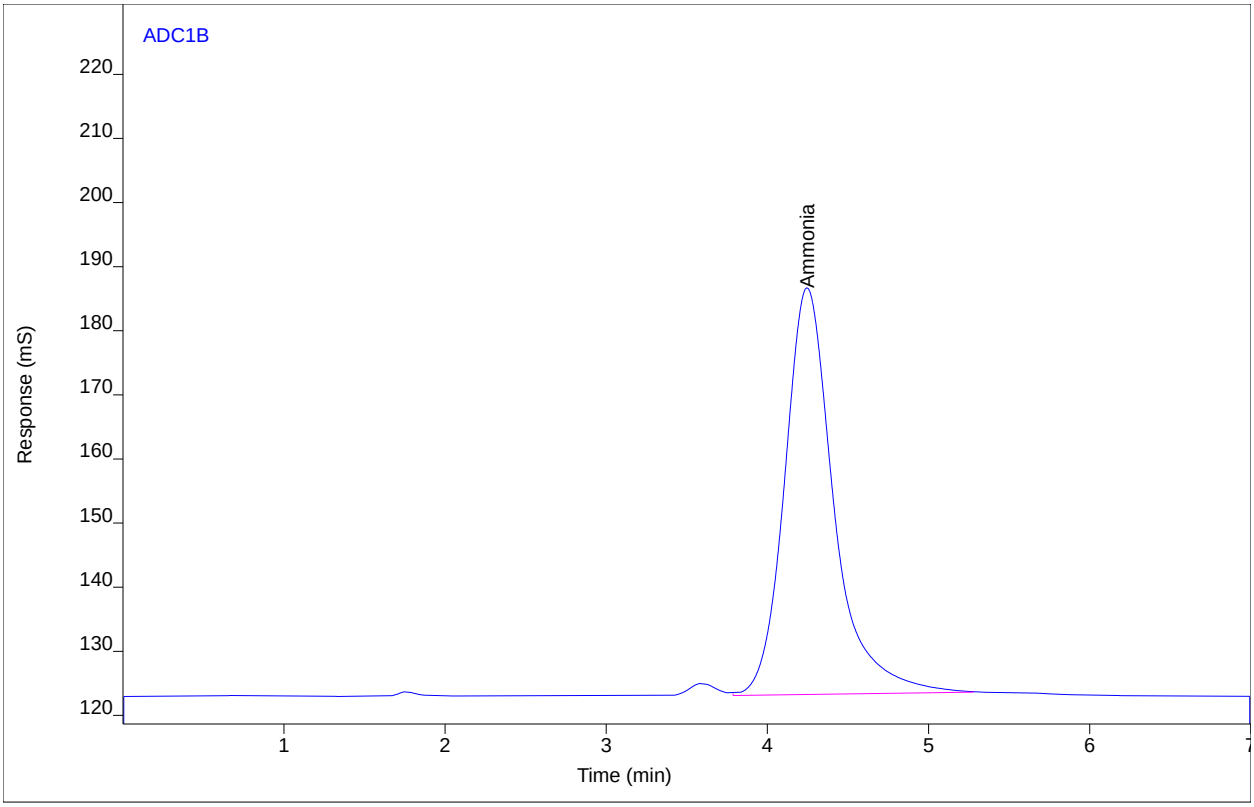
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.25	1064.50	51.5357	6.37292	1	6.37292	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #6
Sequence Name	Curly329 ver.4
Inj Data File	006-0701.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:27 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	6
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



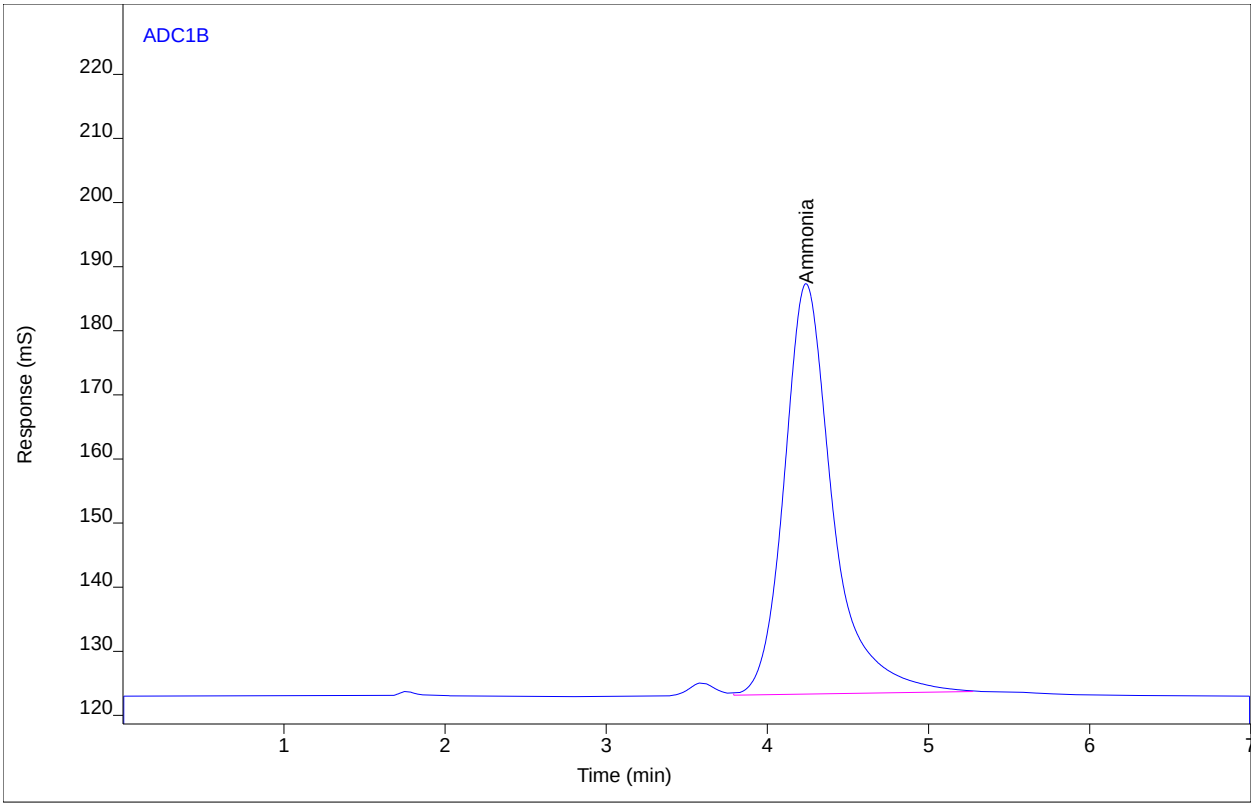
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.25	1347.19	63.4438	8.83140	1	8.83140	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #6
Sequence Name	Curly329 ver.4
Inj Data File	006-0702.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:35 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	6
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



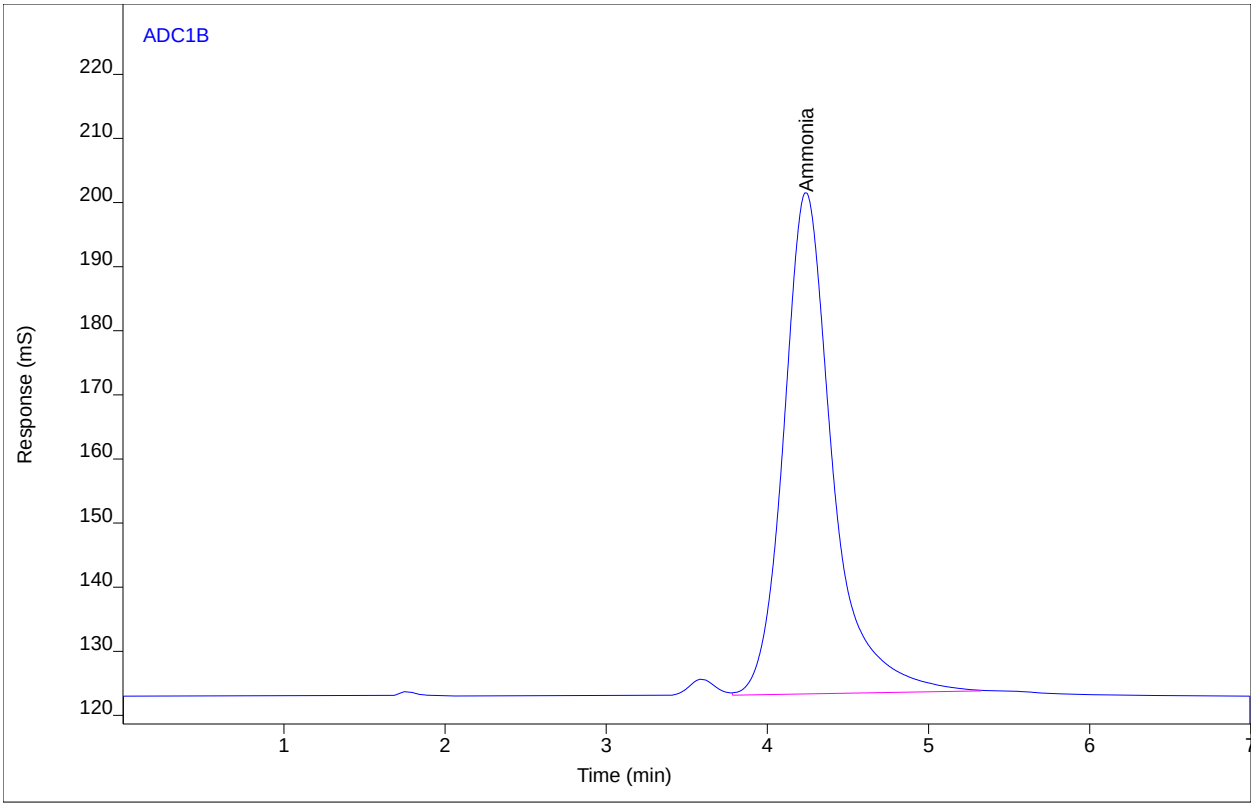
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	1341.80	64.0425	8.77808	1	8.77808	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #7
Sequence Name	Curly329 ver.4
Inj Data File	007-0801.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:43 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	7
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



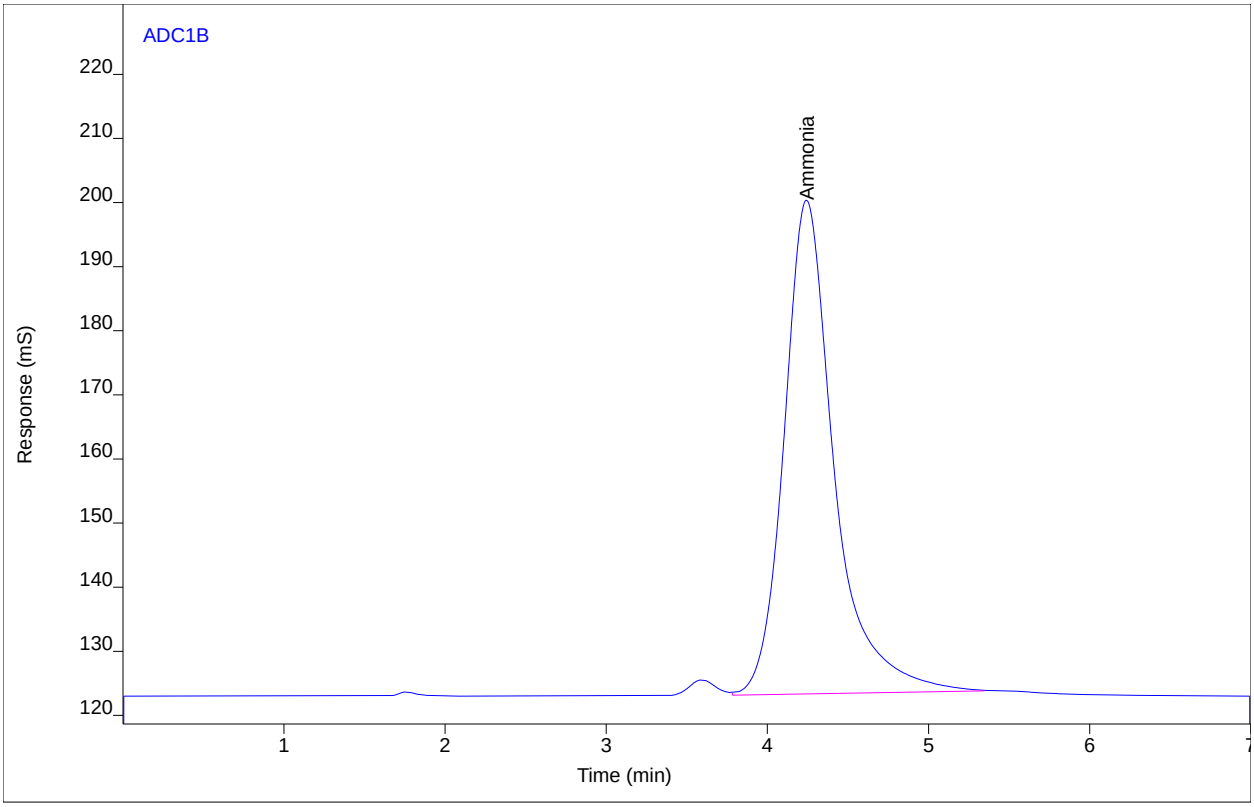
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	1649.80	78.2852	12.6570	1	12.6570	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #7
Sequence Name	Curly329 ver.4
Inj Data File	007-0802.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 6:51 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	7
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



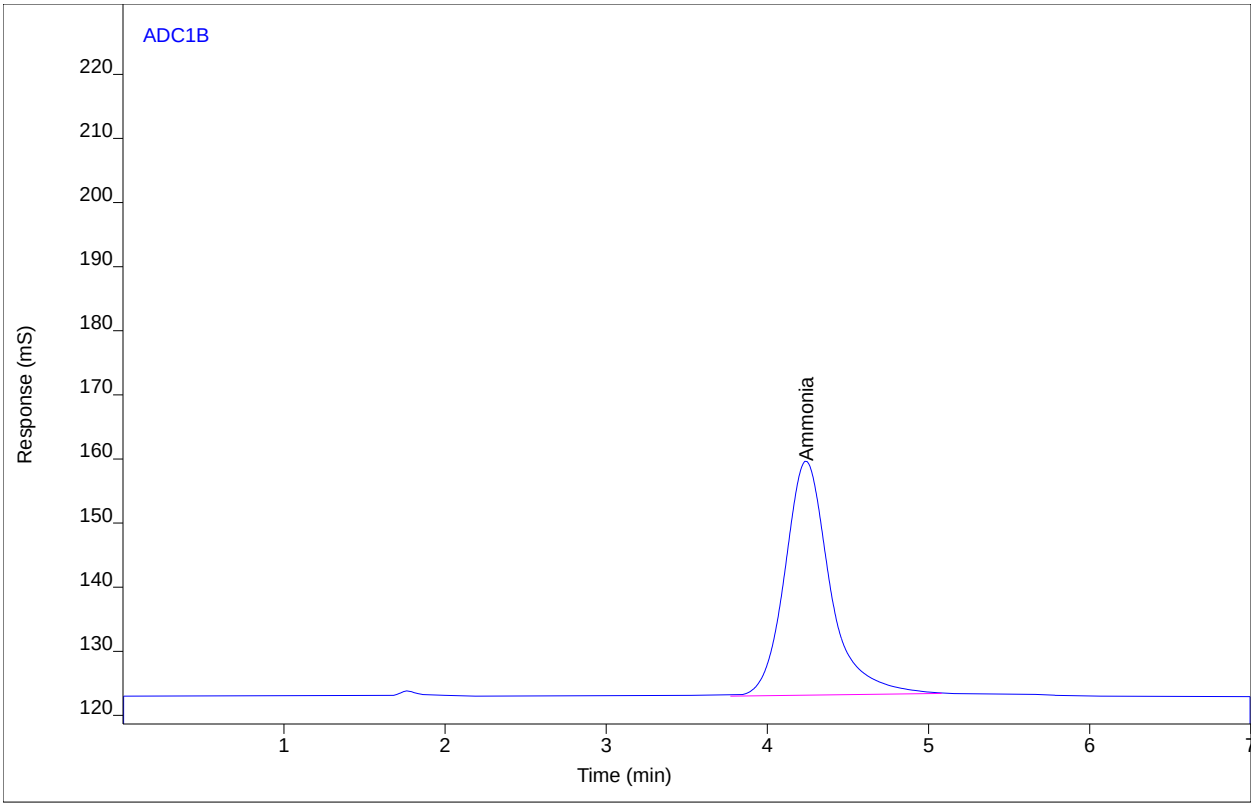
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	1664.93	77.0257	12.9287	1	12.9287	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #SS
Sequence Name	Curly329 ver.4
Inj Data File	008-0901.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 7:00 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Control
Vial Number	8
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



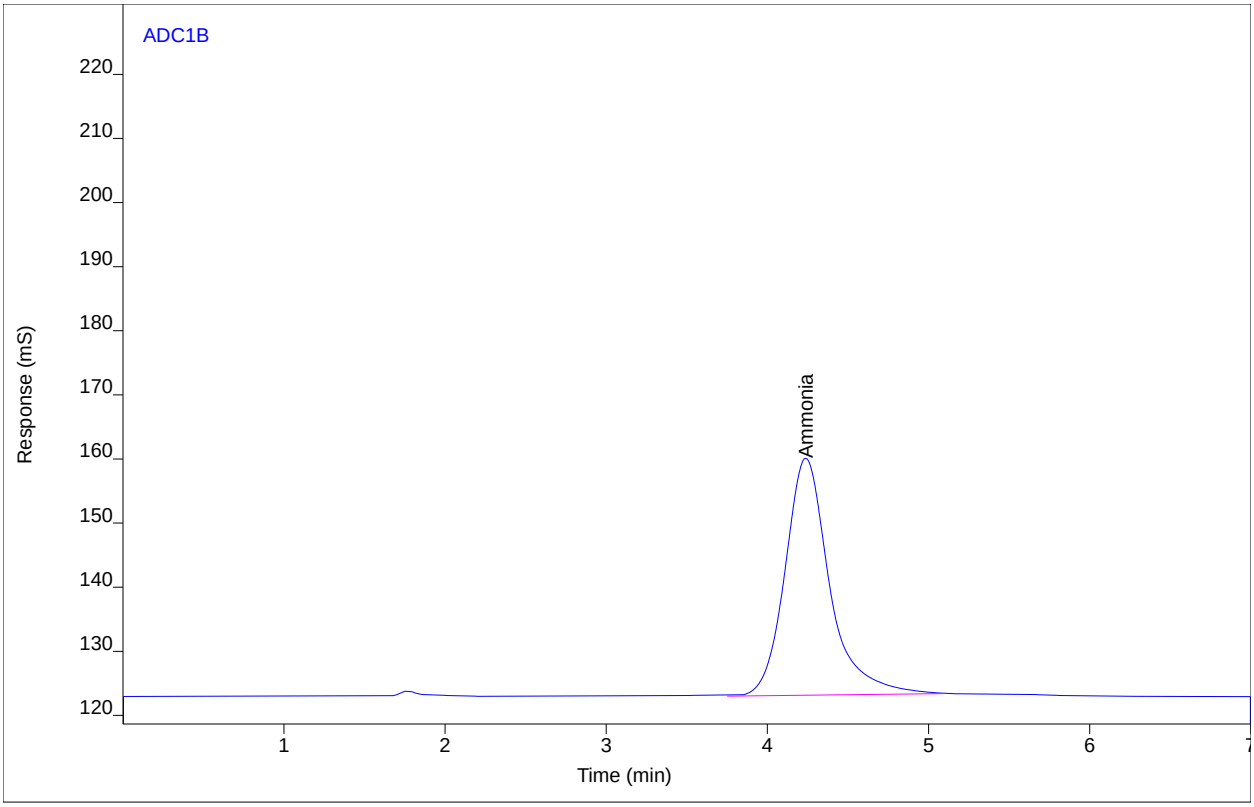
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	711.928	36.5096	3.90904	1	3.90904	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #SS
Sequence Name	Curly329 ver.4
Inj Data File	008-0902.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 7:08 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Control
Vial Number	8
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



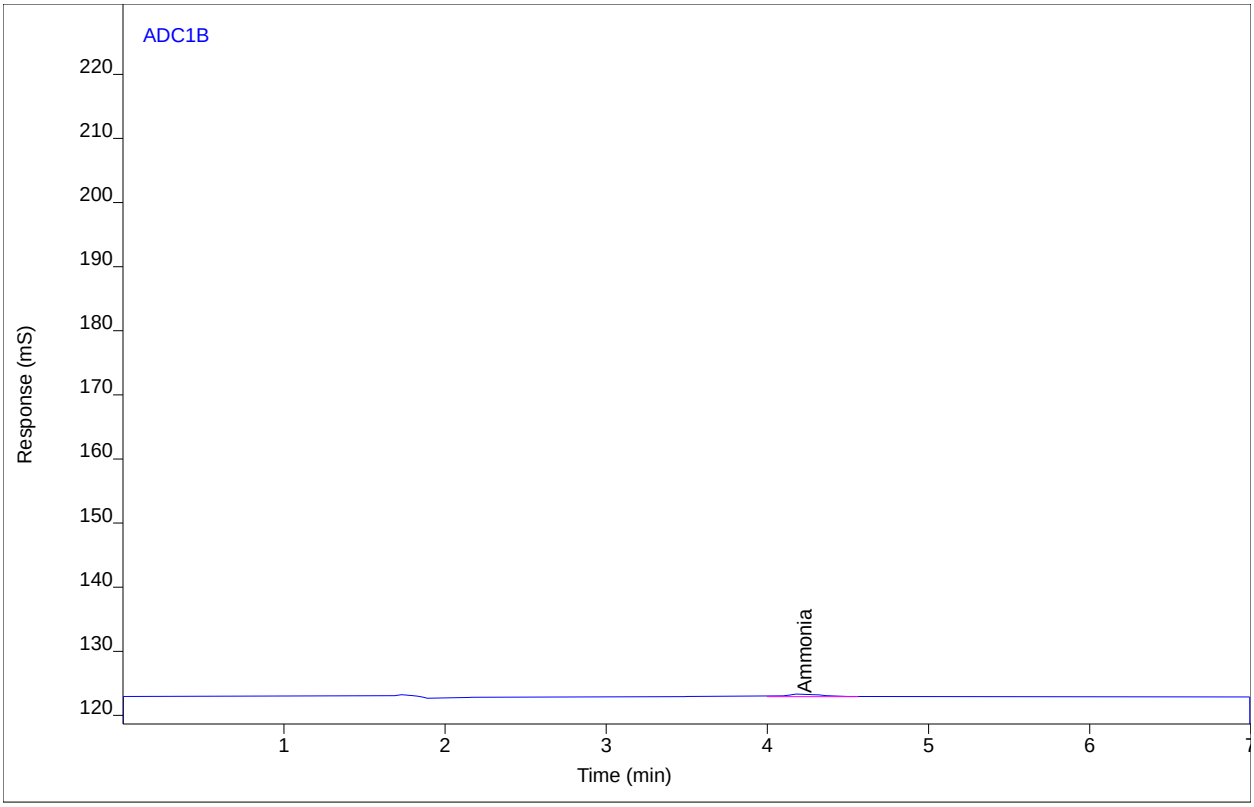
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	710.960	36.9911	3.90288	1	3.90288	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #RB
Sequence Name	Curly329 ver.4
Inj Data File	009-1001.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 7:16 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Control
Vial Number	9
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	MM	4.23	6.52742	0.50442	0.02588	1	0.02588	µg/ml

Analyst Peak Integration Comments

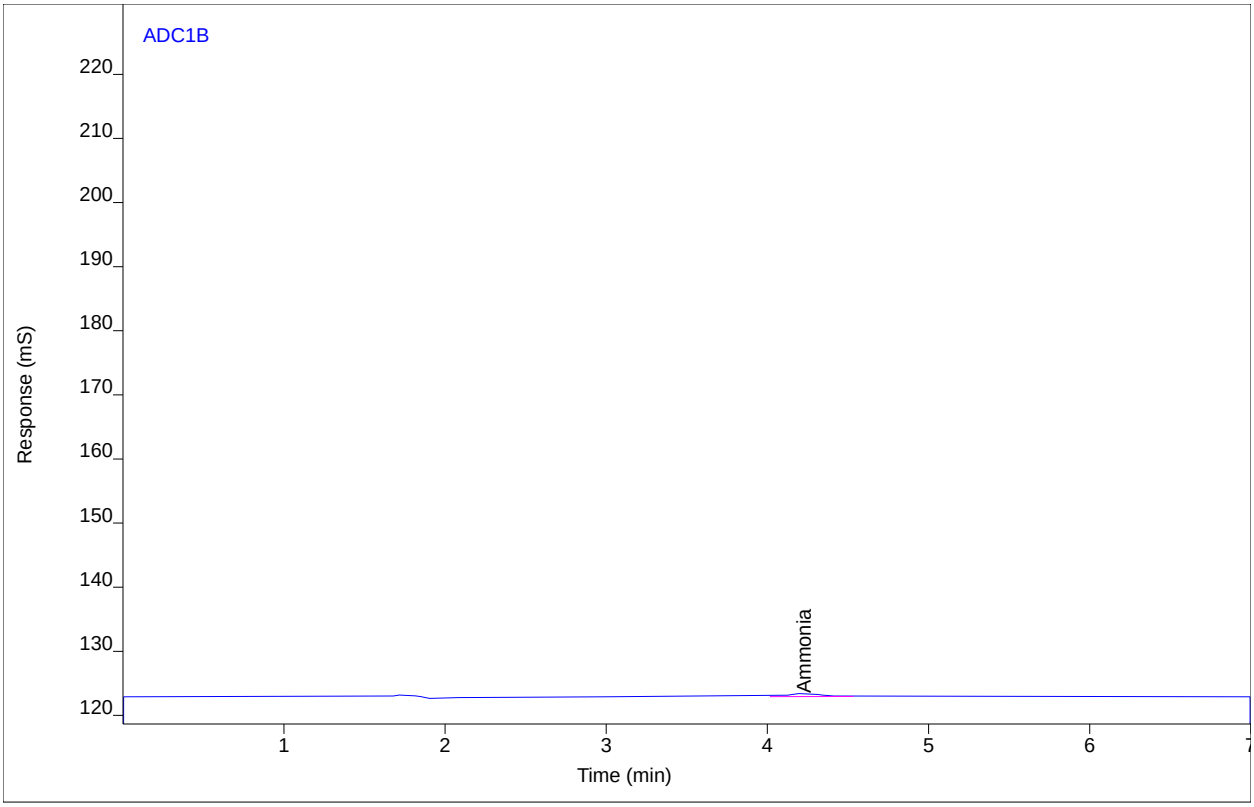
09:03:51 03/31/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #RB
Sequence Name	Curly329 ver.4
Inj Data File	009-1002.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 7:24 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Control
Vial Number	9
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	MM	4.23	6.51948	0.51438	0.02585	1	0.02585	µg/ml

Analyst Peak Integration Comments

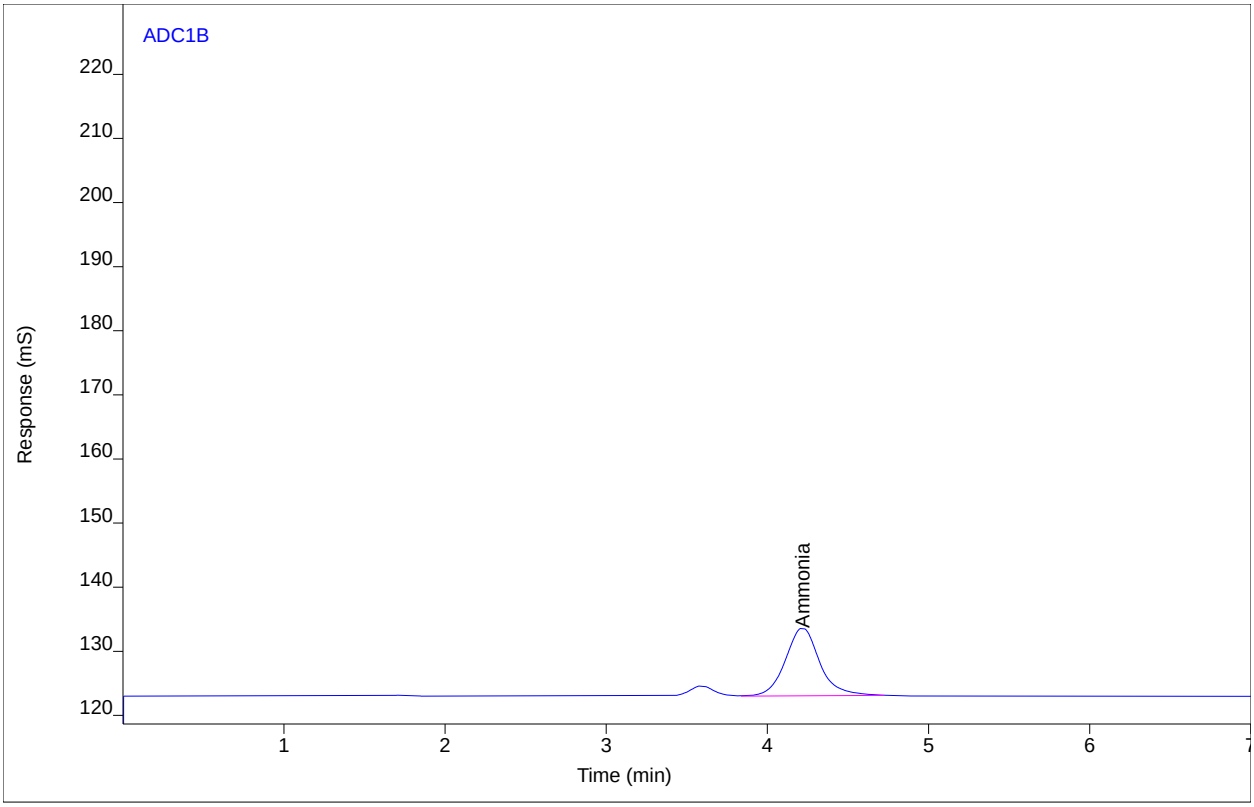
09:04:02 03/31/17 Scott Wilson NI

Chromatogram Report

Sample Name	0317-144.R1.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	011-1101.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 7:33 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	11
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.22	156.369	10.5991	0.73930	1	0.73930	µg/ml

Analyst Peak Integration Comments

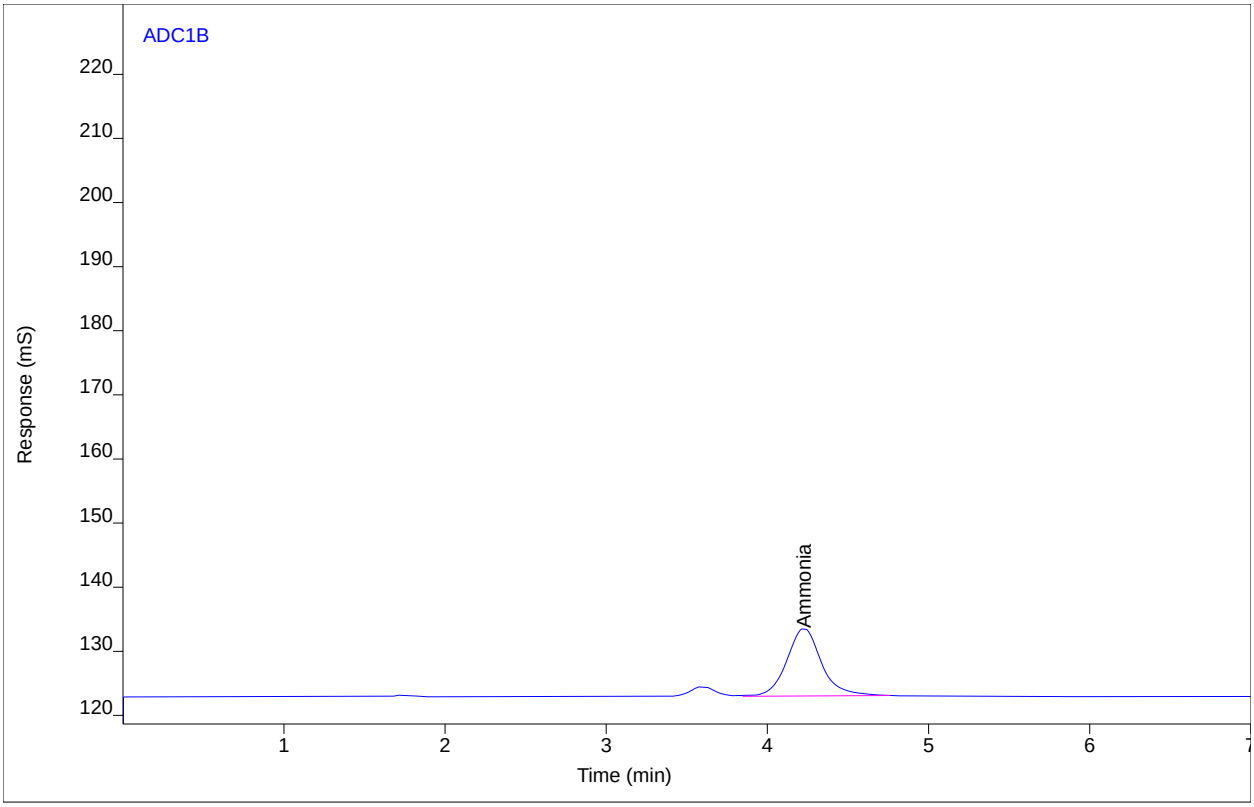
09:04:19 03/31/17 Scott Wilson II

Chromatogram Report

Sample Name	0317-144.R1.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	011-1102.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 7:49 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	11
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.23	157.710	10.5623	0.74624	1	0.74624	µg/ml

Analyst Peak Integration Comments

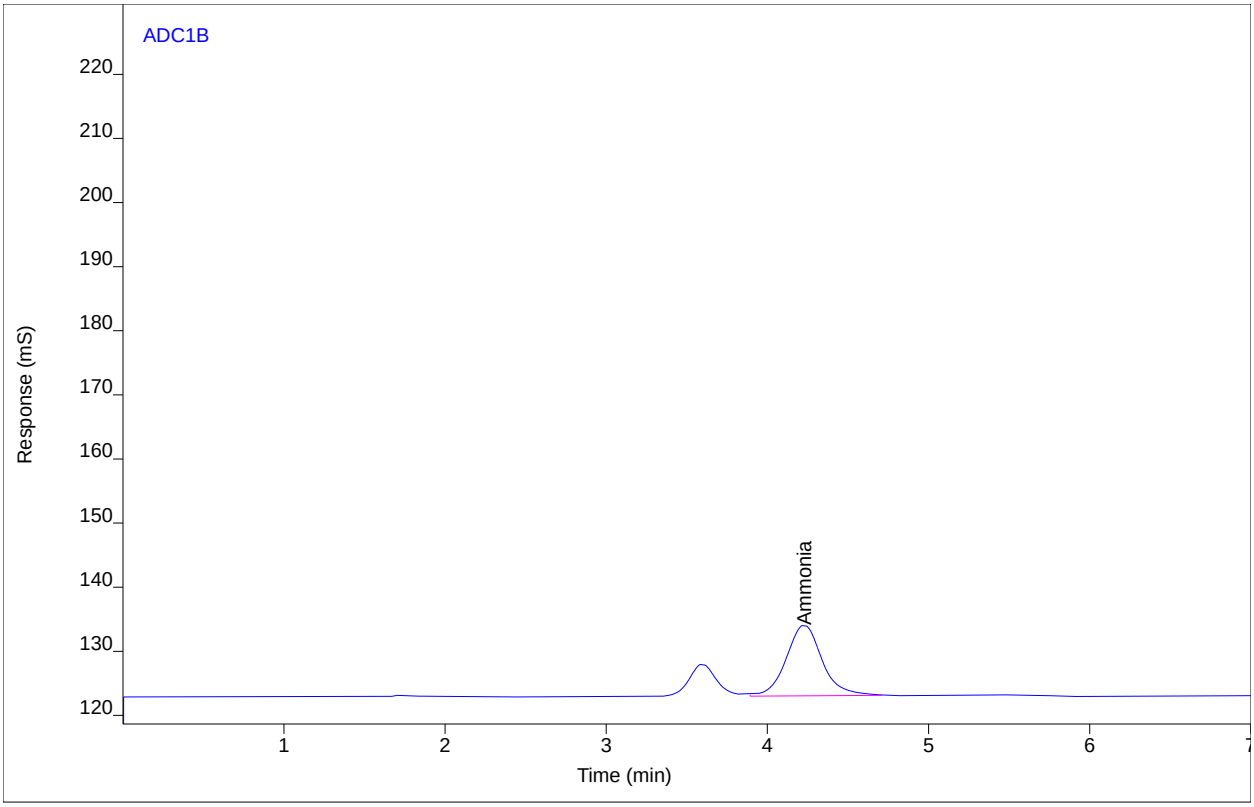
09:04:36 03/31/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R2.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	012-1201.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 8:04 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	12
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



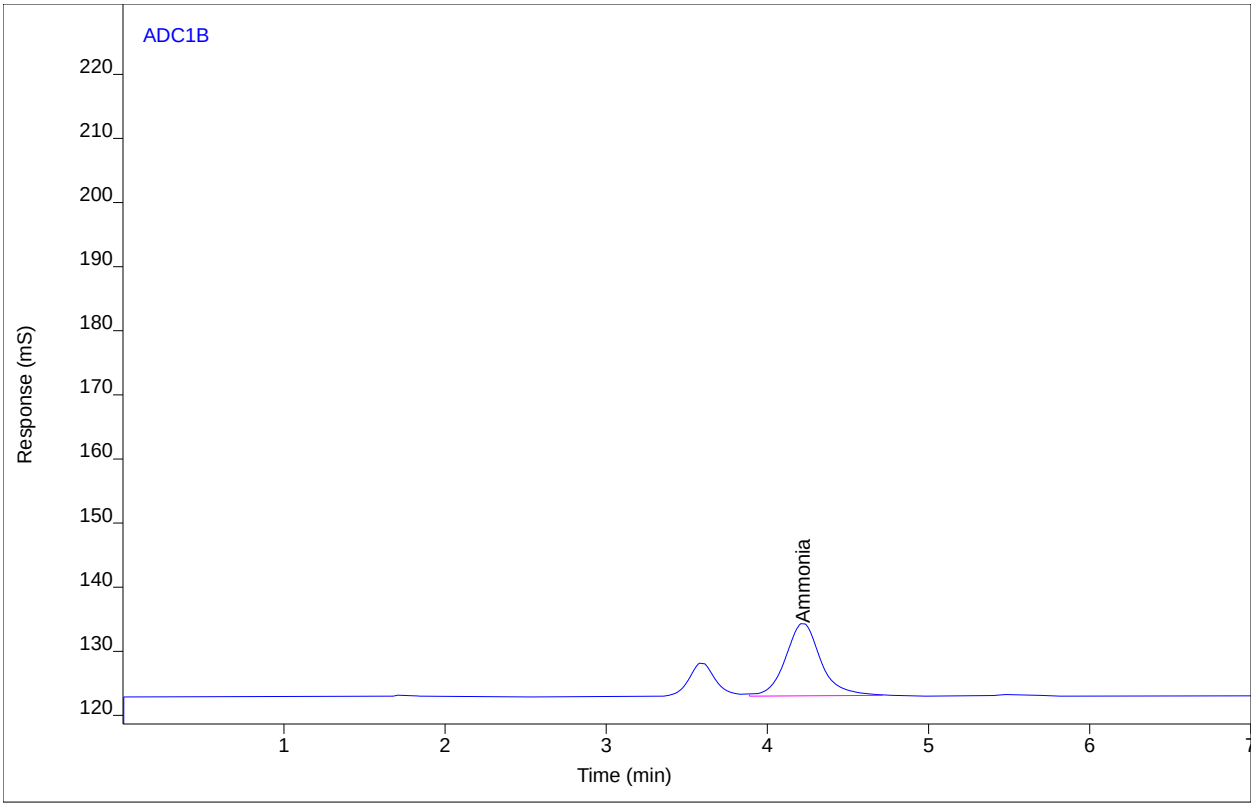
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.23	171.375	11.0547	0.81708	1	0.81708	µg/ml

Chromatogram Report

Sample Name	0317-144.R2.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	012-1202.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 8:20 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	12
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



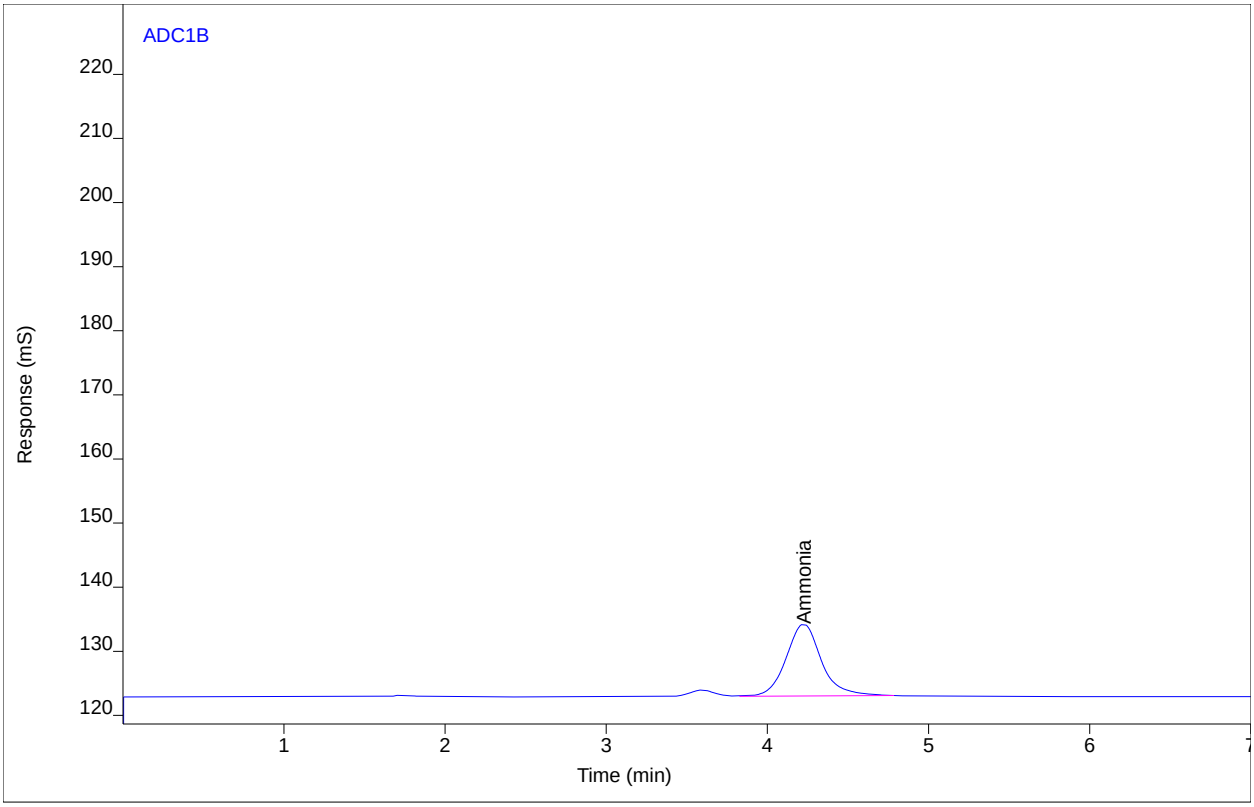
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.22	172.168	11.3605	0.82120	1	0.82120	µg/ml

Chromatogram Report

Sample Name	0317-144.R3.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	013-1301.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 8:35 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	13
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.23	170.748	11.2479	0.81383	1	0.81383	µg/ml

Analyst Peak Integration Comments

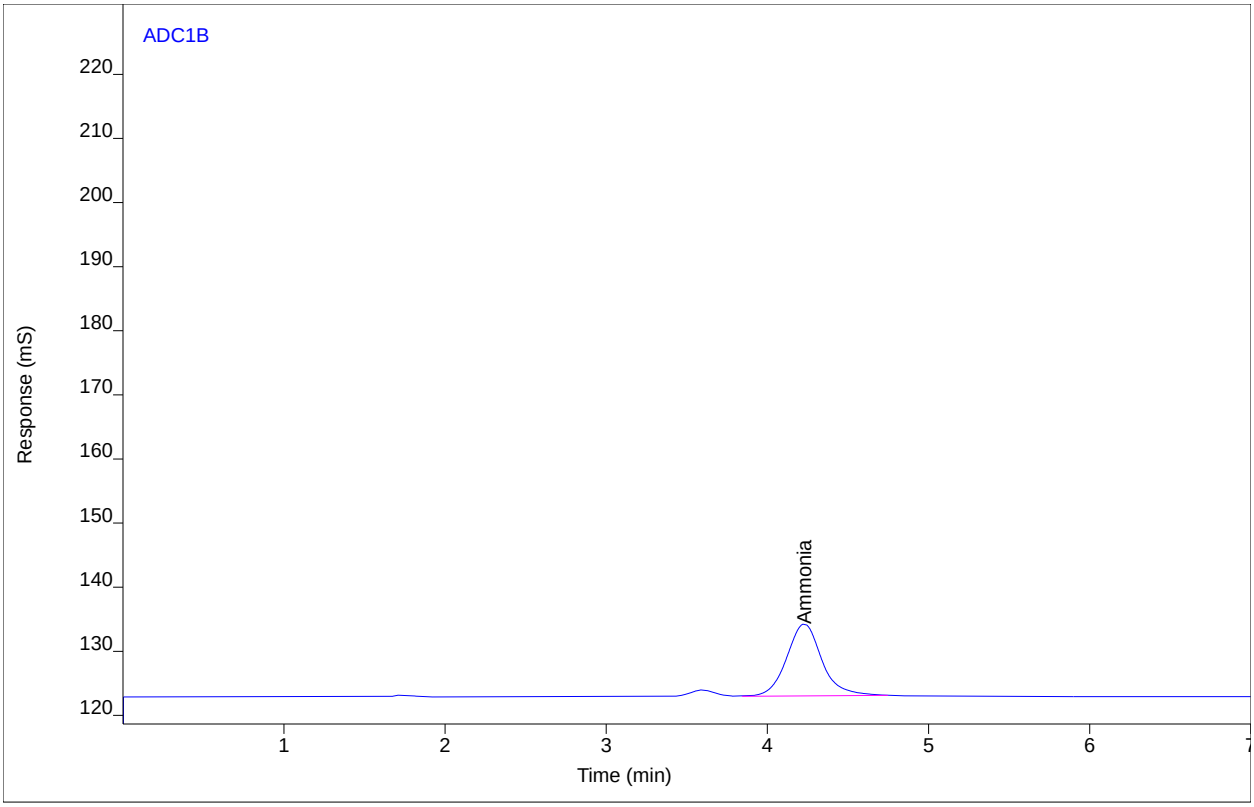
09:05:02 03/31/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	013-1302.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 8:51 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	13
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.23	170.535	11.2368	0.81272	1	0.81272	µg/ml

Analyst Peak Integration Comments

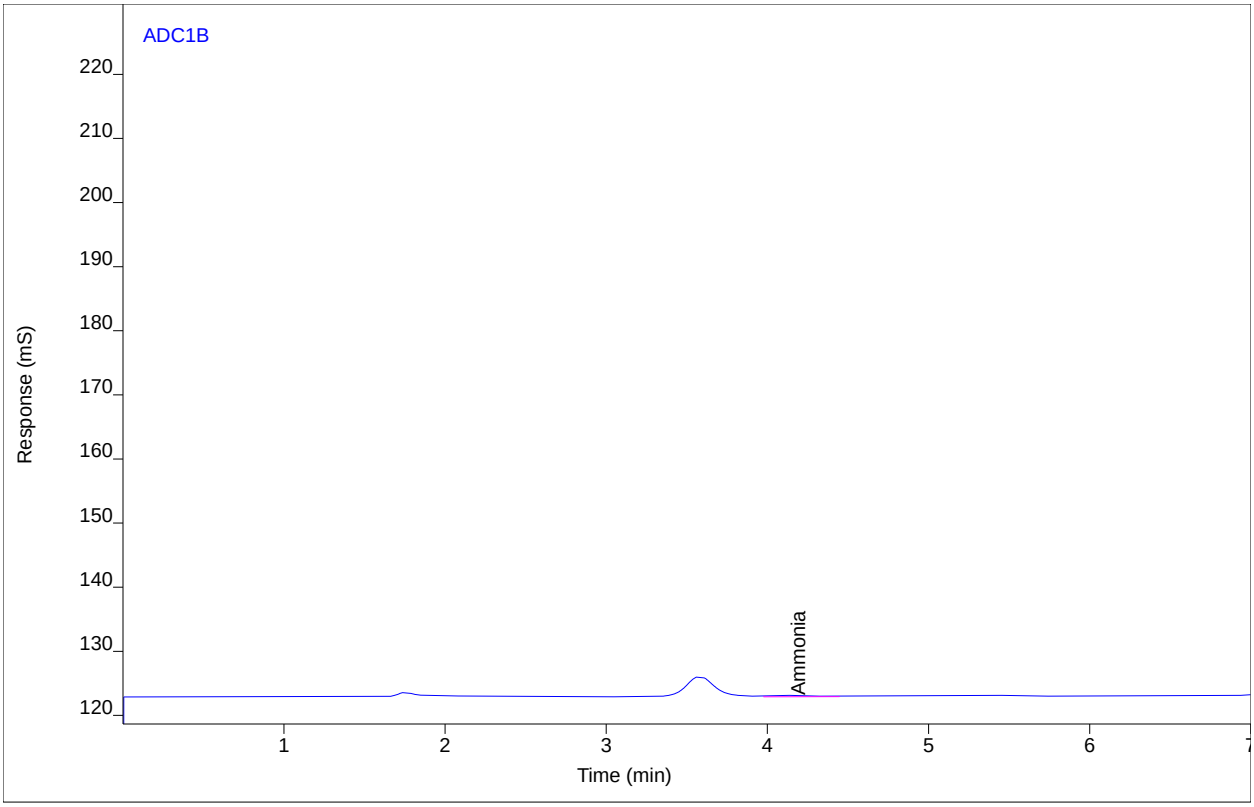
09:05:17 03/31/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R1.IMP 2
Sequence Name	Curly329 ver.4
Inj Data File	014-1401.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 9:06 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	14
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.19	3.56857	0.25761	0.01415	1	0.01415	µg/ml

Analyst Peak Integration Comments

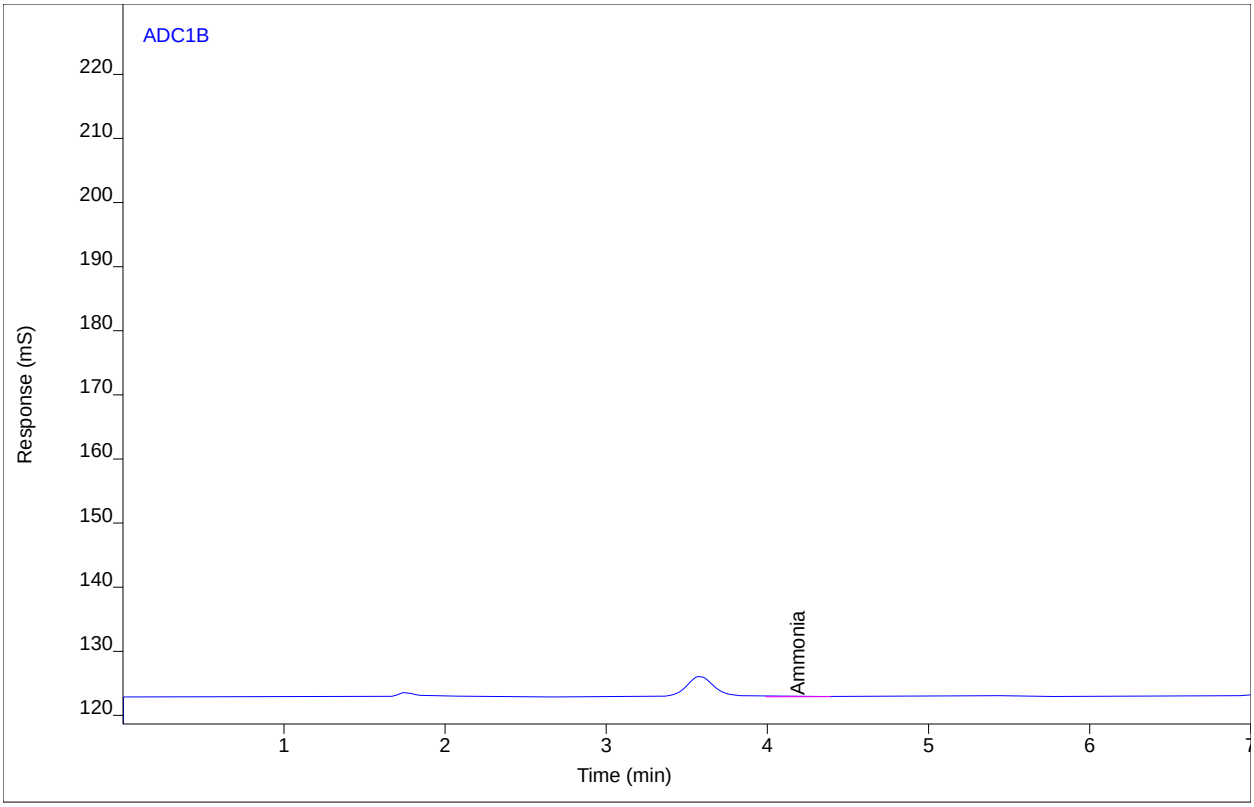
09:05:37 03/31/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R1.IMP 2
Sequence Name	Curly329 ver.4
Inj Data File	014-1402.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 9:22 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	14
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.19	2.94591	0.23304	0.01168	1	0.01168	µg/ml

Analyst Peak Integration Comments

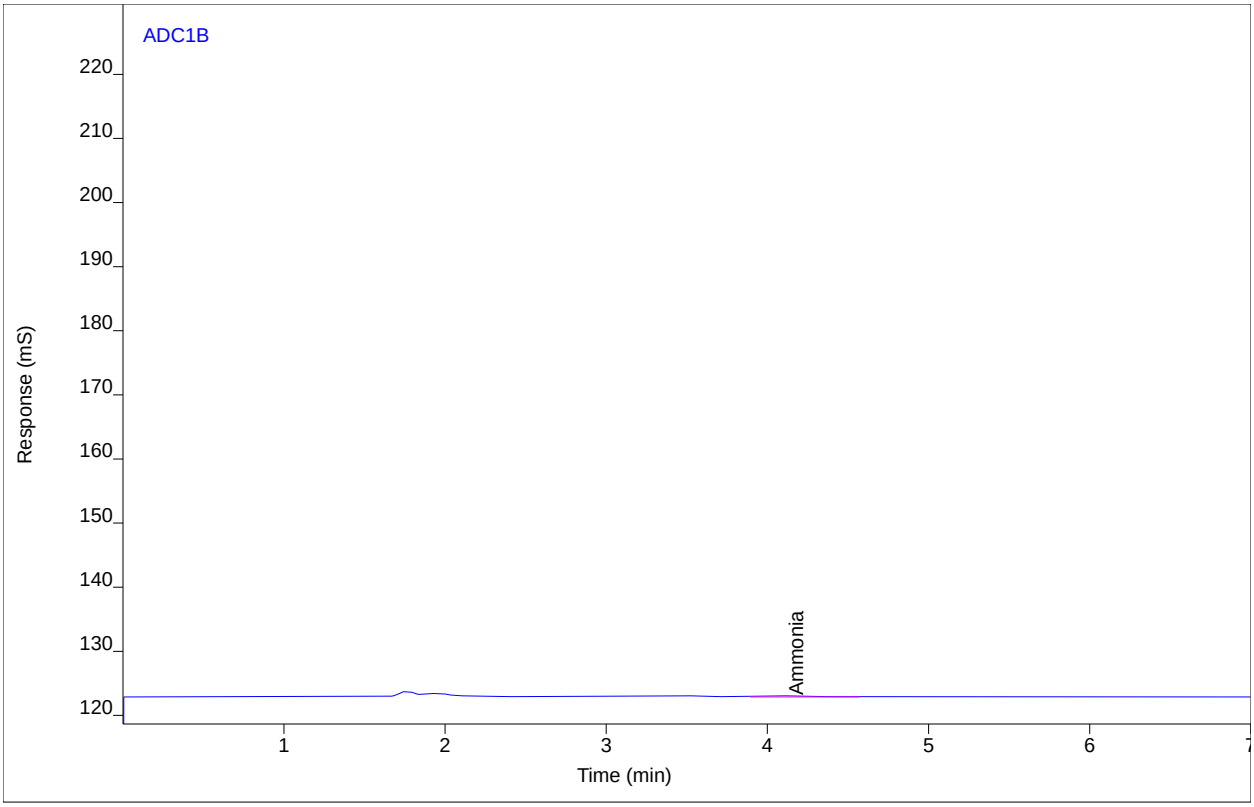
09:05:50 03/31/17 Scott Wilson II

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R2.IMP 2
Sequence Name	Curly329 ver.4
Inj Data File	015-1501.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 9:37 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	15
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.18	3.74186	0.26084	0.01484	1	0.01484	µg/ml

Analyst Peak Integration Comments

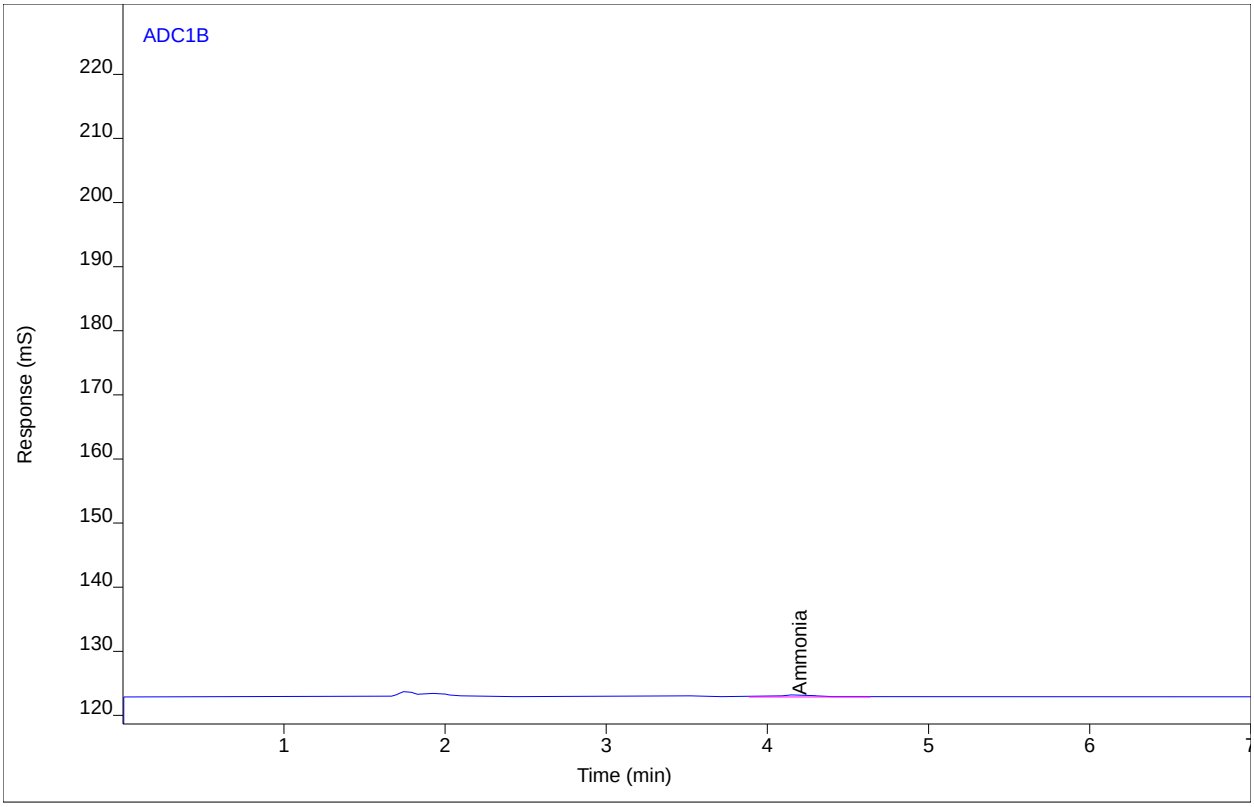
09:06:07 03/31/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R2.IMP 2
Sequence Name	Curly329 ver.4
Inj Data File	015-1502.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 9:53 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	15
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.20	5.47008	0.36610	0.02169	1	0.02169	µg/ml

Analyst Peak Integration Comments

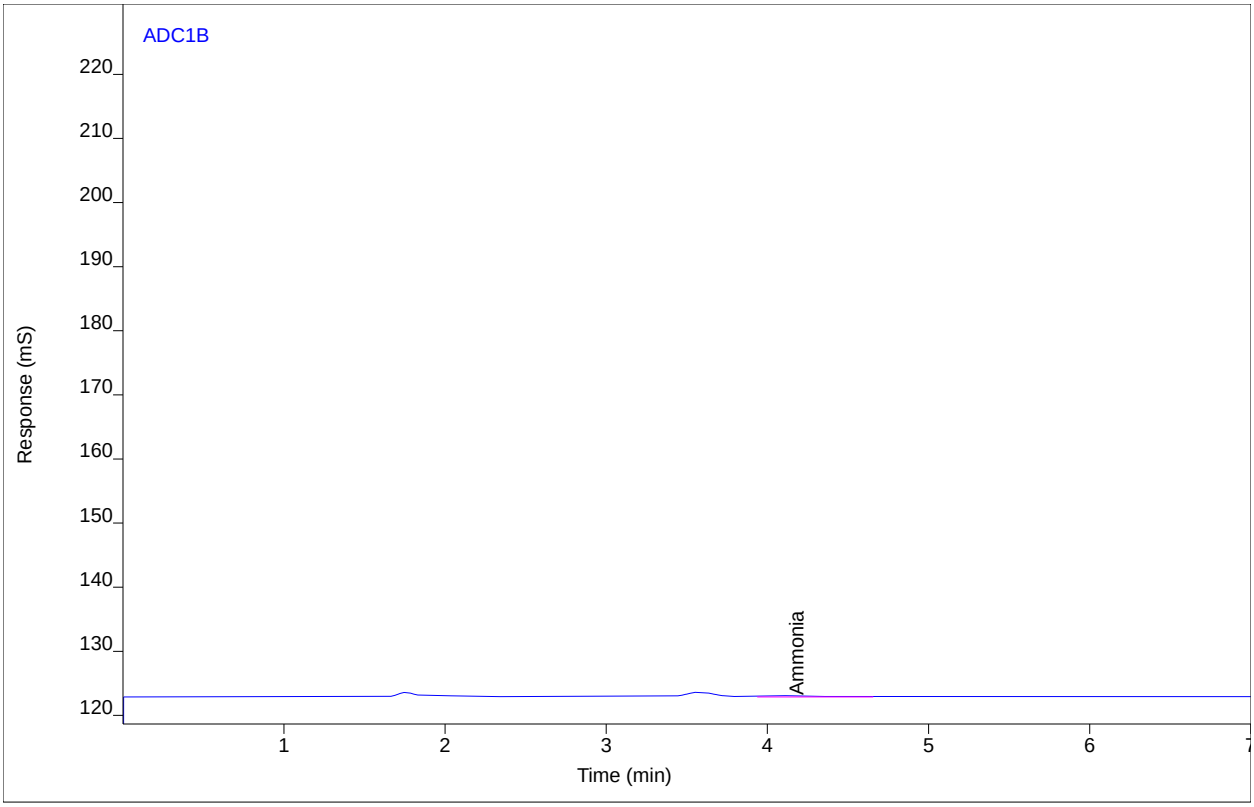
09:06:19 03/31/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.IMP 2
Sequence Name	Curly329 ver.4
Inj Data File	016-1601.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 10:08 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	16
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.18	4.77466	0.31975	0.01893	1	0.01893	µg/ml

Analyst Peak Integration Comments

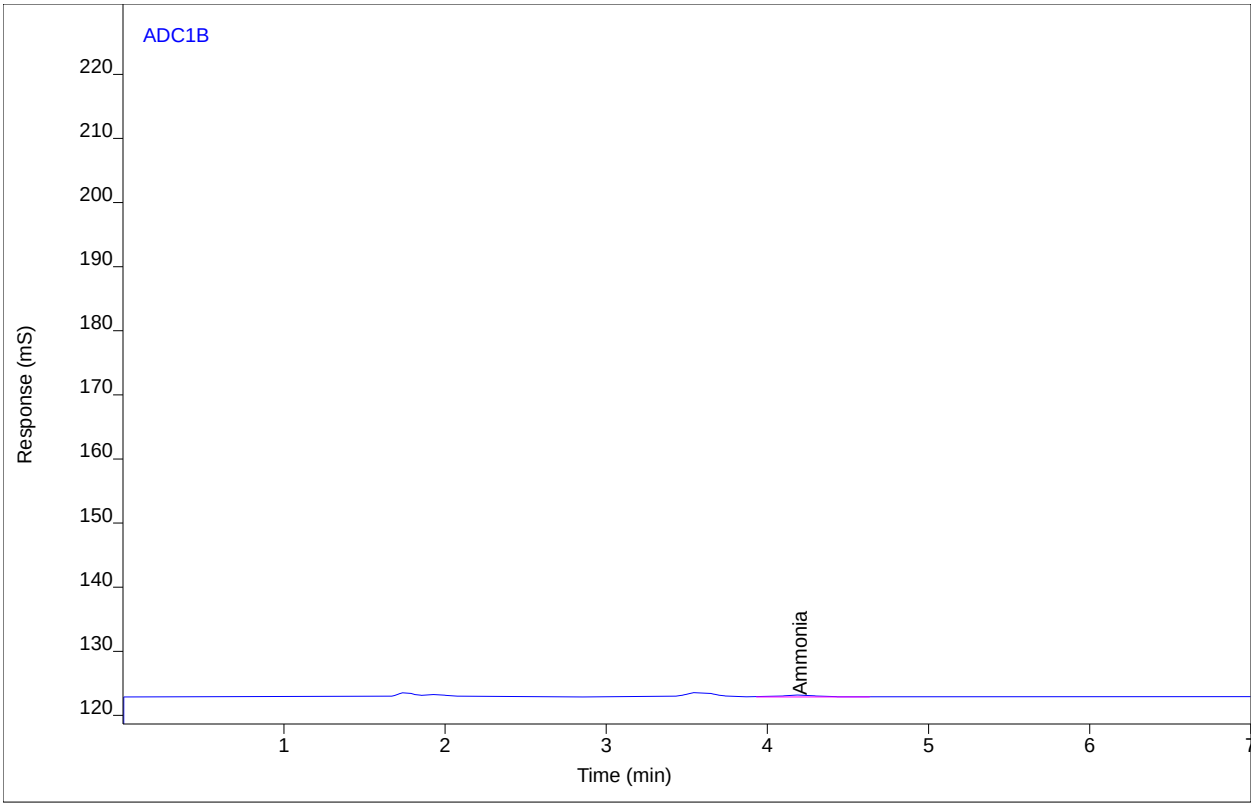
09:06:35 03/31/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.IMP 2
Sequence Name	Curly329 ver.4
Inj Data File	016-1602.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 10:24 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	16
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.20	4.58807	0.30674	0.01819	1	0.01819	µg/ml

Analyst Peak Integration Comments

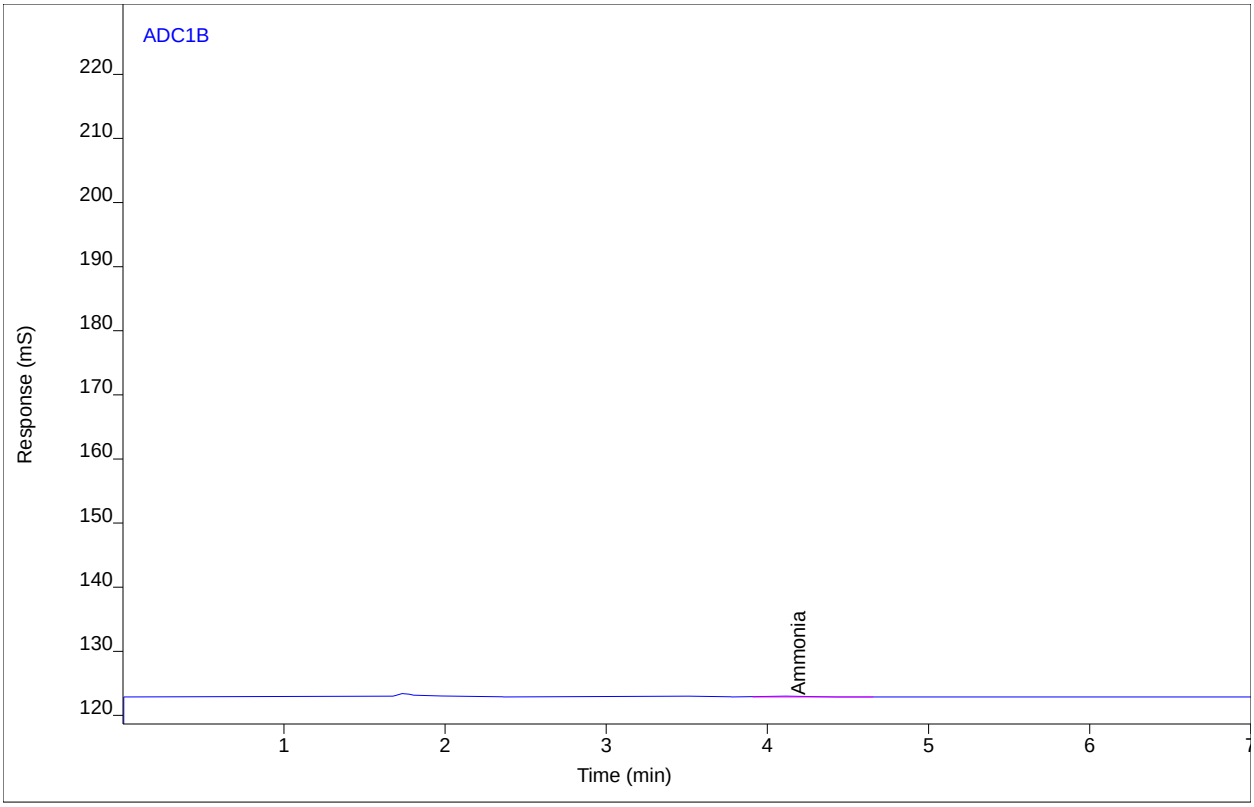
09:06:54 03/31/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.BLANK.H2SO4
Sequence Name	Curly329 ver.4
Inj Data File	017-1701.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 10:39 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	17
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.19	3.35112	0.24663	0.01329	1	0.01329	µg/ml

Analyst Peak Integration Comments

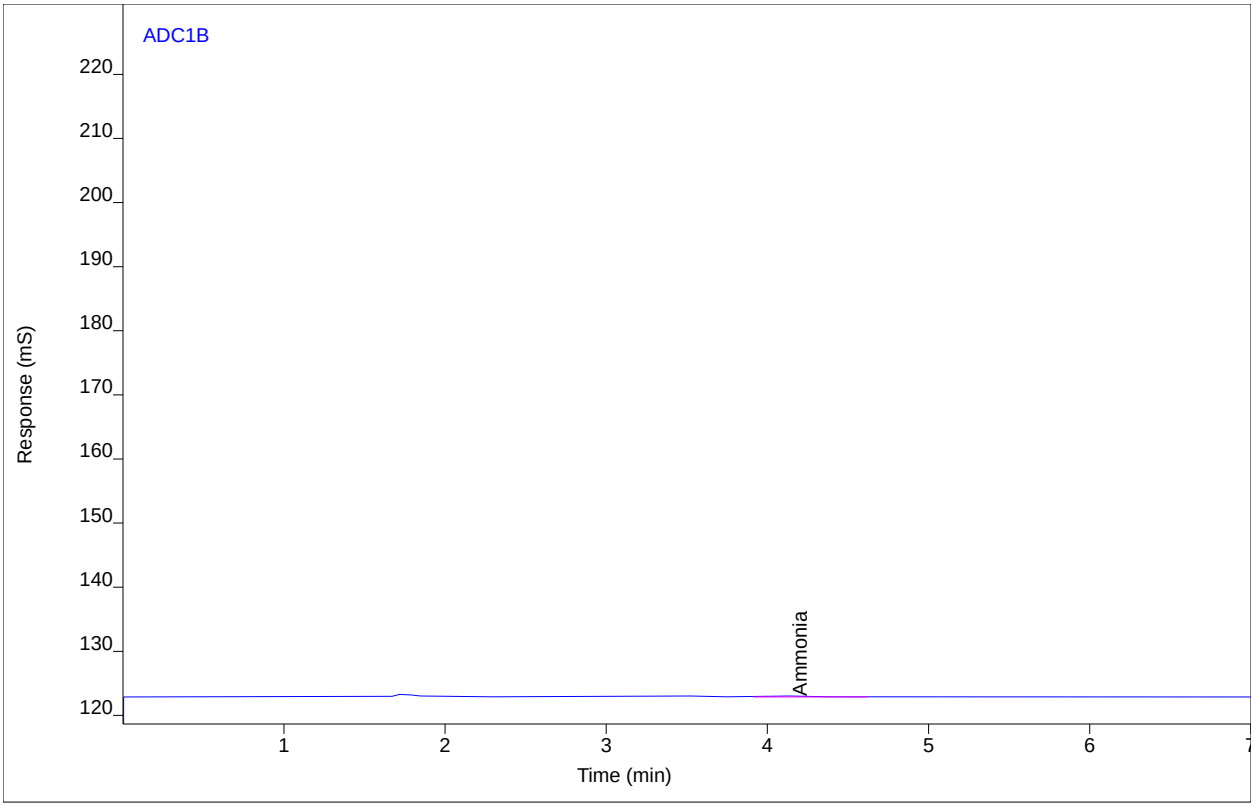
09:07:08 03/31/17 Scott Wilson NI

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.BLANK.H2SO4
Sequence Name	Curly329 ver.4
Inj Data File	017-1702.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 10:55 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Sample
Vial Number	17
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	FM	4.20	3.12943	0.23418	0.01241	1	0.01241	µg/ml

Analyst Peak Integration Comments

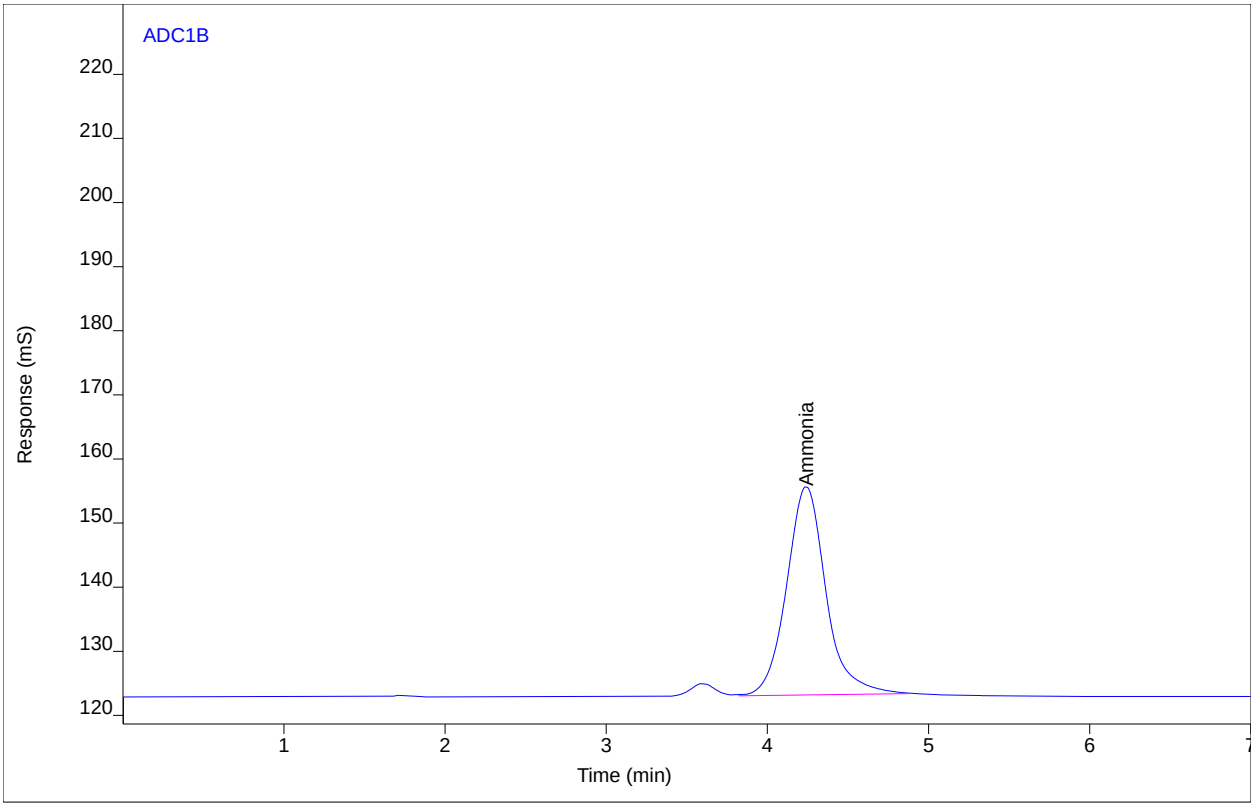
09:07:22 03/31/17 Scott Wilson NI

Chromatogram Report

Sample Name	0317-144.MS-R1.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	018-1801.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 11:10 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	18
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



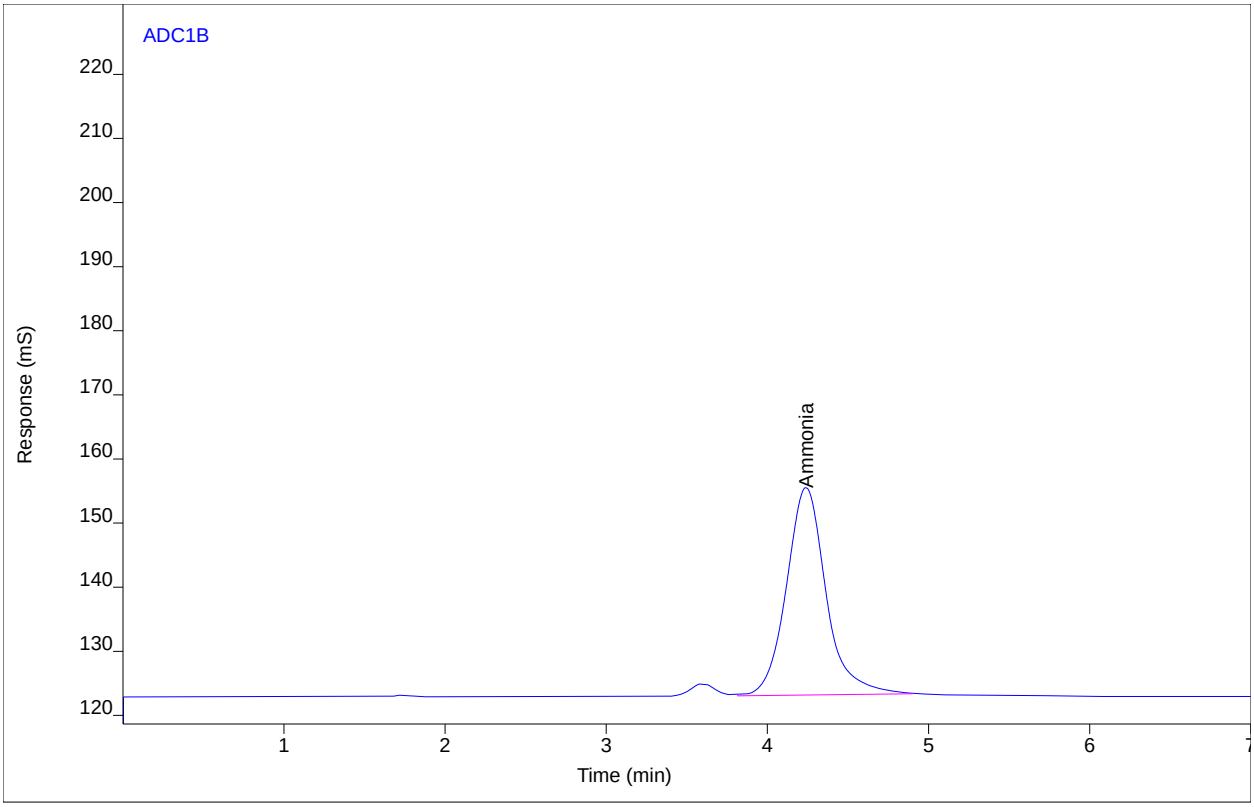
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	552.421	32.5503	2.92905	1	2.92905	µg/ml

Chromatogram Report

Sample Name	0317-144.MS-R1.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	018-1802.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 11:26 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	18
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



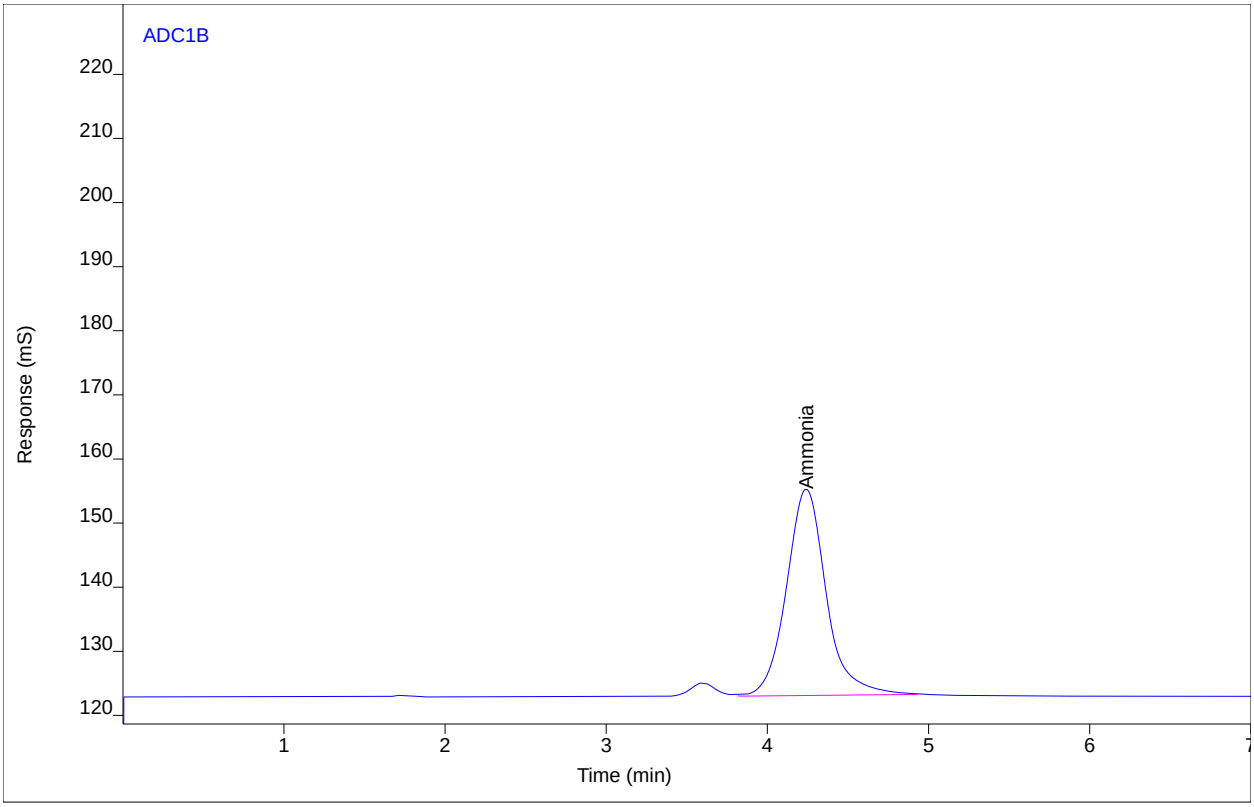
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	554.889	32.3870	2.94372	1	2.94372	µg/ml

Chromatogram Report

Sample Name	0317-144.MSD-R1.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	019-1901.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 11:41 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	19
Injection Volume	20
Injection	1 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



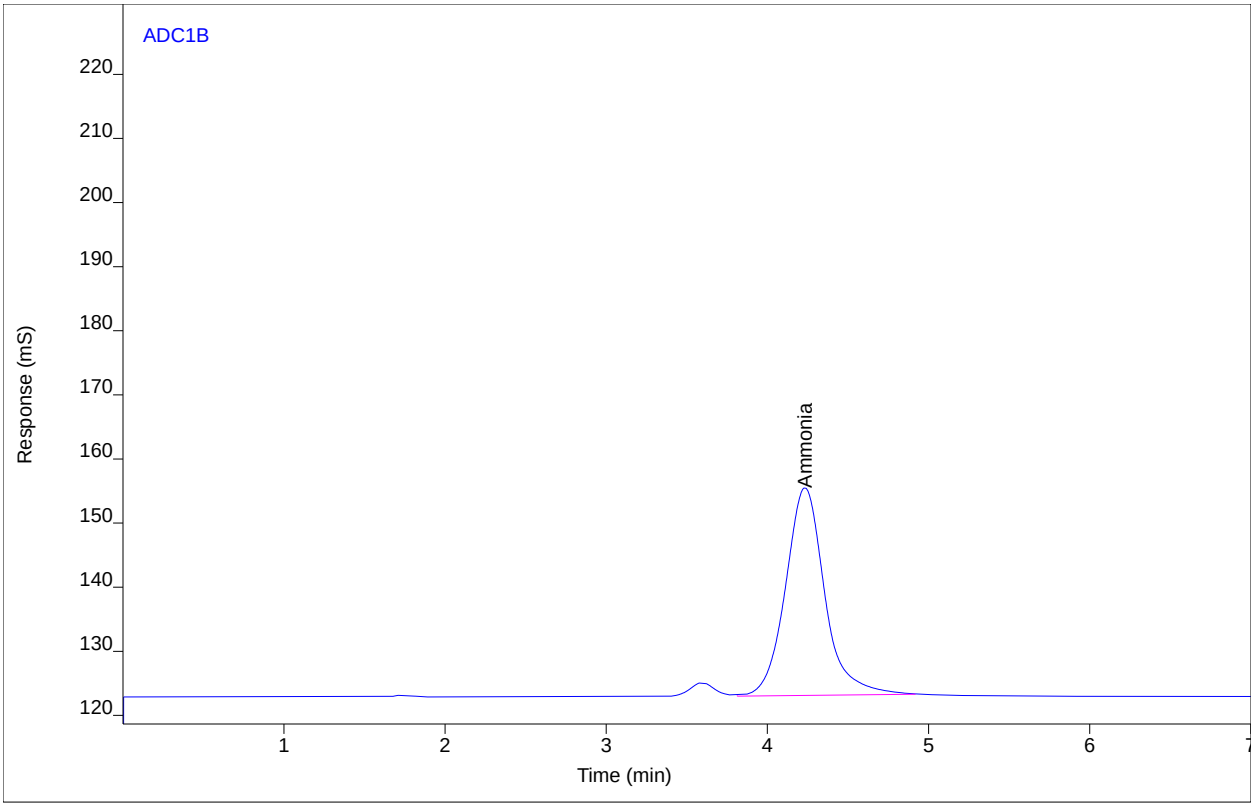
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	552.379	32.2091	2.92880	1	2.92880	µg/ml

Chromatogram Report

Sample Name	0317-144.MSD-R1.IMP 1
Sequence Name	Curly329 ver.4
Inj Data File	019-1902.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/30/2017 11:57 PM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Sample
Vial Number	19
Injection Volume	20
Injection	2 of 2
Acquisition Method	CATIONS.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



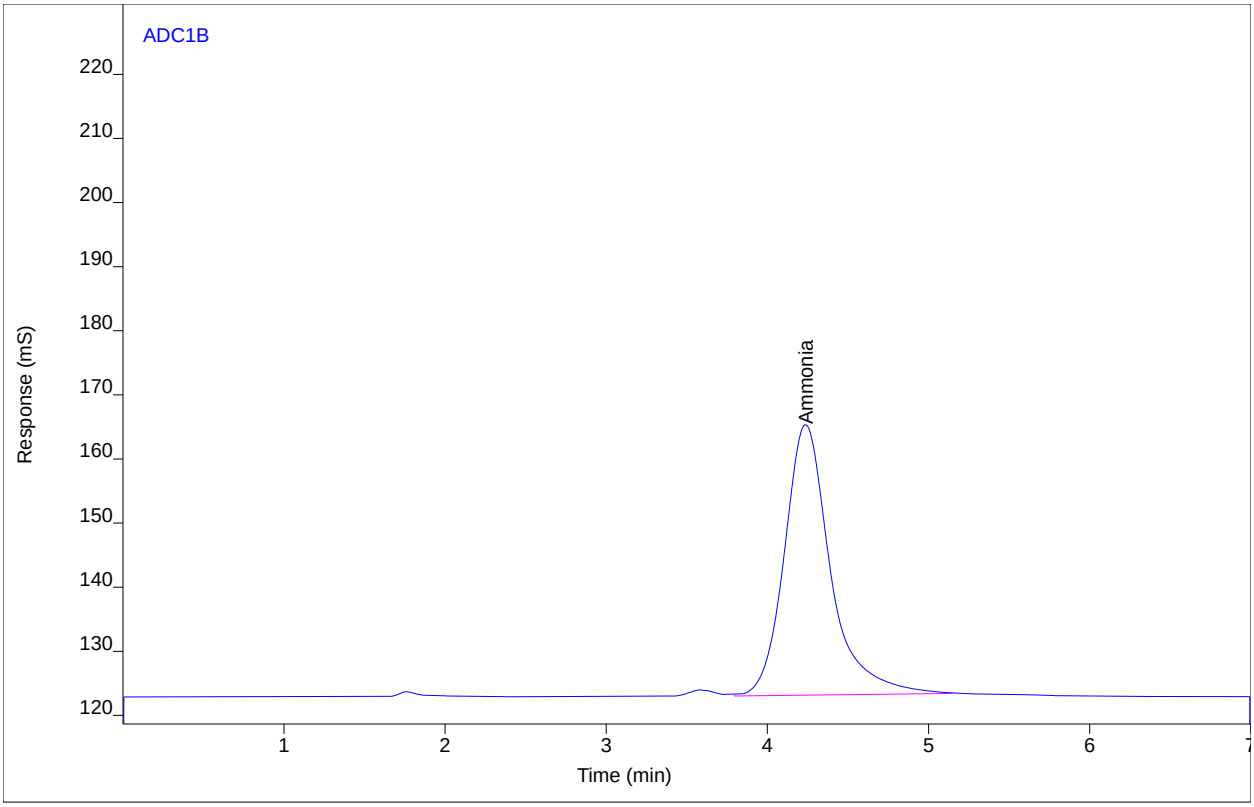
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.23	548.715	32.4144	2.90706	1	2.90706	µg/ml

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds415 #4
Sequence Name	Curly329 ver.4
Inj Data File	004-2001.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/31/2017 12:12 AM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	4
Injection Volume	35
Injection	1 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



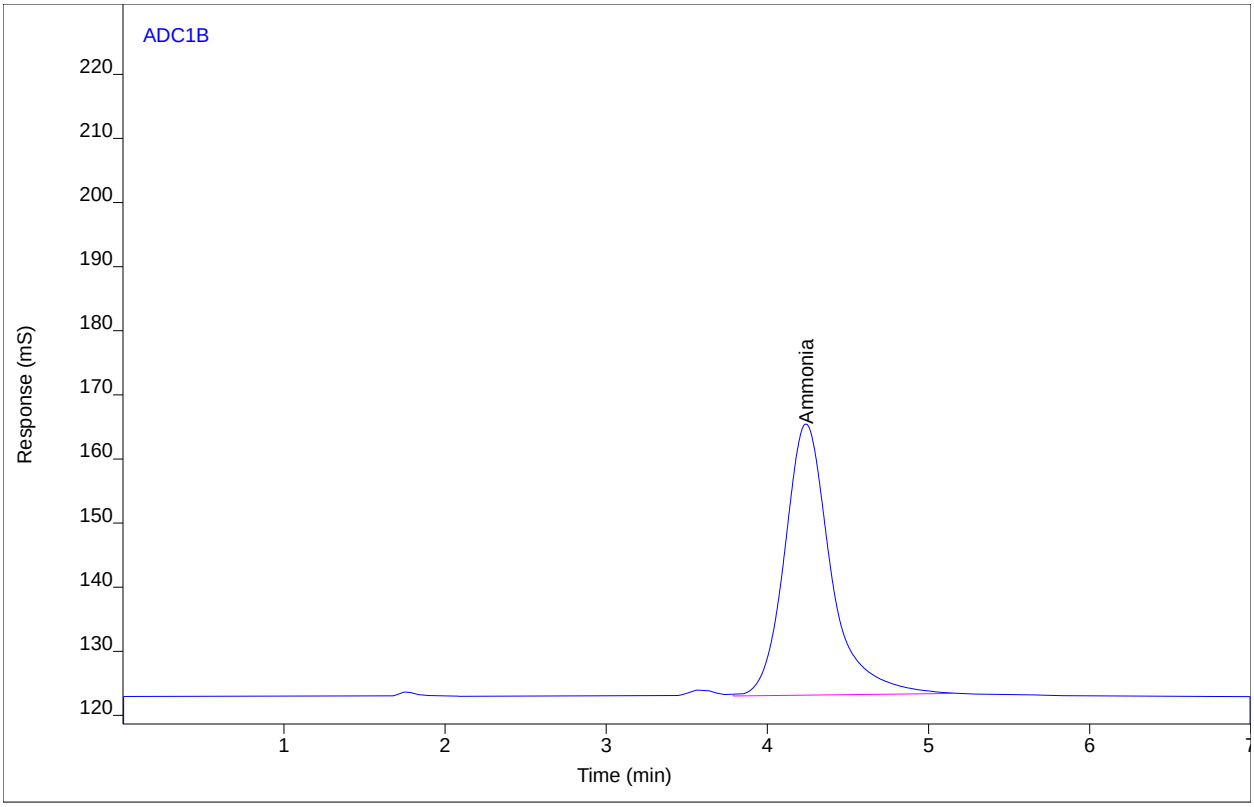
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	839.969	42.2315	4.74937	1	4.74937	µg/ml

Chromatogram Report

Sample Name	HPLCStds415 #4
Sequence Name	Curly329 ver.4
Inj Data File	004-2002.D
File Location	HPLC/2017/Curly/Quarter 1
Injection Date	3/31/2017 12:20 AM
File Modified	3/31/2017 9:08 AM
Instrument	Curly
Operator	Scott Wilson

Enthalpy Analytical

Sample Type	Calibration
Vial Number	4
Injection Volume	35
Injection	2 of 2
Acquisition Method	ENV_AMM_18MM.M
Analysis Method	Curly329.M
Method Modified	3/31/2017 9:02 AM
Printed	4/3/2017 4:21 PM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Ammonia	VB	4.24	843.510	42.3323	4.77339	1	4.77339	µg/ml

Calibration Table

General Calibration Setting

Calib. Data Modified : Friday, March 31, 2017 9:02:18 AM
Signals calculated separately : No

Rel. Reference Window : 5.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 10.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Quadratic
Origin : Connected
Weight : Linear (Amnt)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 B, ADC1, B

Overview Table

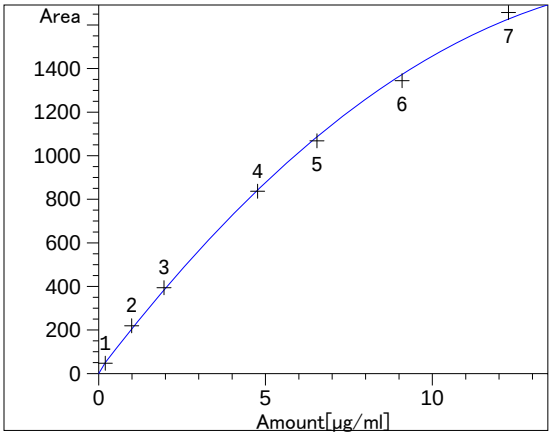
RT	Sig	Lvl	Amount [µg/ml]	Area	Rsp.Factor	Ref	ISTD	#	Compound
4.243	1	1	1.99600e-1	47.27915	4.22173e-3	No	No		Ammonia
		2	9.90100e-1	219.02037	4.52058e-3				
		3	1.96080	394.23798	4.97365e-3				
		4	4.76190	836.87598	5.69009e-3				
		5	6.54210	1068.06317	6.12520e-3				
		6	9.09090	1344.49536	6.76157e-3				
		7	12.28070	1657.36414	7.40978e-3				

Method C:\Chem32\1\Data\Curly329\Curly329.M

Peak Sum Table

No Entries in table

Calibration Curves



Ammonia at exp. RT: 4.243
ADC1 B, ADC1, B
Correlation: 0.99959
Residual Std. Dev.: 21.83544
Formula: $y = ax^2 + bx + c$
a: -5.71078
b: 201.81527
c: 10.28801
x: Amount[µg/ml]
y: Area

Calibration Level Weights:

Level 1	1
Level 2	0.201596
Level 3	0.101795
Level 4	0.041916
Level 5	0.03051
Level 6	0.021956
Level 7	0.016253

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

Method Information

Method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified: 2/22/2017 at 7:45:44 AM

Column: Dionex IonPac CS12 (250 mm x 4 mm)
Mobile Phase: 18mN Methanesulfonic Acid
Detection: Suppressed Conductivity
Flow Rate: 1.0 mL/min
Temp: 30C

Method Audit Trail

Operator : Kyle Hoffman
Date : 5/25/2016 9:35:55 AM
Change Info: This method was created at 5/25/2016 9:35:55 AM and based on method C:\HPLC\2014\Curly\Methods\ENV_AMM_18MM_DIUF_new.M

Operator : Kyle Hoffman
Date : 5/25/2016 9:35:56 AM
Change Info: Method saved. User comment: ""

Operator : Kyle Hoffman
Date : 5/27/2016 10:25:55 AM
Change Info: Method saved. User comment: ""

Operator : Kyle Hoffman
Date : 6/29/2016 6:47:51 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 8/11/2016 9:02:46 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 8/12/2016 9:01:05 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 8/16/2016 8:45:19 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 8/18/2016 8:05:08 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 8/18/2016 10:58:16 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 8/18/2016 1:54:18 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 9/15/2016 8:22:52 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 9/27/2016 4:56:41 PM
Change Info: Method saved. User comment: ""

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM
Operator : Scott Wilson
Date : 10/18/2016 1:43:58 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/19/2016 9:06:51 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/19/2016 12:29:13 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/19/2016 3:27:36 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/19/2016 3:56:24 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/20/2016 10:03:38 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/20/2016 12:59:06 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/20/2016 1:19:49 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 10/31/2016 4:22:59 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 11/1/2016 2:49:27 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 12/19/2016 11:31:44 AM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 2/1/2017 3:05:45 PM
Change Info: Method saved. User comment: "mobile phase switch"

Operator : Scott Wilson
Date : 2/1/2017 3:34:30 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 2/1/2017 4:27:13 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 2/16/2017 1:37:26 PM
Change Info: Method saved. User comment: ""

Operator : Scott Wilson
Date : 2/22/2017 7:45:44 AM
Change Info: Method saved. User comment: ""

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

Run Time Checklist

Pre-Run Cmd/Macro:	off
Data Acquisition:	on
Standard Data Analysis:	off
Customized Data Analysis:	off
Save GLP Data:	off
Post-Run Cmd/Macro:	off
Save Method with Data:	off

ANALOG DIGITAL CONVERTER

	Signal 1
Description:	ADC1, B
Source:	Signal
Unit:	mS
Units/Volt:	1000.000
Peakwidth (Data Rate):	0.053 Min (5.00 Hz)
Stop Time:	No Limit
Data Storage:	All

Start Signal Source: External Device Will Start 35900

Timed Event Table:
<no events>

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

```
   ================================================================
                    Agilent 1100/1200 Binary Pump 1
   ================================================================

   Control
       Column Flow            :      1.000 ml/min
       Stoptime               :          7.00 min
       Posttime               :      Off

   Solvents
       Solvent A              :        0.0 % ( )
       Solvent B              :      100.0 % (18 mN MethaneSulfonic Acid)

   PressureLimits
       Minimum Pressure       :        0 bar
       Maximum Pressure       :      400 bar


   Auxiliary
       Maximal Flow Ramp      :      100.00 ml/min^2
       Compressibility A      :       50*10^-6/bar
       Minimal Stroke A       :       50 µl
       Compressibility B      :      115*10^-6/bar
       Minimal Stroke B       :      Auto

   Store Parameters
       Store Ratio A          :      Yes
       Store Ratio B          :      Yes
       Store Flow             :      Yes
       Store Pressure         :      Yes

   Timetable is empty



   ================================================================
                      Agilent 1100 Autosampler 1
   ================================================================

   Injection
       Injection Mode         :    Standard
       Injector volume        :         35.00 µl
       Optimization           :        Prefetch Sample Vial
                                       5.00 min. after Injection

   Auxiliary
       Drawspeed              :          100 µl/min
       Ejectspeed             :          100 µl/min
       Draw position          :          0.0 mm

   Time
       Stoptime               :         14.0 min
       Posttime               :      Off



   The Data Analysis Parameters of the used Method are :

   ================================================================
                             Integration Events
   ================================================================
```

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

Non signal specific Integration Events

Event	Value
Tangent Skim Mode	Standard
Tail Peak Skim Height Ratio	0.000
Front Peak Skim Height Ratio	0.000
Skim Valley Ratio	0.000
Baseline Correction	Classical
Peak to Valley Ratio	0.000

Default Integration Event Table "Event"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_DAD"

Event	Value	Time
Initial Slope Sensitivity	5.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	5.000	Initial
Initial Height Reject	1.000	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_FLD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_VWD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

Detector Default Integration Event Table "Event_ECD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_MWD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_ADC"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.040	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	0.500	Initial
Initial Shoulders	OFF	Initial

Apply Method's Manual Integration Events: No

Specify Report

Calculate: External Standard
Based on: Peak Area
Do not use Multiplier & Dilution Factor with ISTDs

Use Sample Data from Data File
Report mode: Classic
Destination: File (Prefix: Report)
Destination File Types: .TXT
Quantitative Results sorted by: Signal
Report Style: Short
Sample info on each page: No
Add Chromatogram Output: Yes
Chromatogram Output: Portrait
Size in Time direction: 100 % of Page
Size in Response direction: 40 % of Page
Uncalibrated Peaks: Report with Calibrated Peaks

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

Signal Options

Include: Axes, Retention Times, Baselines, Tick Marks
Font: Arial, Size: 8

Ranges: Full
Multi Chromatograms: Separated, Each in full Scale

Calibration Table

General Calibration Setting

Calib. Data Modified : 3/9/2013 9:10:59 AM
Signals calculated separately : No

Rel. Reference Window : 5.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 5.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Quadratic
Origin : Connected
Weight : Linear (Amnt)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 A, Dionex ED40
Signal 2: PMP1, Pressure

Overview Table

method: C:\HPLC\2014\CURLY\METHODS\ENV_AMM_18MM.M
Modified on: 2/22/2017 at 7:45:44 AM

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD #	Compound
8.022	1	1	1.16500	34.33678	3.39286e-2	No	No	Ammonia
		2	4.49500	142.40279	3.15654e-2			
		3	15.73000	484.89142	3.24403e-2			
		4	20.36000	600.09448	3.39280e-2			
		5	31.47000	875.20233	3.59574e-2			
		6	38.87000	1033.55652	3.76080e-2			

Identification Details Table

RT	From	To	Sig	+-	Pk Usage	Compound
8.022	7.822	8.223	1	0.0000	Main	Ammonia

Peak Sum Table

No Entries in table

Component Details Table

RT	Sig	Grp	Lvl	Amount [ug/mL]	Low Limit	High Limit	Compound
8.022	1		1	1.16500	0.00000	0.00000	Ammonia
			2	4.49500			
			3	15.73000			
			4	20.36000			
			5	31.47000			
			6	38.87000			

Sample related custom fields

Custom Field	Type	Mand.	Default Value
None defined			

Compound related custom fields

Custom Field	Type	Mand.	Default Value
None defined			

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

Method Information

Method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified: 2/23/2017 at 2:16:23 PM

Column: Dionex IonPac CS12 (250 mm x 4 mm)
Mobile Phase: 18mN Methanesulfonic Acid
Detection: Suppressed Conductivity
Flow Rate: 1.0 mL/min
Temp: 30C

Method Audit Trail

Operator : Scott Wilson
Date : 2/23/2017 2:16:15 PM
Change Info: This method was created at 2/23/2017 2:16:15 PM and based on method C:\HPLC\2014\Curly\Methods\CATIONS.M, the original method was overwritten.

Operator : Scott Wilson
Date : 2/23/2017 2:16:23 PM
Change Info: Method saved. User comment: "mobile phase"

Run Time Checklist

Pre-Run Cmd/Macro: off

Data Acquisition: on

Standard Data Analysis: off

Customized Data Analysis: off

Save GLP Data: off

Post-Run Cmd/Macro: off

Save Method with Data: off

ANALOG DIGITAL CONVERTER

	Signal 1
Description:	ADC1, B
Source:	Signal
Unit:	mS
Units/Volt:	1000.000
Peakwidth (Data Rate):	0.053 Min (5.00 Hz)
Stop Time:	No Limit
Data Storage:	All

Start Signal Source: External Device Will Start 35900

Timed Event Table:
<no events>

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

Agilent 1100/1200 Binary Pump 1

Control

Column Flow	:	1.000 ml/min
Stoptime	:	14.00 min
Posttime	:	Off

Solvents

Solvent A	:	0.0 % (18 mN Methanesulfonic Acid)
Solvent B	:	100.0 % (18 mN Methanesulfonic Acid)

PressureLimits

Minimum Pressure	:	0 bar
Maximum Pressure	:	400 bar

Auxiliary

Maximal Flow Ramp	:	100.00 ml/min^2
Compressibility A	:	50*10^-6/bar
Minimal Stroke A	:	Auto
Compressibility B	:	115*10^-6/bar
Minimal Stroke B	:	Auto

Store Parameters

Store Ratio A	:	Yes
Store Ratio B	:	Yes
Store Flow	:	Yes
Store Pressure	:	Yes

Timetable is empty

Agilent 1100 Autosampler 1

Injection

Injection Mode	:	Needle Wash
Injector volume	:	20.00 µl
Wash Vial	:	100
Optimization	:	Prefetch Sample Vial 5.00 min. after Injection

Auxiliary

Drawspeed	:	100 µl/min
Ejectspeed	:	100 µl/min
Draw position	:	0.0 mm

Time

Stoptime	:	No Limit
Posttime	:	Off

The Data Analysis Parameters of the used Method are :

Integration Events

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

Non signal specific Integration Events

Event	Value
Tangent Skim Mode	Standard
Tail Peak Skim Height Ratio	0.000
Front Peak Skim Height Ratio	0.000
Skim Valley Ratio	0.000
Baseline Correction	Classical
Peak to Valley Ratio	0.000

Default Integration Event Table "Event"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_DAD"

Event	Value	Time
Initial Slope Sensitivity	5.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	5.000	Initial
Initial Height Reject	1.000	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_FLD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_VWD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

Detector Default Integration Event Table "Event_ECD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_MWD"

Event	Value	Time
Initial Slope Sensitivity	1.000	Initial
Initial Peak Width	0.020	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	1.700	Initial
Initial Shoulders	OFF	Initial

Detector Default Integration Event Table "Event_ADC"

Event	Value	Time
Initial Slope Sensitivity	0.300	Initial
Initial Peak Width	0.100	Initial
Initial Area Reject	1.000	Initial
Initial Height Reject	0.300	Initial
Initial Shoulders	OFF	Initial

Apply Method's Manual Integration Events: No

Specify Report

Calculate: External Standard
Based on: Peak Area
Do not use Multiplier & Dilution Factor with ISTDs

Use Sample Data from Data File
Report mode: Classic
Destination: File (Prefix: Report)
Destination File Types: .TXT
Quantitative Results sorted by: Signal
Report Style: Short
Sample info on each page: No
Add Chromatogram Output: Yes
Chromatogram Output: Portrait
Size in Time direction: 100 % of Page
Size in Response direction: 40 % of Page
Uncalibrated Peaks: Report with Calibrated Peaks

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

Signal Options

Include: Axes, Retention Times, Baselines, Tick Marks
Font: Arial, Size: 8

Ranges: Full
Multi Chromatograms: Separated, Each in full Scale

Calibration Table

General Calibration Setting

Calib. Data Modified : 3/9/2013 1:39:57 PM
Signals calculated separately : No

Rel. Reference Window : 5.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 5.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Quadratic
Origin : Connected
Weight : Linear (Amnt)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 A, Dionex ED40

Overview Table

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD #	Compound
5.270	1	1	2.35000e-1	45.04745	5.21672e-3	No	No	Ammonia
		2	4.70000e-1	81.56224	5.76247e-3			
		3	1.85100	310.89604	5.95376e-3			
		4	4.49500	678.07352	6.62907e-3			
		5	6.58600	922.60376	7.13849e-3			
		6	8.58200	1151.75916	7.45121e-3			
		7	12.31000	1512.94824	8.13643e-3			

Identification Details Table

RT	From	To	Sig	+-	Pk Usage	Compound
5.270	5.139	5.402	1	0.0000	Main	Ammonia

Peak Sum Table

No Entries in table

Component Details Table

RT	Sig	Grp	Lvl	Amount [ug/mL]	Low Limit	High Limit	Compound
5.270	1		1	2.35000e-1	0.00000	0.00000	Ammonia
			2	4.70000e-1			
			3	1.85100			
			4	4.49500			
			5	6.58600			
			6	8.58200			
			7	12.31000			

Sample related custom fields

Custom Field	Type	Mand.	Default Value
None defined			

Compound related custom fields

method: C:\HPLC\2014\CURLY\METHODS\CATIONS.M
Modified on: 2/23/2017 at 2:16:23 PM

Custom Field	Type	Mand.	Default Value

None defined

NCASI Method 8A (HPLC) Sulfuric Acid Mist Raw Data

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 3. NCASI Method 8A (HPLC/ IC)

Client No.: 11542

Sulfate -- Calibration Standards, Laboratory Blanks and Controls

Sample ID	Sequence	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Flag	Standard Tag	%Tag
HPLCStds422 #1	Gonzo228.v2	001-0201.D	001-0202.D	Gonzo230.M	8.95	8.94	0.1	0.542	0.546	0.4	0.544		0.495	110
HPLCStds422 #2	Gonzo228.v2	002-0301.D	002-0302.D	Gonzo230.M	8.96	8.97	0.0	1.00	1.03	1.3	1.01		1.00	101
HPLCStds422 #3	Gonzo228.v2	003-0401.D	003-0402.D	Gonzo230.M	8.94	8.94	0.0	4.65	4.73	0.9	4.69		5.00	93.8
HPLCStds422 #4	Gonzo228.v2	004-0501.D	004-0502.D	Gonzo230.M	8.95	8.96	0.0	9.62	9.62	0.0	9.62		10.0	96.2
HPLCStds422 #5	Gonzo228.v2	005-0601.D	005-0602.D	Gonzo230.M	8.95	8.95	0.0	14.5	14.5	0.0	14.5		15.0	97.0
HPLCStds422 #6	Gonzo228.v2	006-0701.D	006-0702.D	Gonzo230.M	8.96	8.96	0.0	24.8	24.8	0.0	24.8		25.0	99.2
HPLCStds422 #7	Gonzo228.v2	007-0801.D	007-0802.D	Gonzo230.M	8.96	8.95	0.0	51.3	51.2	0.1	51.3		50.0	103
HPLCStds422 #SS	Gonzo228.v2	008-0901.D	008-0902.D	Gonzo230.M	8.97	8.96	0.0	5.78	5.73	0.4	5.75		5.88	97.8
HPLCStds422 #RB	Gonzo228.v2	009-1001.D	009-1002.D	Gonzo230.M	NA	NA	NA	0.0554	0.0554	0.0	0.0554	ND	NA	NA
HPLCStds422 #5	Gonzo228b.v6	005-0201.D	005-0202.D	Gonzo230.M	8.57	8.25	1.9	14.5	14.5	0.2	14.5		15.0	96.7
HPLCStds422 #SS	Gonzo228b.v6	008-0301.D	008-0302.D	Gonzo230.M	8.23	8.20	0.2	5.56	6.09	4.5	5.82		5.88	99.0
HPLCStds422 #RB	Gonzo228b.v6	009-0401.D	009-0402.D	Gonzo230.M	NA	NA	NA	0.0554	0.0554	0.0	0.0554	ND	NA	NA
HPLCStds422 #5	Gonzo228b.v6	005-1501.D	005-1502.D	Gonzo230.M	8.34	8.26	0.5	14.5	14.4	0.3	14.5		15.0	96.4
HPLCStds422 #1	Gonzo234.v3	001-0201.D	001-0202.D	Gonzo234.M	8.24	8.24	0.0	0.585	0.538	4.2	0.562		0.495	113
HPLCStds422 #2	Gonzo234.v3	002-0301.D	002-0302.D	Gonzo234.M	8.21	8.22	0.1	0.983	1.01	1.3	0.996		1.00	99.6

Enthalpy Analytical

Company: C.E.M. Solutions, Inc.

Job No.: 0317-144 - 3. NCASI Method 8A (HPLC/ IC)

Client No.: 11542

Sulfate -- Calibration Standards, Laboratory Blanks and Controls

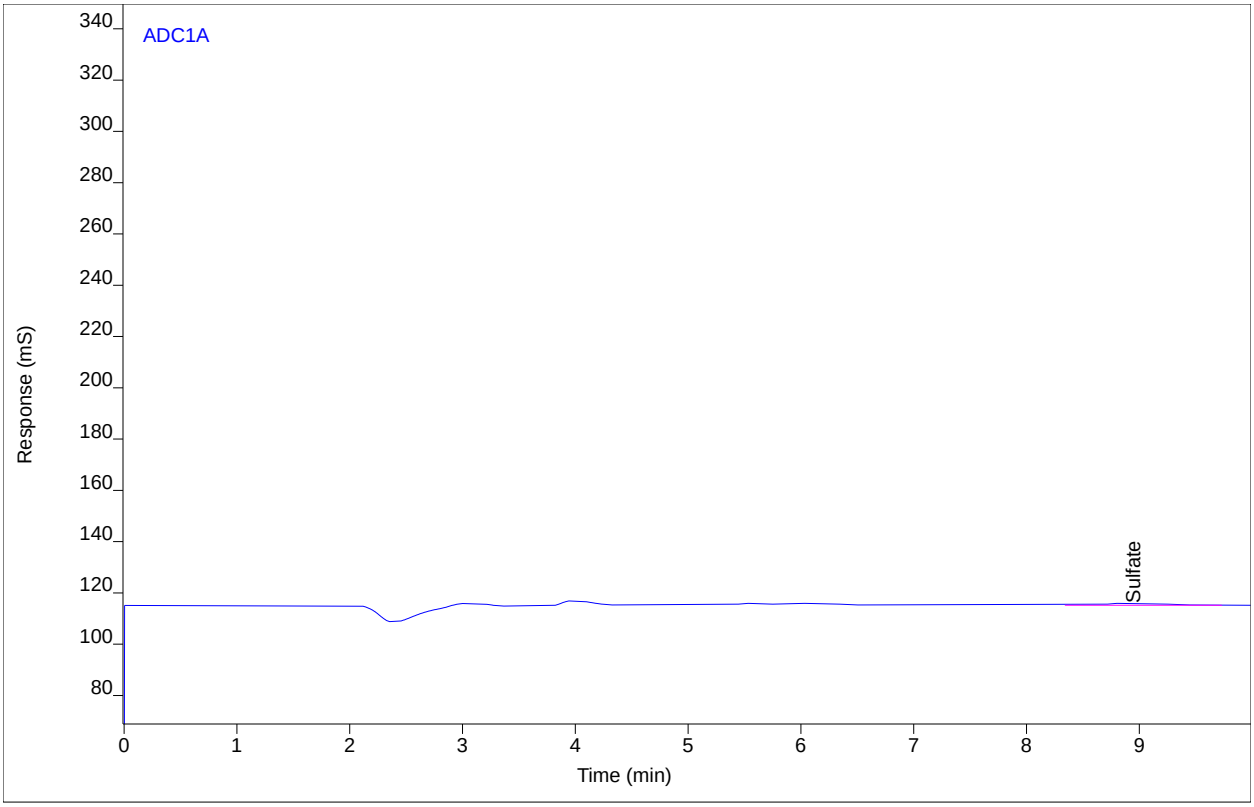
Sample ID	Sequence	Filename #1	Filename #2	Analysis Method	Ret Time (min)	Ret Time (min)	%diff RT	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	%diff conc	Avg Conc (ug/mL)	Flag	Standard Tag	%Tag
HPLCStds422 #3	Gonzo234.v3	003-0401.D	003-0402.D	Gonzo234.M	8.24	8.23	0.1	4.59	4.60	0.1	4.59		5.00	91.8
HPLCStds422 #4	Gonzo234.v3	004-0501.D	004-0502.D	Gonzo234.M	8.22	8.23	0.0	9.40	9.42	0.1	9.41		10.0	94.1
HPLCStds422 #5	Gonzo234.v3	005-0601.D	005-0602.D	Gonzo234.M	8.23	8.23	0.0	14.9	14.9	0.1	14.9		15.0	99.4
HPLCStds422 #6	Gonzo234.v3	006-0701.D	006-0702.D	Gonzo234.M	8.23	8.23	0.0	24.7	24.8	0.0	24.7		25.0	99.0
HPLCStds422 #7	Gonzo234.v3	007-0801.D	007-0802.D	Gonzo234.M	8.23	8.23	0.0	51.4	51.2	0.2	51.3		50.0	103
HPLCStds422 #SS	Gonzo234.v3	008-0901.D	008-0902.D	Gonzo234.M	8.24	8.23	0.1	5.73	5.70	0.2	5.71		5.88	97.1
HPLCStds422 #RB	Gonzo234.v3	009-1001.D	009-1002.D	Gonzo234.M	NA	NA	NA	0.0554	0.0554	0.0	0.0554	ND	NA	NA
HPLCStds422 #5	Gonzo234.v3	005-2201.D	005-2202.D	Gonzo234.M	8.25	8.24	0.0	15.0	15.0	0.0	15.0		15.0	100
HPLCStds422 #2	Gonzo235 2.v11	002-0301.D	002-0302.D	Gonzo235.M	7.32	7.33	0.0	1.11	1.09	1.0	1.10		1.00	110
HPLCStds422 #3	Gonzo235 2.v11	003-0401.D	003-0402.D	Gonzo235.M	7.32	7.31	0.0	4.84	4.79	0.5	4.81		5.00	96.3
HPLCStds422 #4	Gonzo235 2.v11	004-0501.D	004-0502.D	Gonzo235.M	7.31	7.31	0.0	9.62	9.65	0.1	9.63		10.0	96.3
HPLCStds422 #6	Gonzo235 2.v11	006-0701.D	006-0702.D	Gonzo235.M	7.28	7.28	0.0	24.8	24.9	0.1	24.9		25.0	99.5
HPLCStds422 #SS	Gonzo235 2.v11	008-0801.D	008-0802.D	Gonzo235.M	7.29	7.28	0.0	5.75	5.65	0.9	5.70		5.88	96.9
HPLCStds422 #RB	Gonzo235 2.v11	009-0901.D	009-0902.D	Gonzo235.M	NA	NA	NA	0.0554	0.0554	0.0	0.0554	ND	NA	NA
HPLCStds422 #4	Gonzo235b.v5	004-0101.D	004-0102.D	Gonzo235.M	7.32	7.30	0.1	9.60	9.61	0.0	9.61		10.0	96.1
HPLCStds422 #5	Gonzo235c.v3	005-0101.D	005-0102.D	Gonzo235.M	7.39	7.38	0.1	14.4	14.4	0.0	14.4		15.0	95.7
HPLCStds422 #7	Gonzo235d.v3	007-0101.D	007-0102.D	Gonzo235.M	7.35	7.37	0.1	51.3	51.1	0.2	51.2		50.0	102

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #1
Sequence Name	Gonzo228 ver.2
Inj Data File	001-0201.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 5:14 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	1
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.95	33.5385	1.06362	0.54179	1	0.54179	ug/mL

Analyst Peak Integration Comments

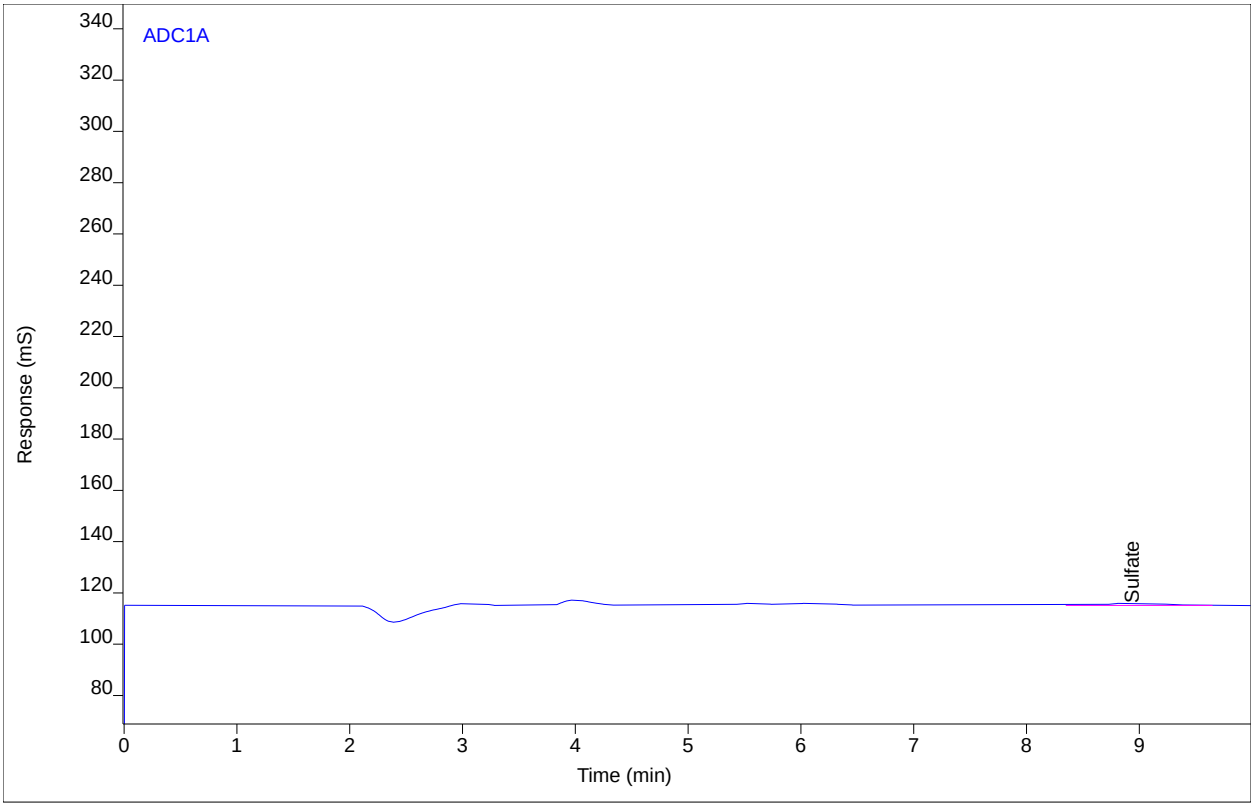
15:21:05 04/06/17 Amelia Paolantonio NI AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #1
Sequence Name	Gonzo228 ver.2
Inj Data File	001-0202.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 5:26 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	1
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.94	33.7825	1.11554	0.54568	1	0.54568	ug/mL

Analyst Peak Integration Comments

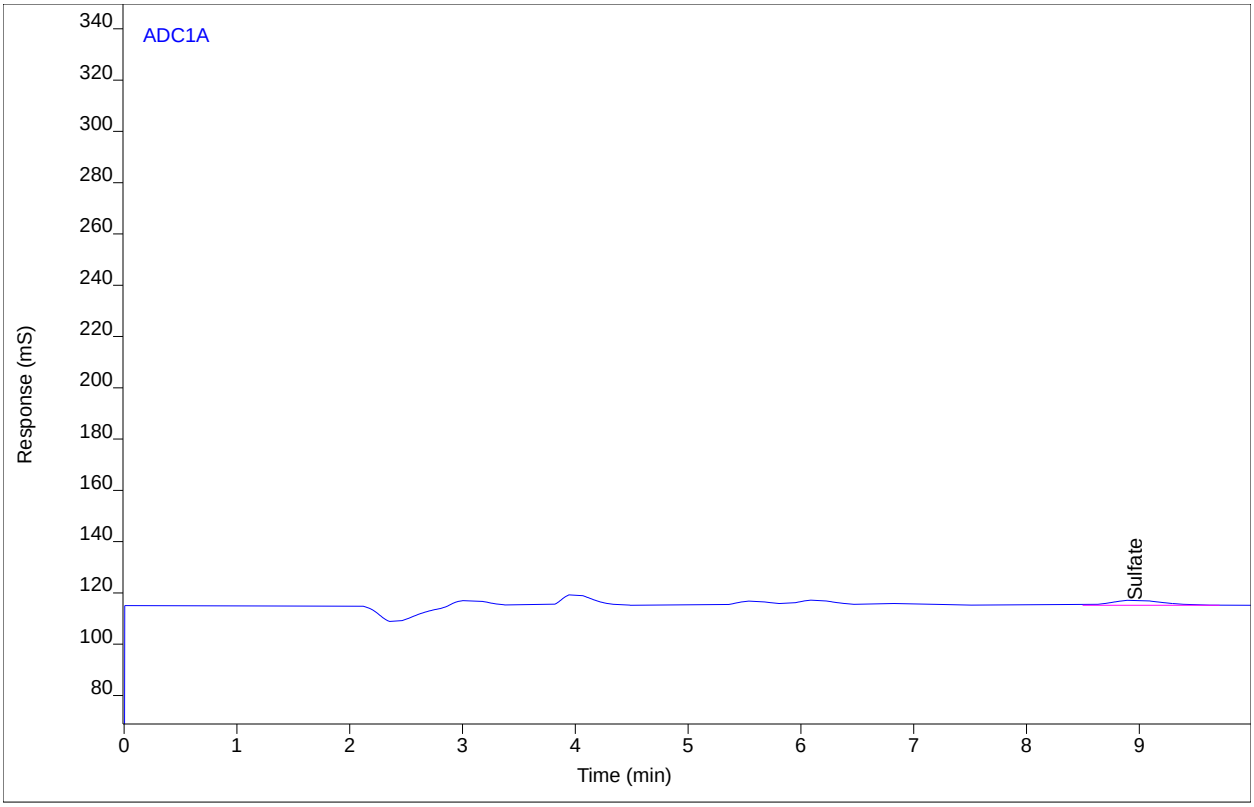
15:21:20 04/06/17 Amelia Paolantonio NI AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #2
Sequence Name	Gonzo228 ver.2
Inj Data File	002-0301.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 5:37 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	2
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.96	62.3570	2.05468	1.00067	1	1.00067	ug/mL

Analyst Peak Integration Comments

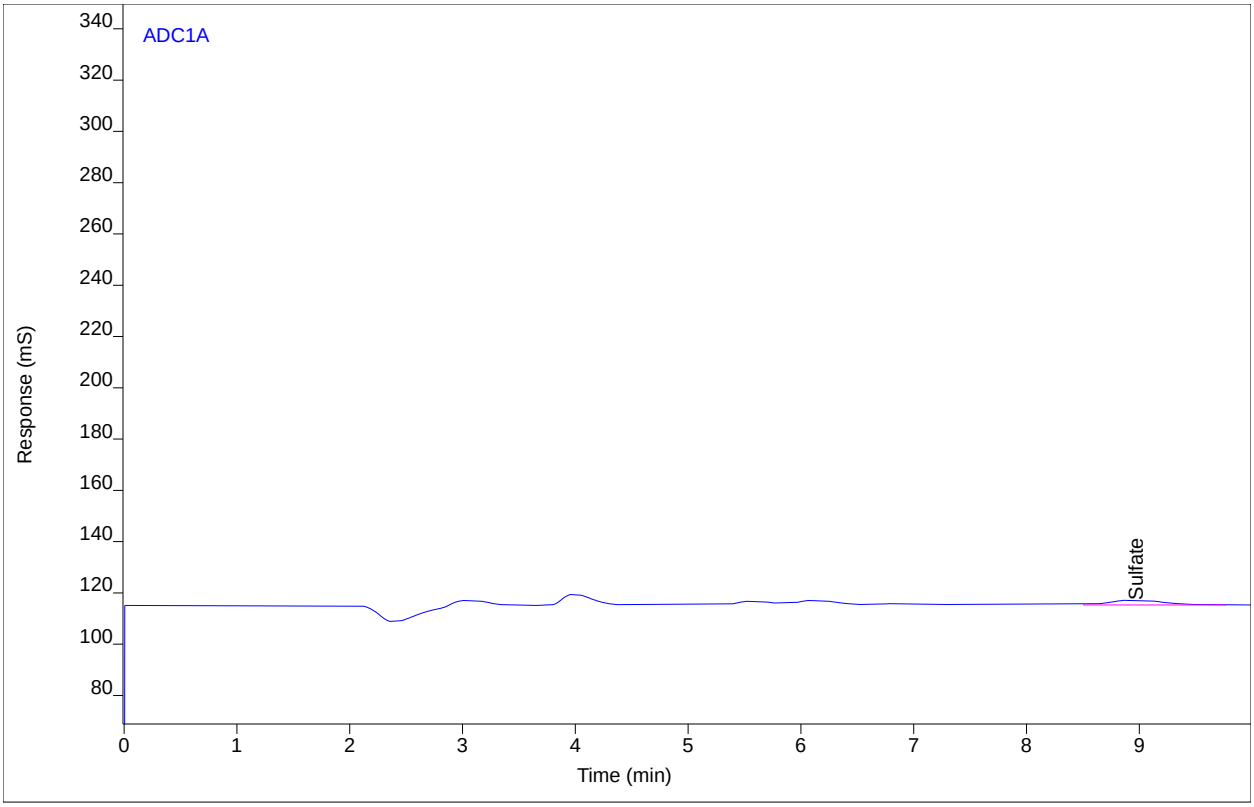
15:21:34 04/06/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #2
Sequence Name	Gonzo228 ver.2
Inj Data File	002-0302.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 5:49 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	2
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.97	64.0038	2.05334	1.02689	1	1.02689	ug/mL

Analyst Peak Integration Comments

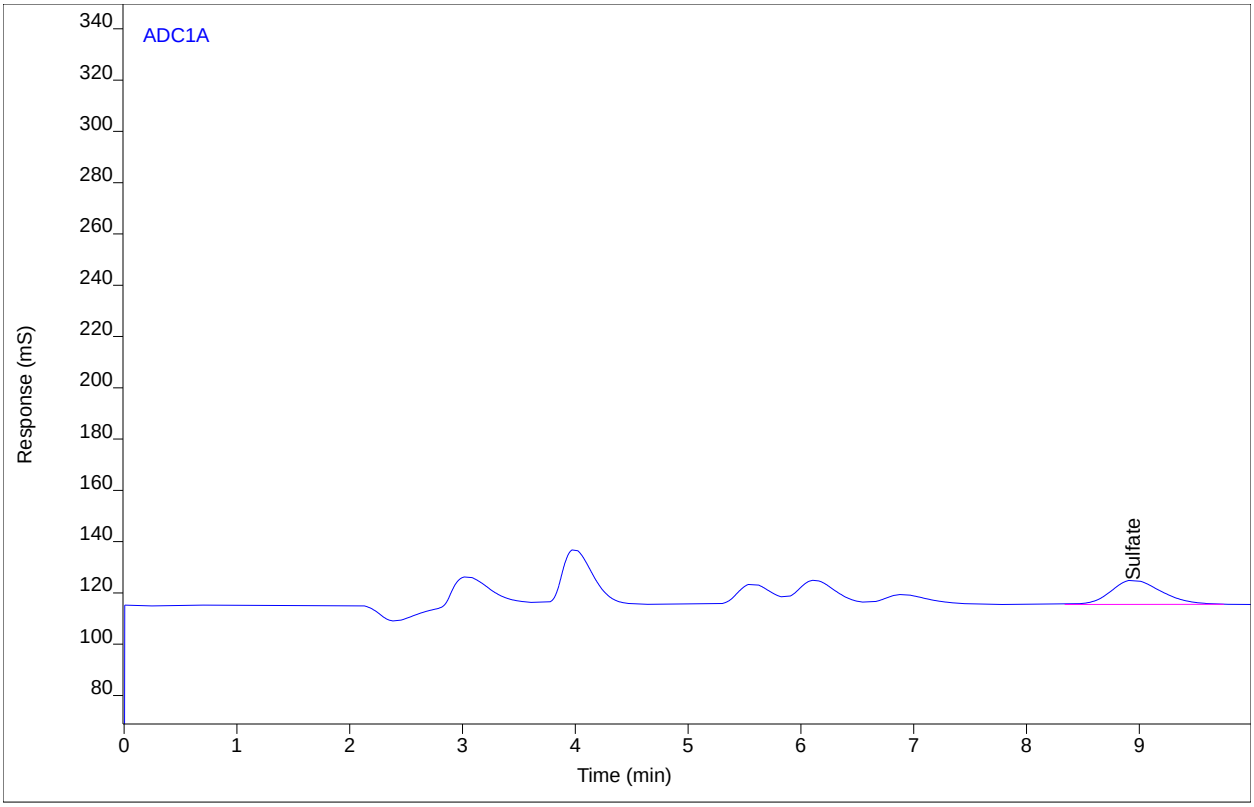
15:21:49 04/06/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #3
Sequence Name	Gonzo228 ver.2
Inj Data File	003-0401.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 6:01 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	3
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



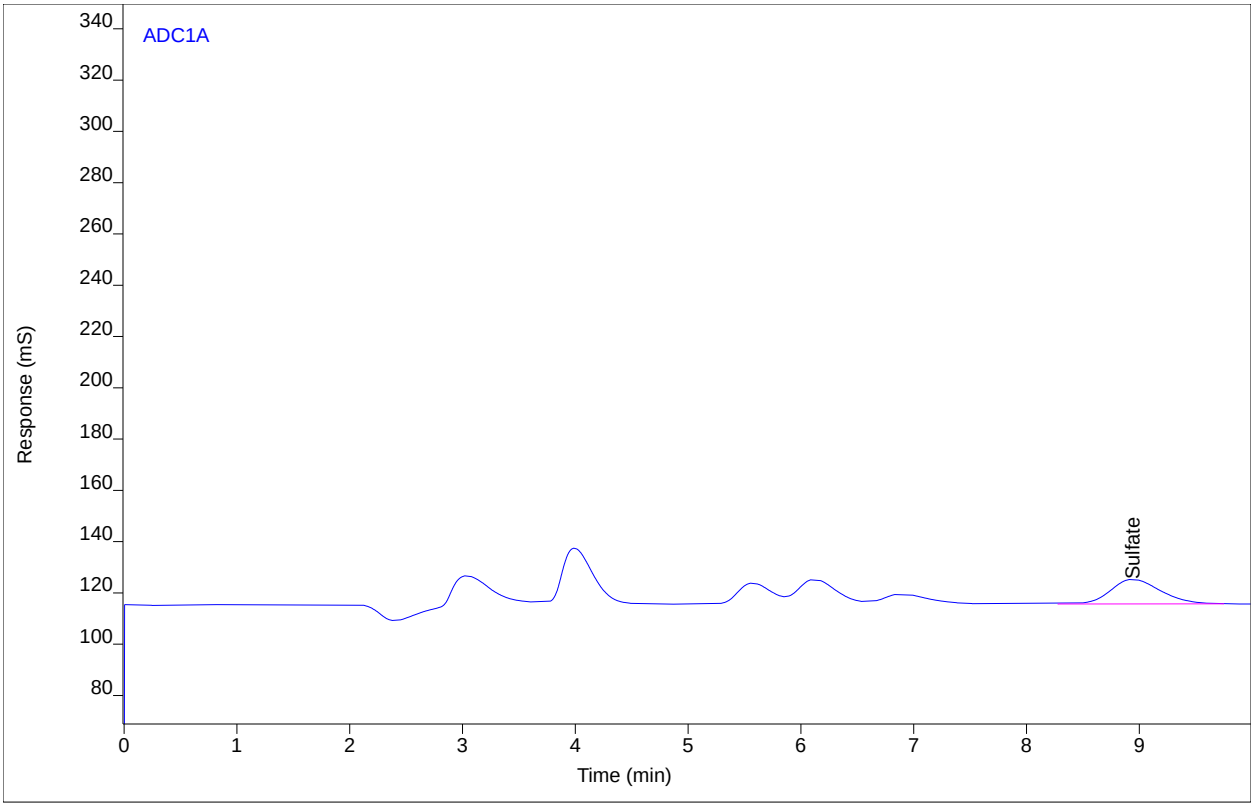
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.94	291.422	9.50079	4.64808	1	4.64808	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #3
Sequence Name	Gonzo228 ver.2
Inj Data File	003-0402.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 6:13 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	3
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



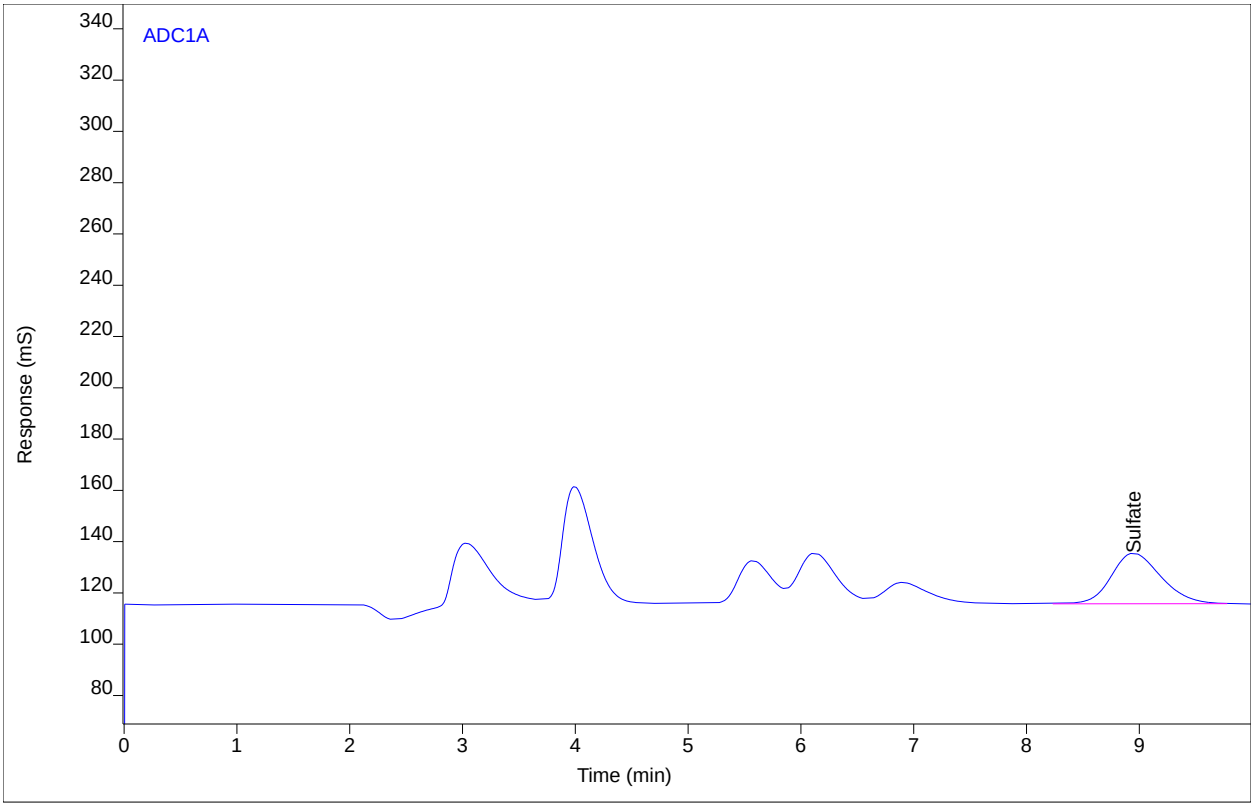
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.94	296.812	9.65276	4.73392	1	4.73392	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo228 ver.2
Inj Data File	004-0501.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 6:24 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



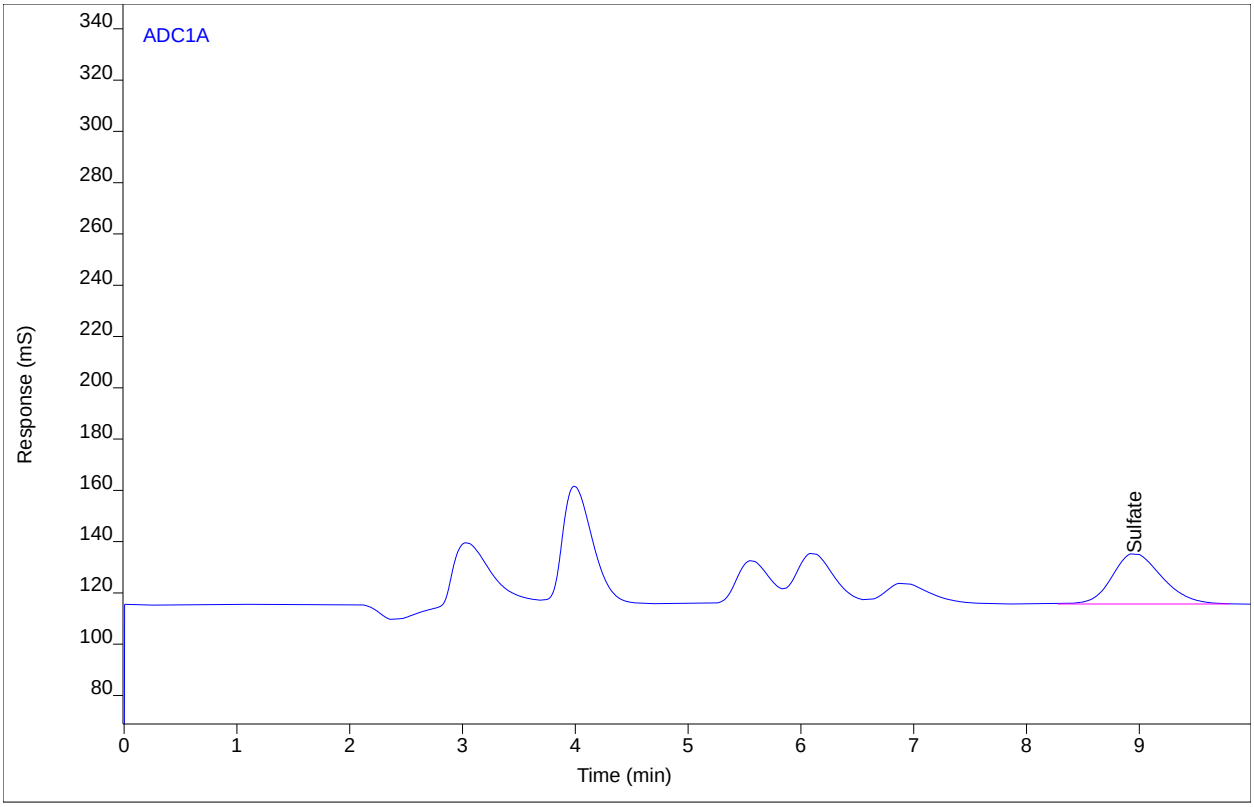
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.95	603.634	19.7565	9.61945	1	9.61945	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo228 ver.2
Inj Data File	004-0502.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 6:36 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



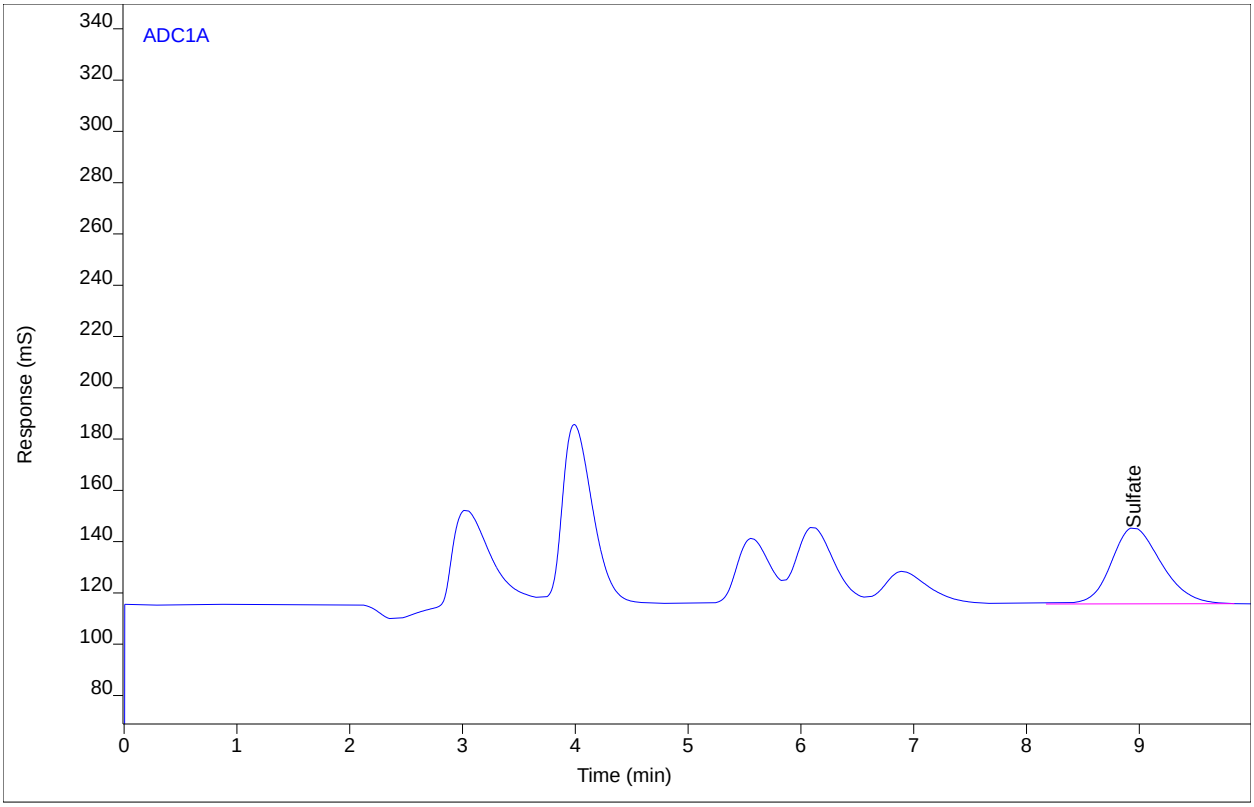
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.96	603.929	19.7893	9.62415	1	9.62415	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo228 ver.2
Inj Data File	005-0601.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 6:48 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



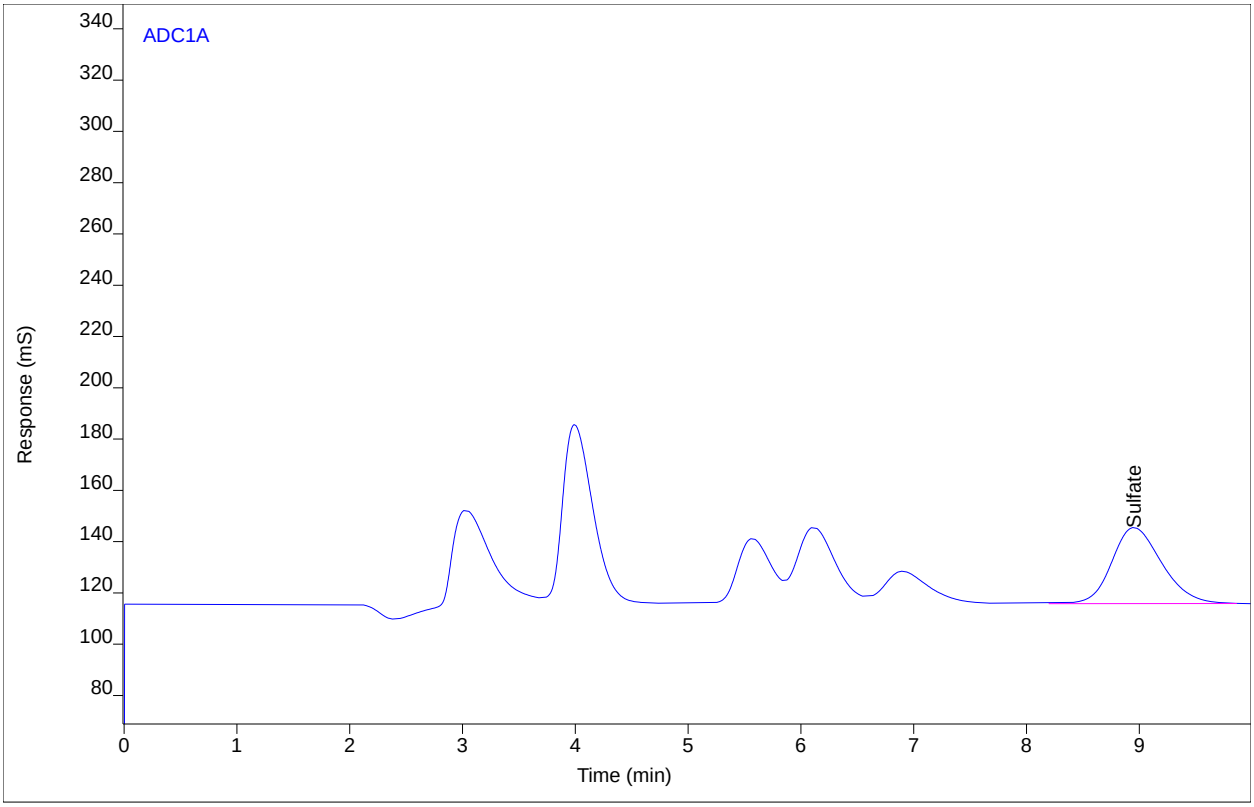
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.95	912.929	29.7774	14.5444	1	14.5444	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo228 ver.2
Inj Data File	005-0602.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 6:59 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



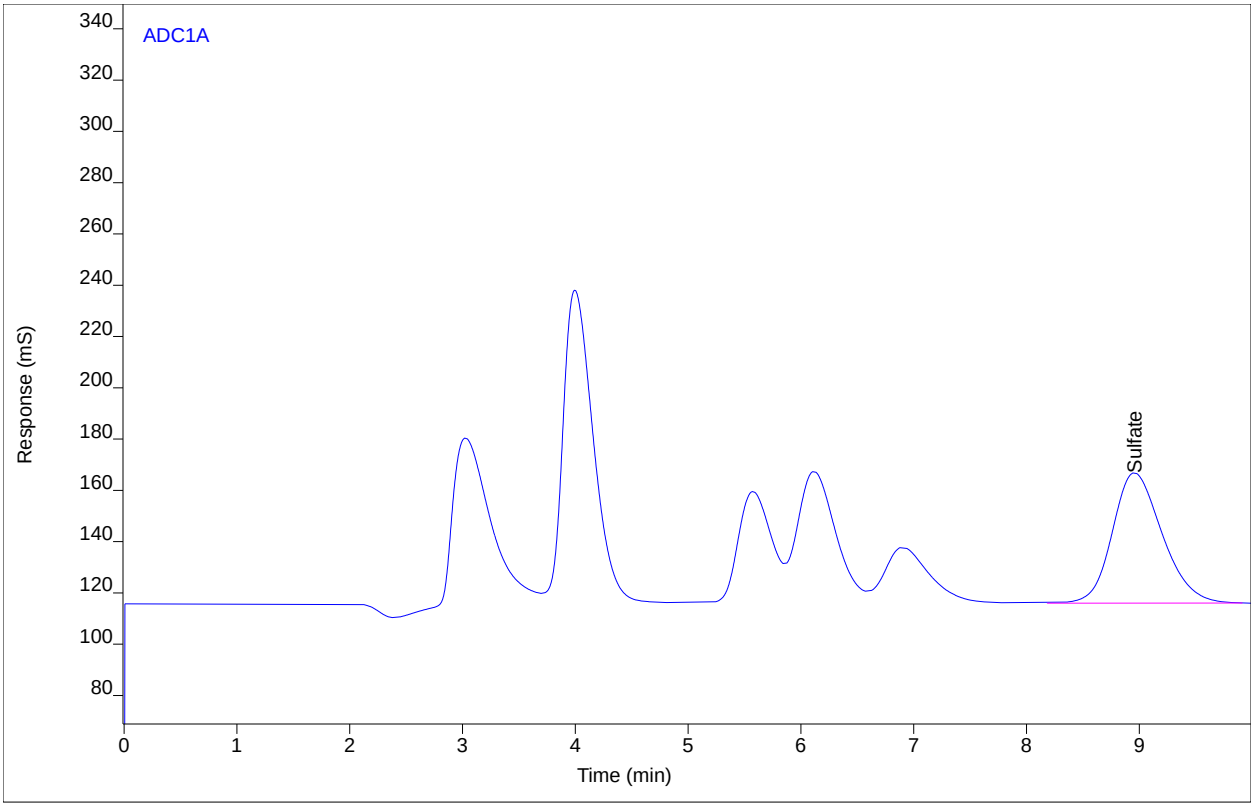
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.95	912.773	29.6764	14.5419	1	14.5419	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #6
Sequence Name	Gonzo228 ver.2
Inj Data File	006-0701.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 7:11 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	6
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



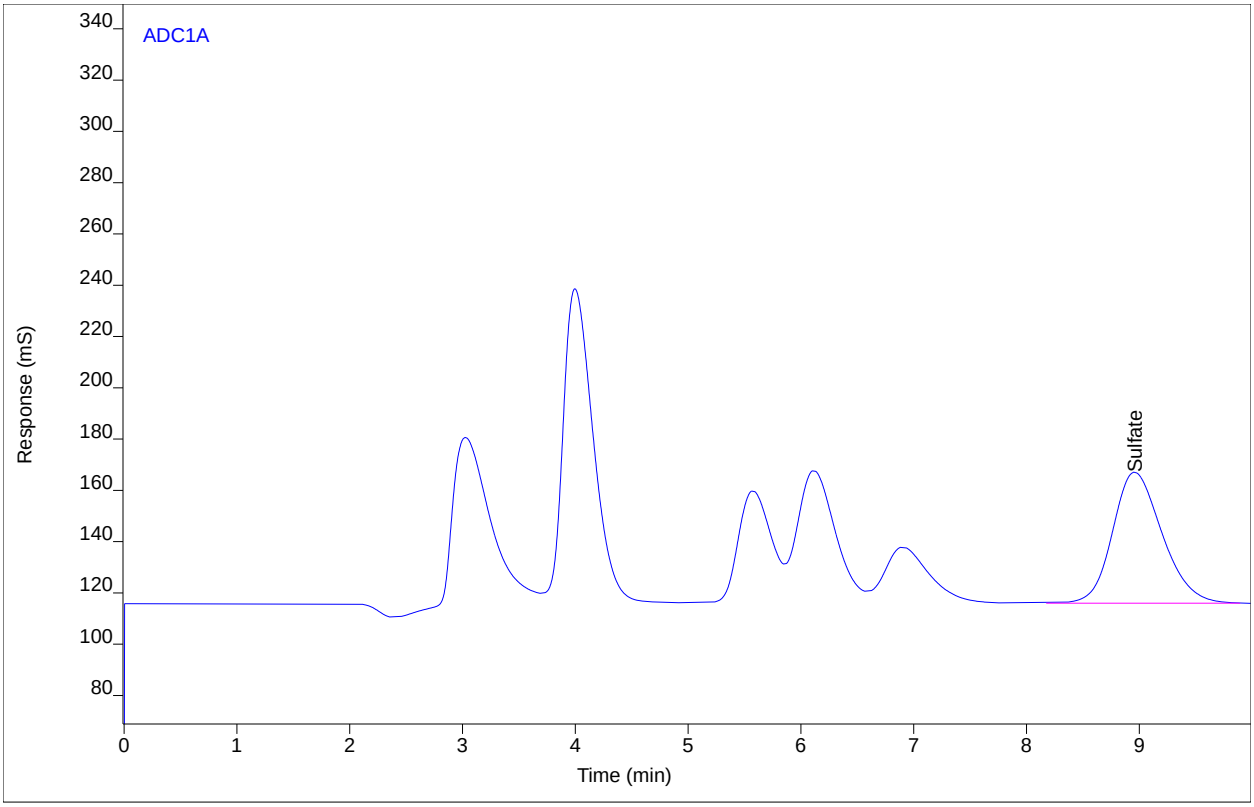
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.96	1557.53	50.8411	24.8084	1	24.8084	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #6
Sequence Name	Gonzo228 ver.2
Inj Data File	006-0702.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 7:23 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	6
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



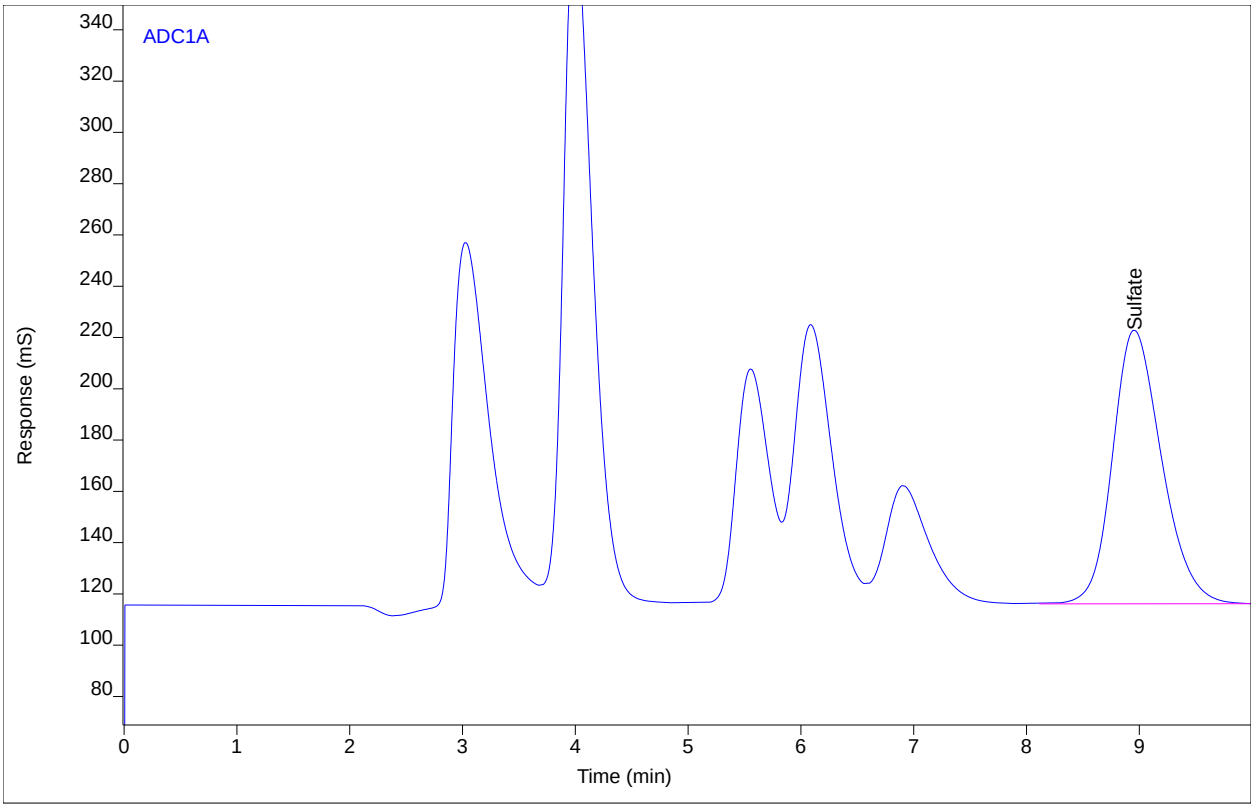
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.96	1557.78	51.1146	24.8123	1	24.8123	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #7
Sequence Name	Gonzo228 ver.2
Inj Data File	007-0801.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 7:35 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	7
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



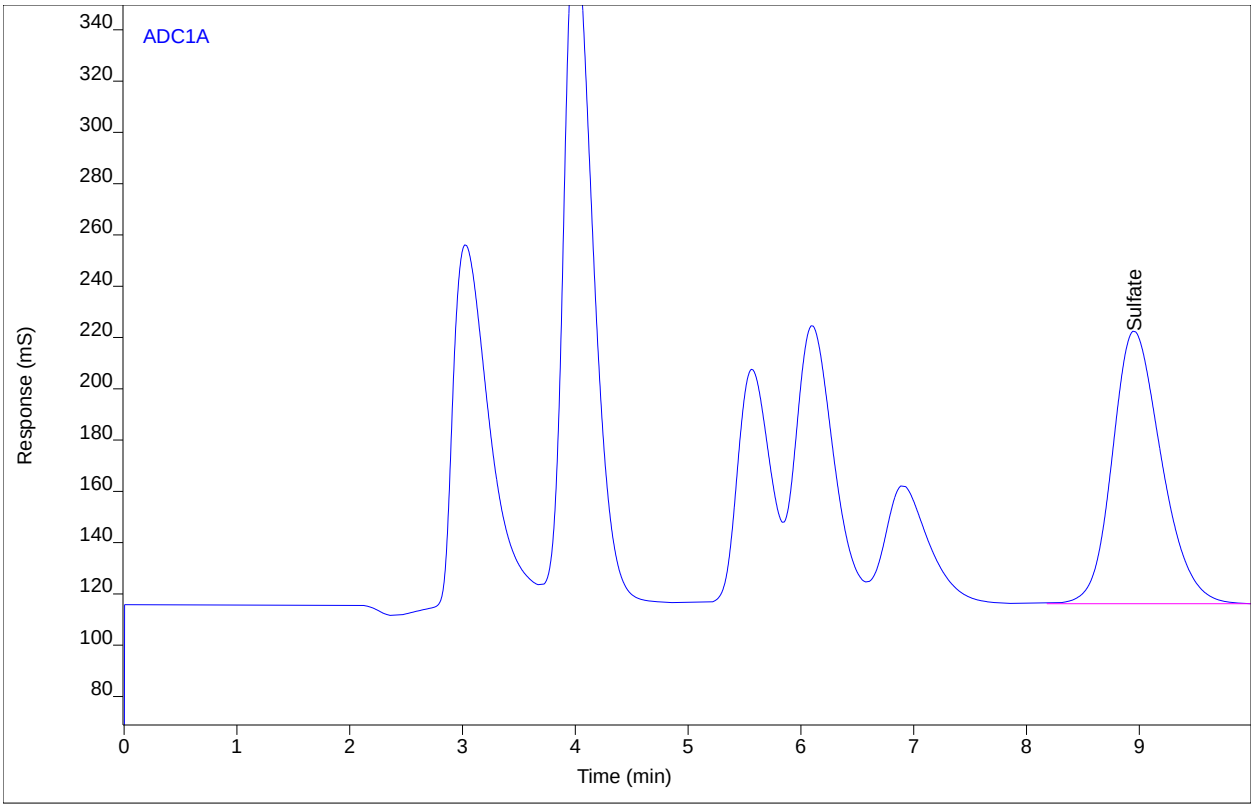
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.96	3221.33	106.727	51.3011	1	51.3011	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #7
Sequence Name	Gonzo228 ver.2
Inj Data File	007-0802.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 7:47 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	7
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



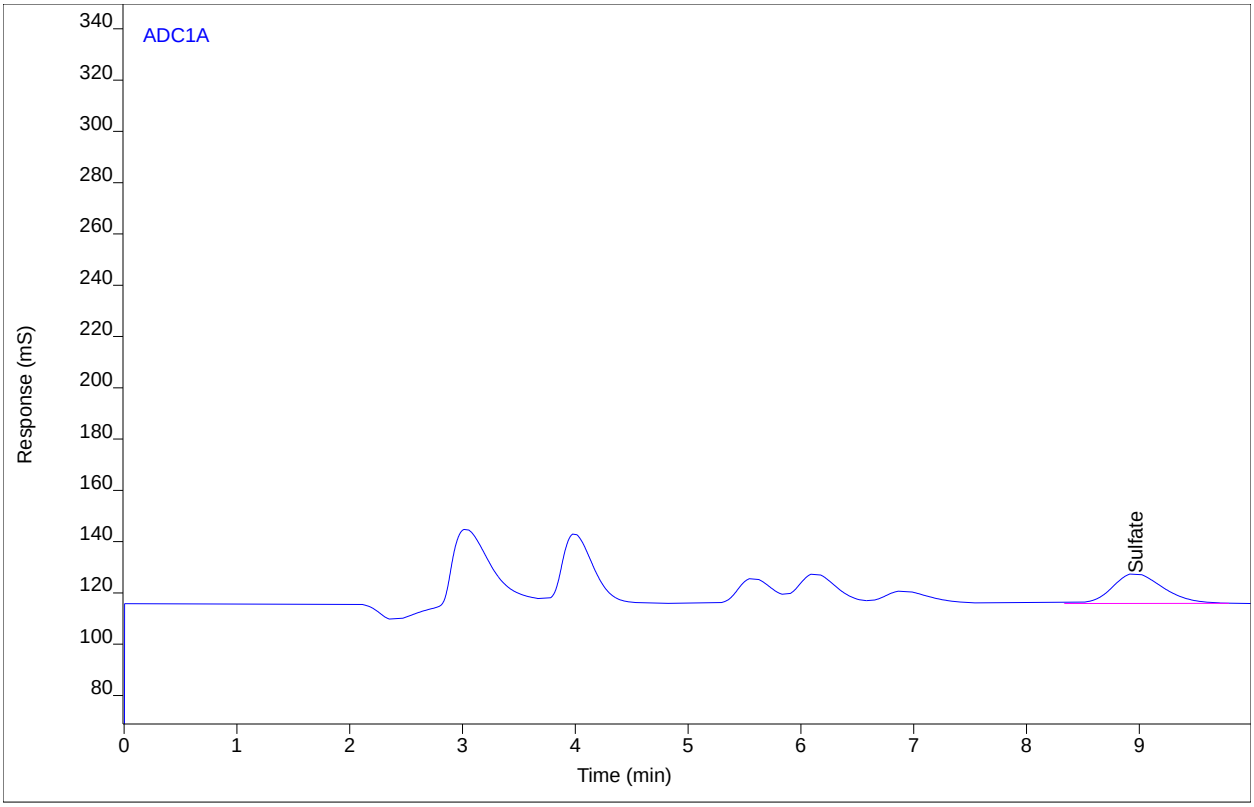
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.95	3217.57	106.344	51.2412	1	51.2412	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo228 ver.2
Inj Data File	008-0901.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 7:58 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



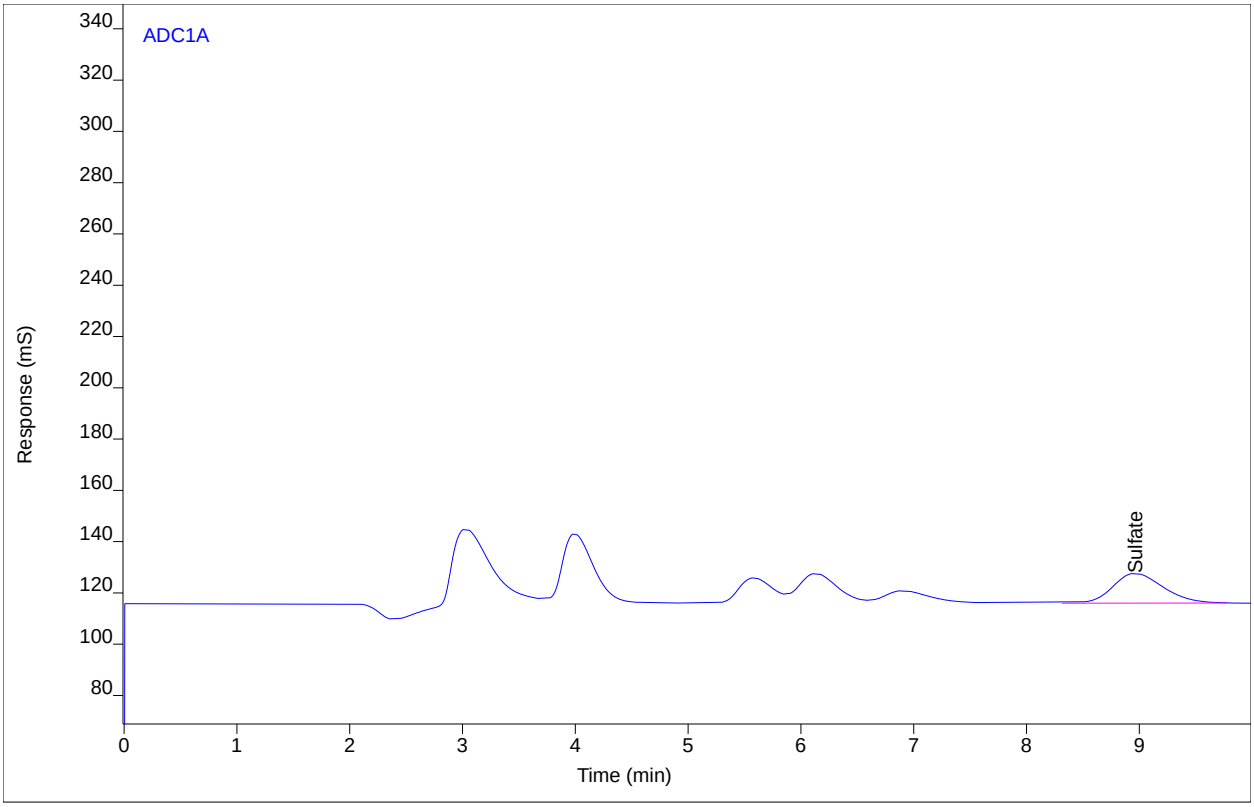
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.97	362.391	11.7341	5.77813	1	5.77813	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo228 ver.2
Inj Data File	008-0902.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 8:10 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



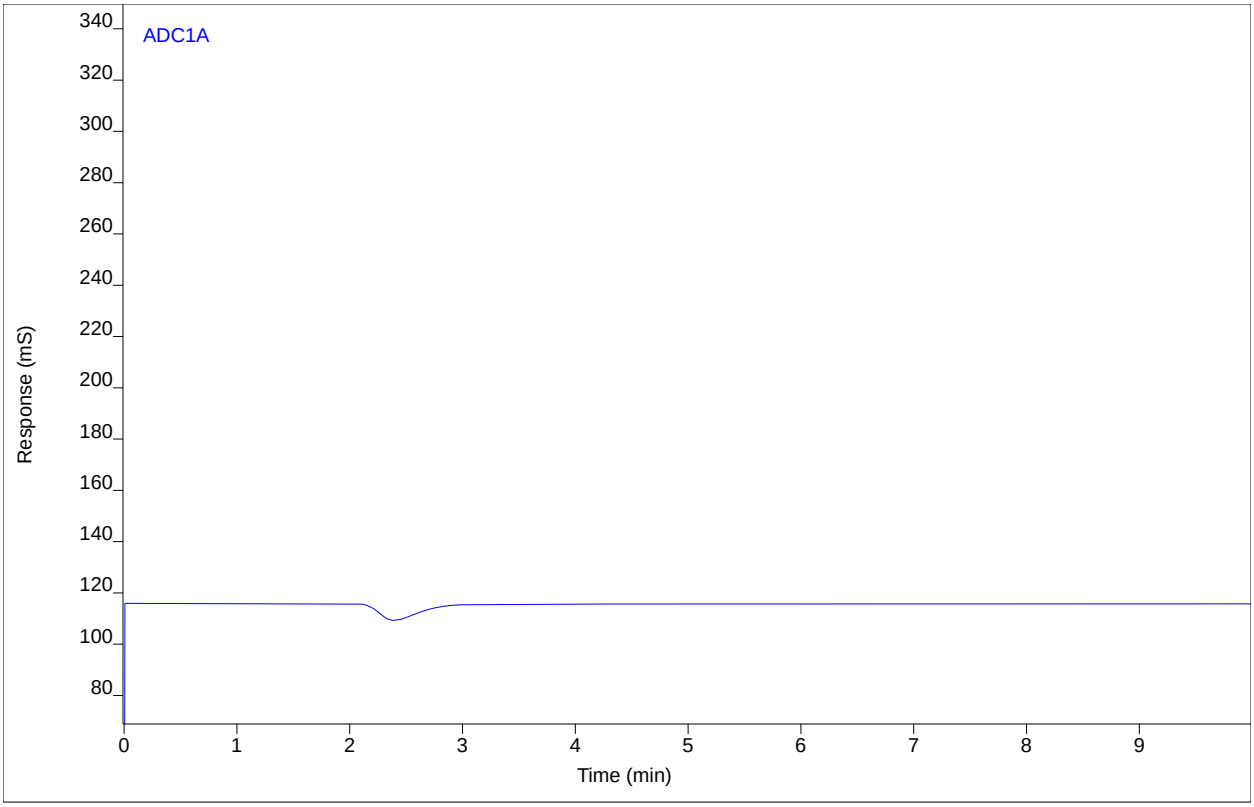
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.96	359.339	11.6488	5.72954	1	5.72954	ug/mL

Chromatogram Report

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo228 ver.2
Inj Data File	009-1001.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 8:22 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Enthalpy Analytical

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



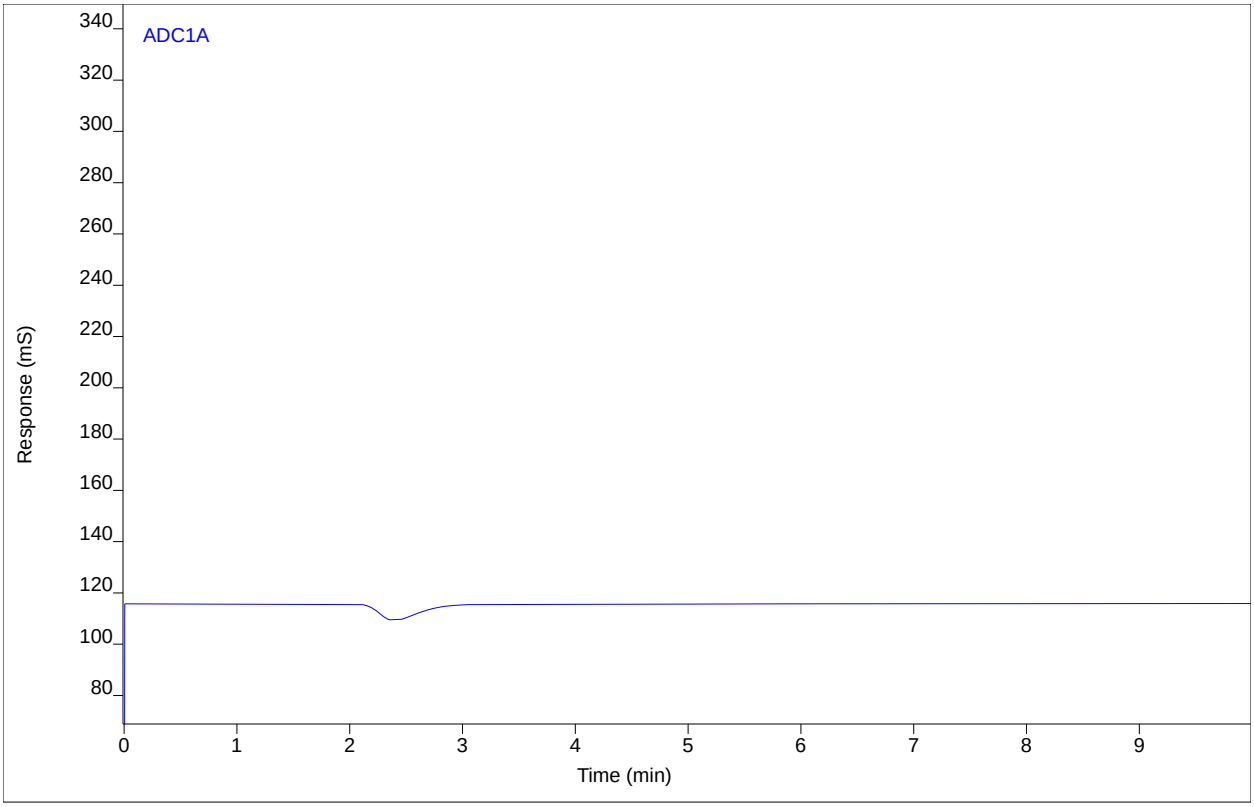
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.80)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo228 ver.2
Inj Data File	009-1002.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/5/2017 8:33 PM
File Modified	4/10/2017 1:30 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 1:18 PM
Printed	4/13/2017 11:23 AM



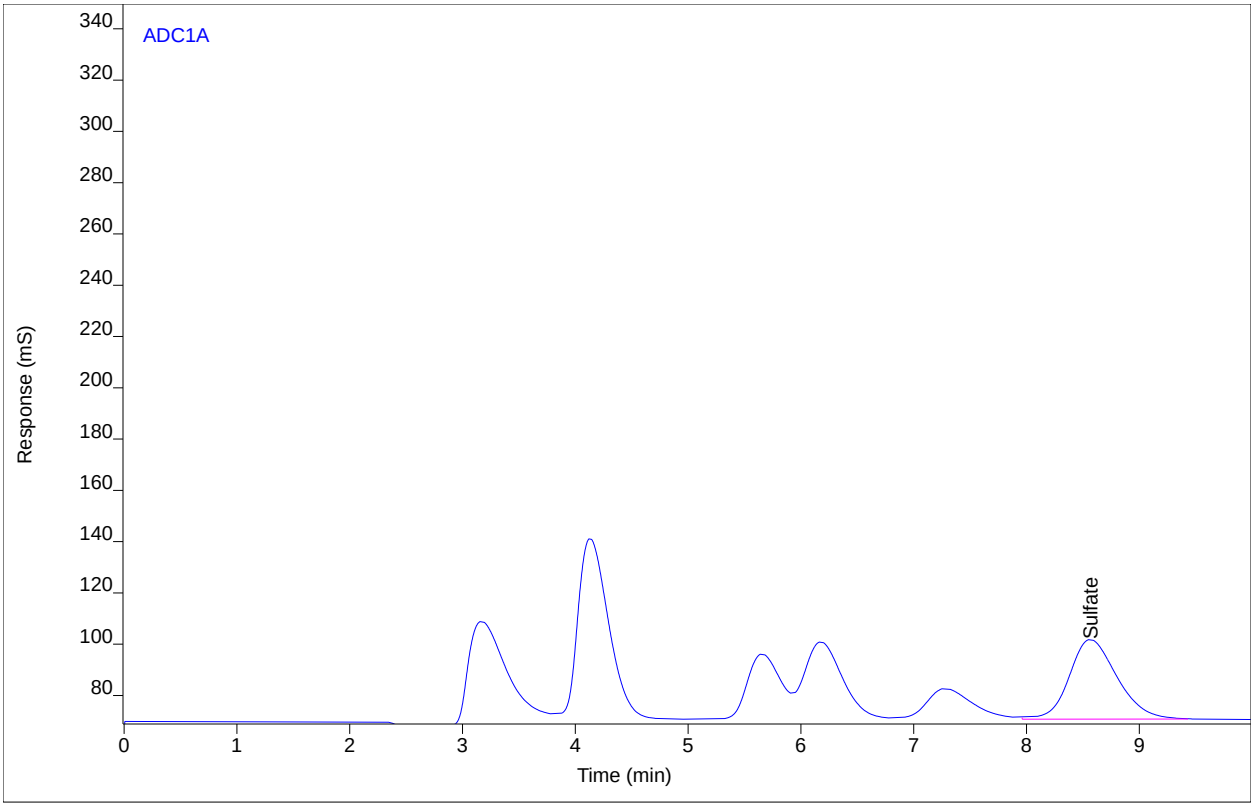
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.80)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo228b ver.6
Inj Data File	005-0201.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 4:58 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	8.57	911.896	31.0779	14.5279	1	14.5279	ug/mL

Analyst Peak Integration Comments

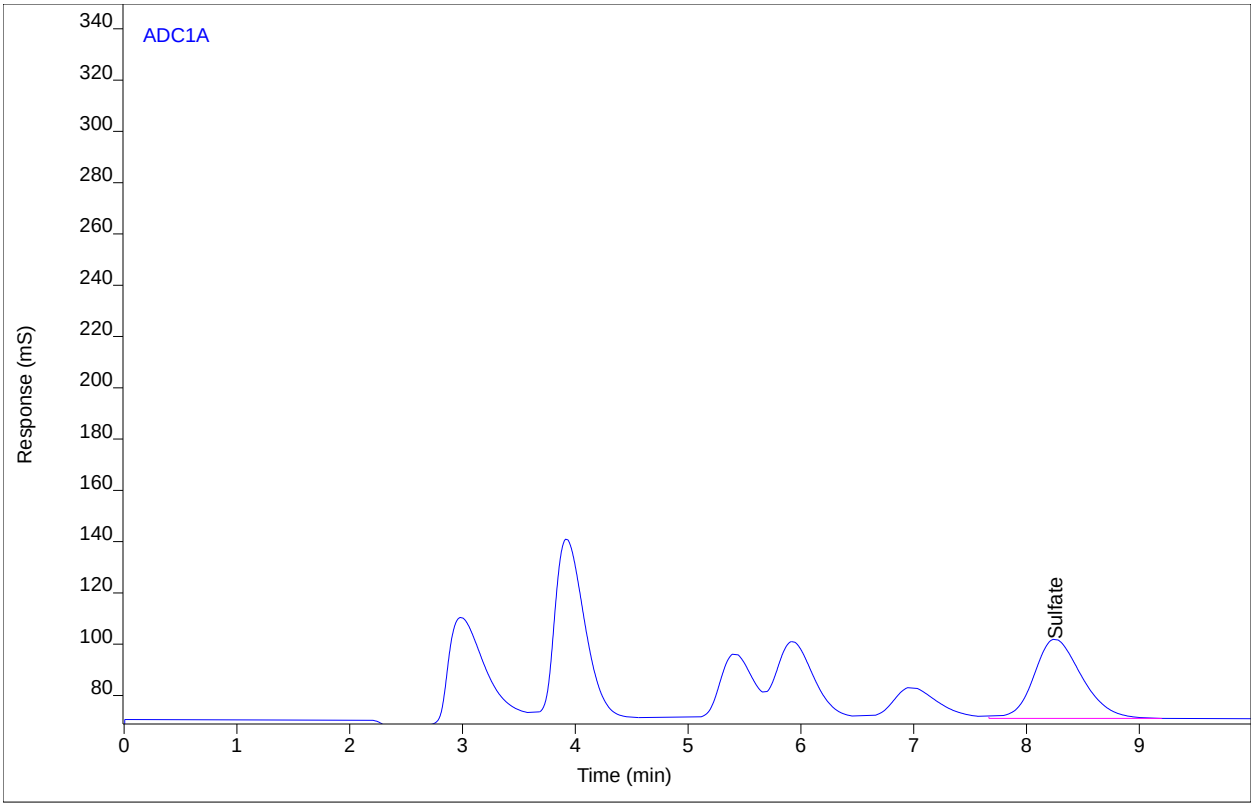
13:51:13 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo228b ver.6
Inj Data File	005-0202.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 5:10 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



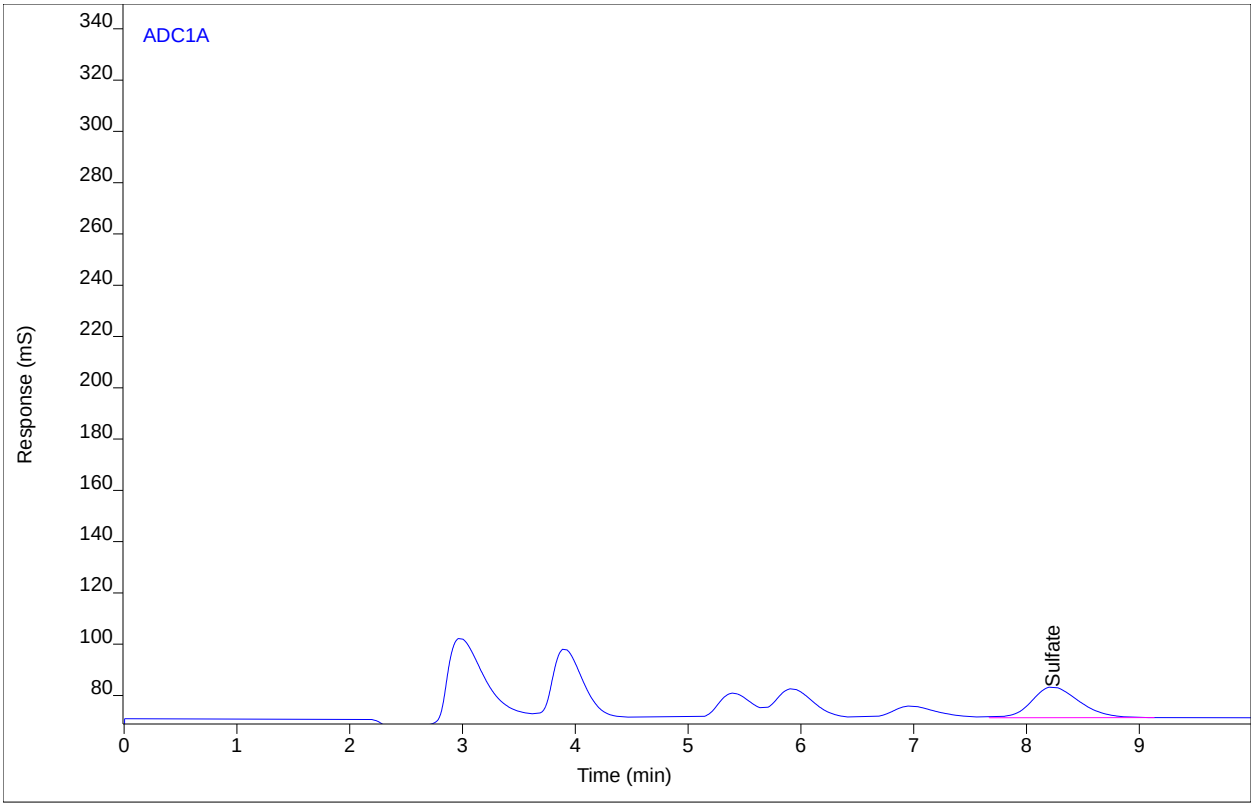
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	8.25	908.739	30.9540	14.4777	1	14.4777	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo228b ver.6
Inj Data File	008-0301.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 5:21 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



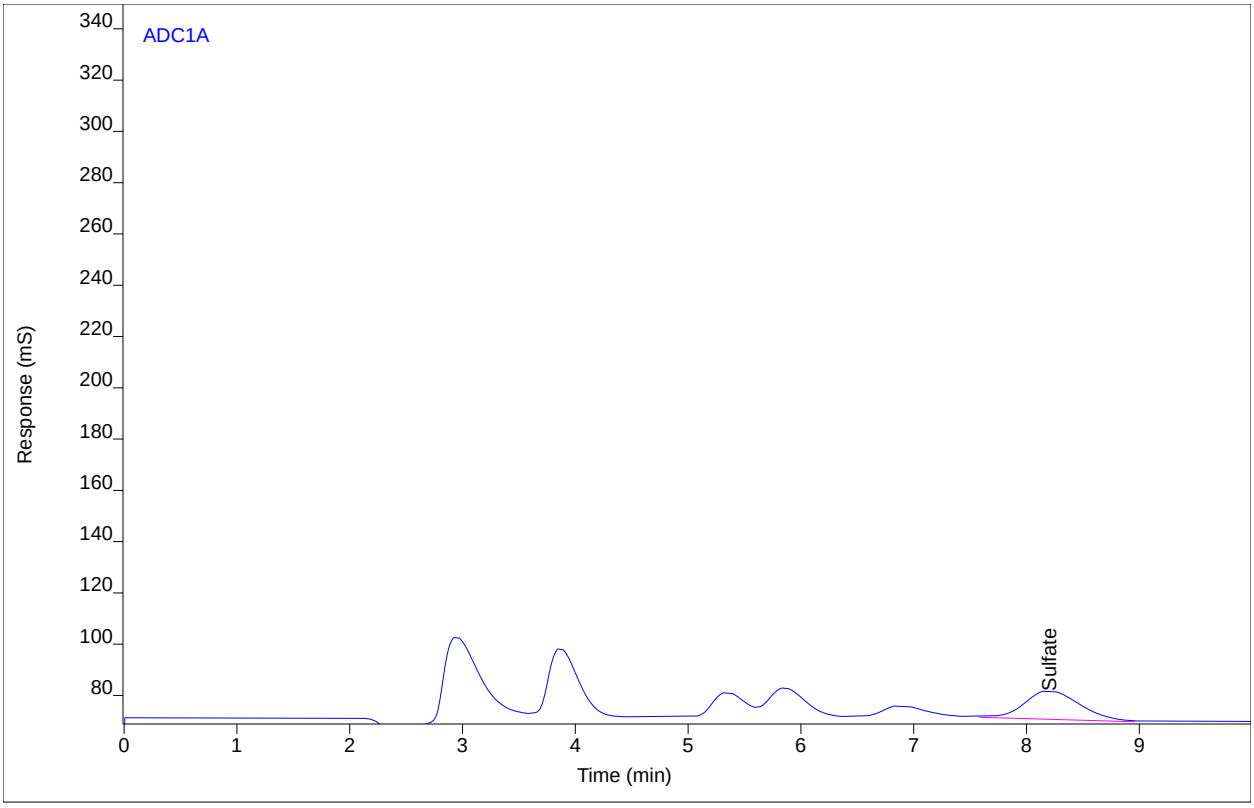
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	8.23	348.624	12.0548	5.55891	1	5.55891	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo228b ver.6
Inj Data File	008-0302.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 5:33 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.20	381.844	11.2287	6.08788	1	6.08788	ug/mL

Analyst Peak Integration Comments

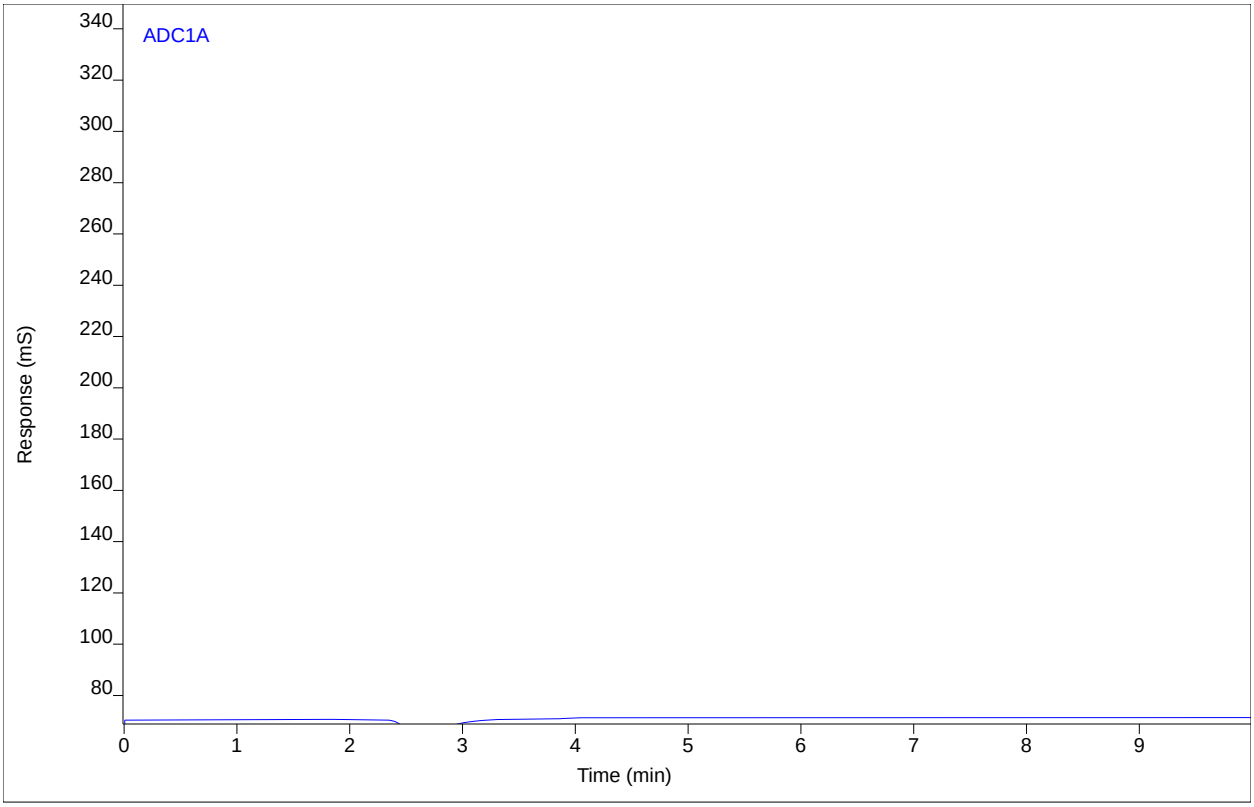
13:35:37 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo228b ver.6
Inj Data File	009-0401.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 5:45 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.20)				1		ug/mL

Analyst Peak Integration Comments

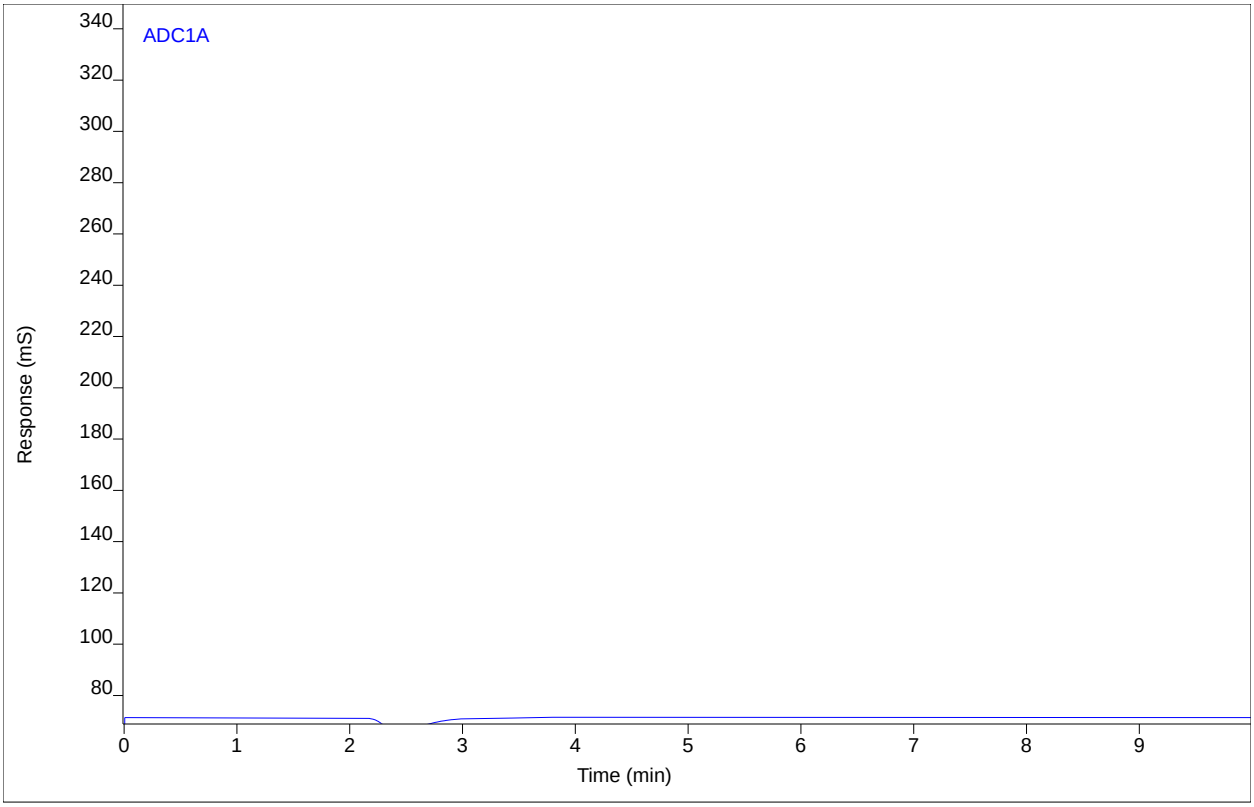
13:36:04 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo228b ver.6
Inj Data File	009-0402.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 5:56 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.20)				1		ug/mL

Analyst Peak Integration Comments

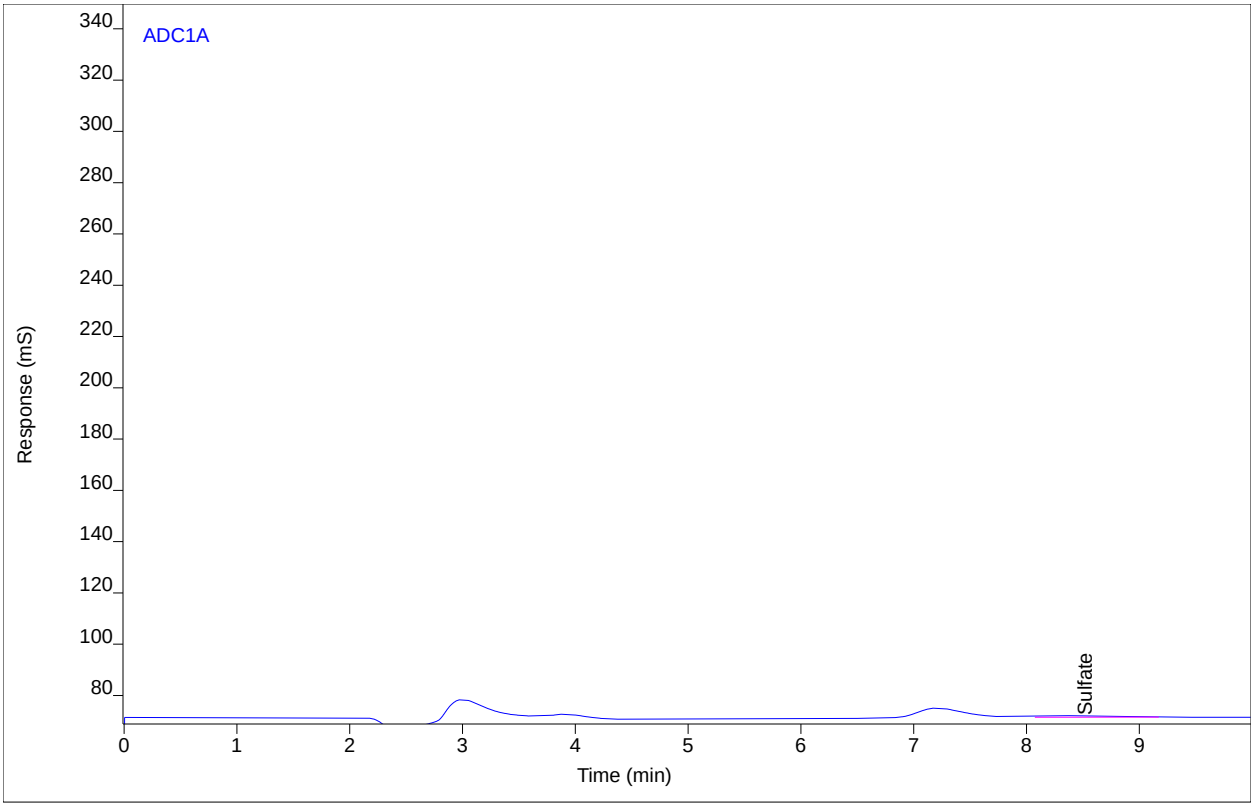
13:36:12 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R1.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	021-0501.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 6:08 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	21
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.52	26.2506	0.90466	0.42465	1	0.42465	ug/mL

Analyst Peak Integration Comments

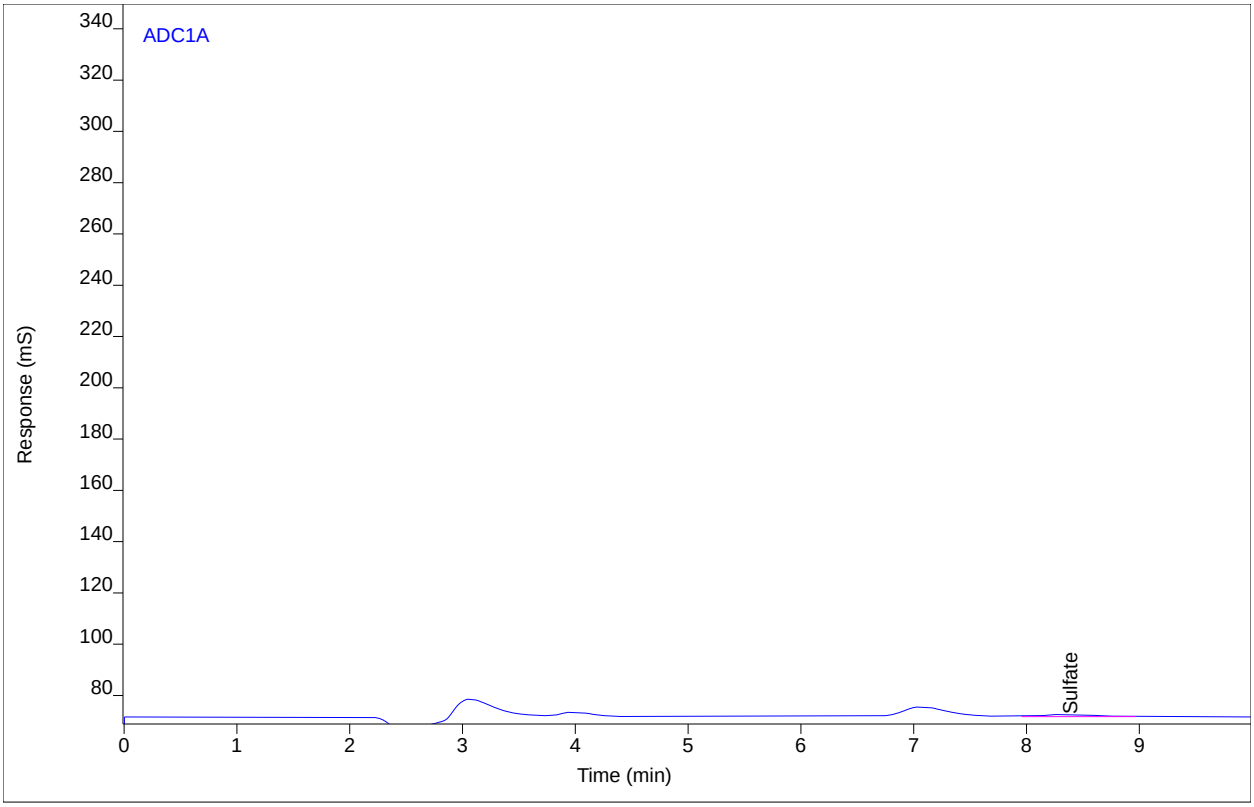
10:01:42 04/10/17 Amelia Paolantonio NI AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R1.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	021-0502.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 6:20 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	21
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.39	26.3244	0.92755	0.42584	1	0.42584	ug/mL

Analyst Peak Integration Comments

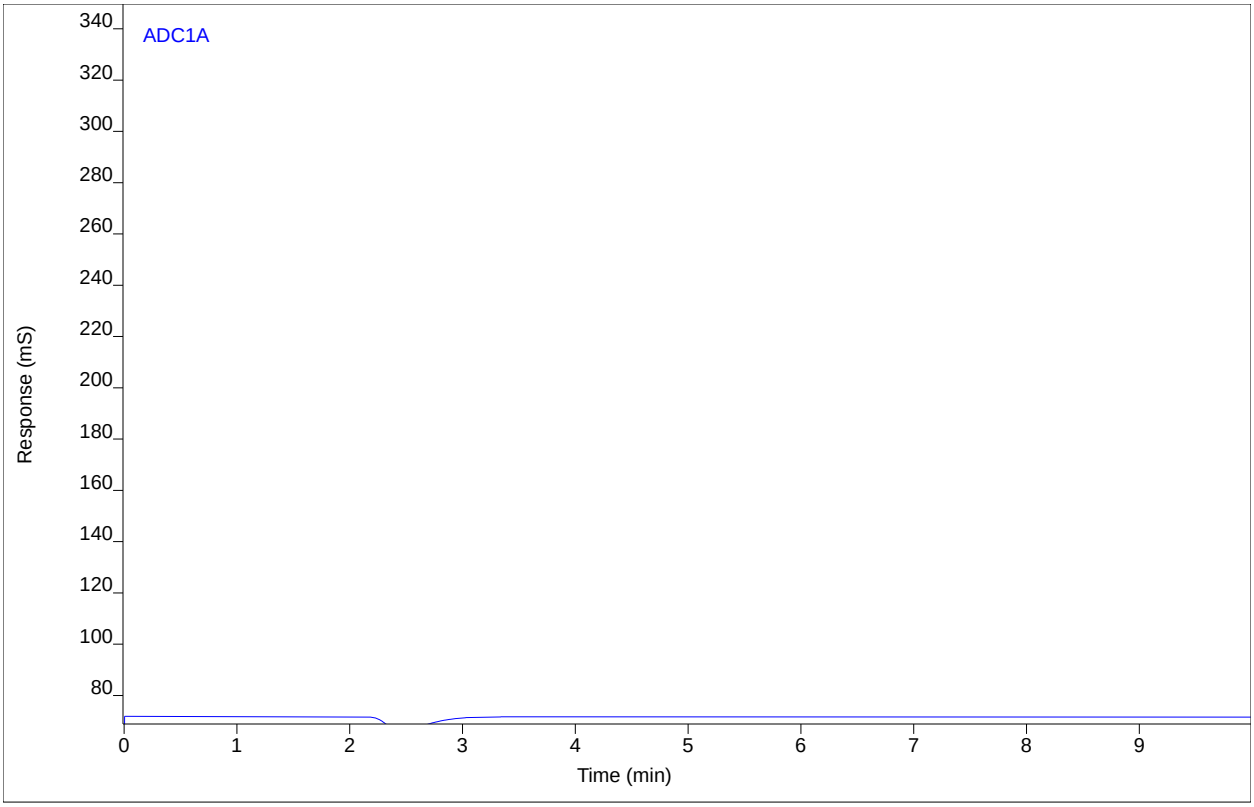
10:01:57 04/10/17 Amelia Paolantonio NI AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.BLANK.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	024-0801.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 6:55 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	24
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



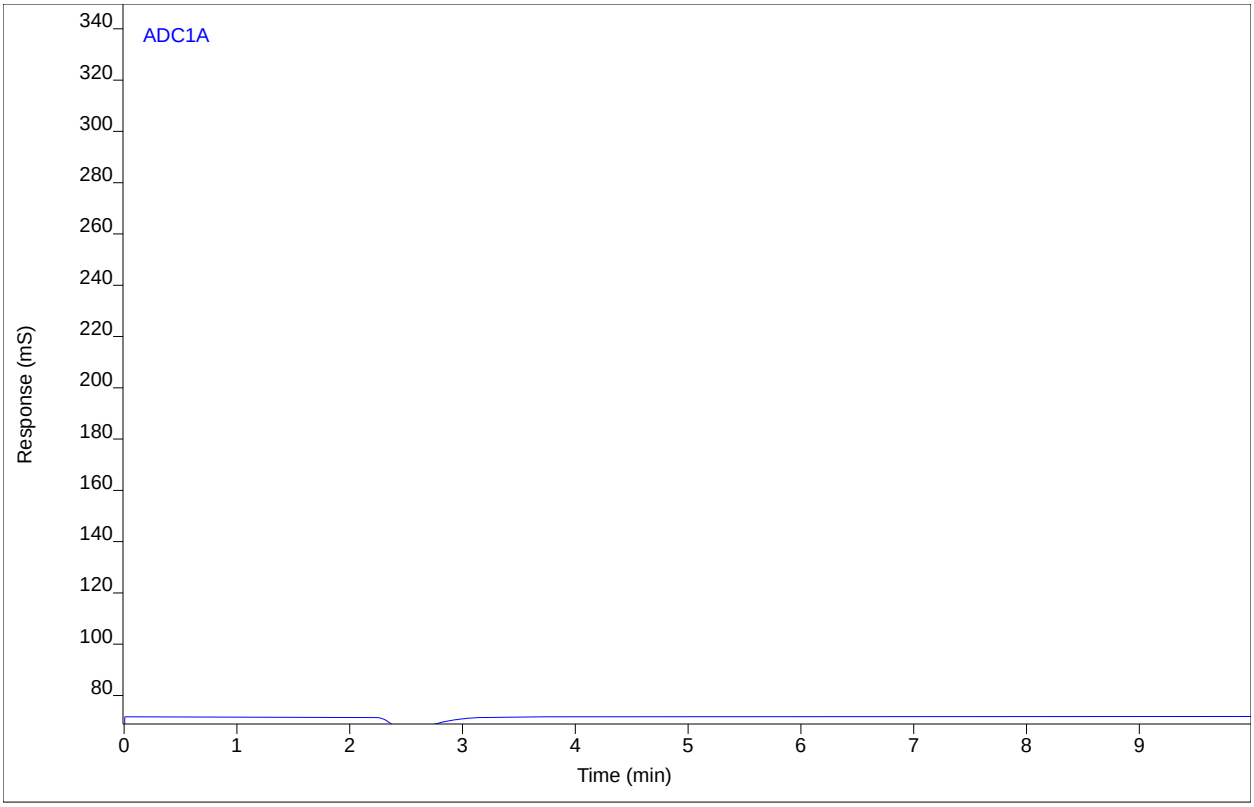
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.20)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.BLANK.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	024-0802.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 7:07 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	24
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



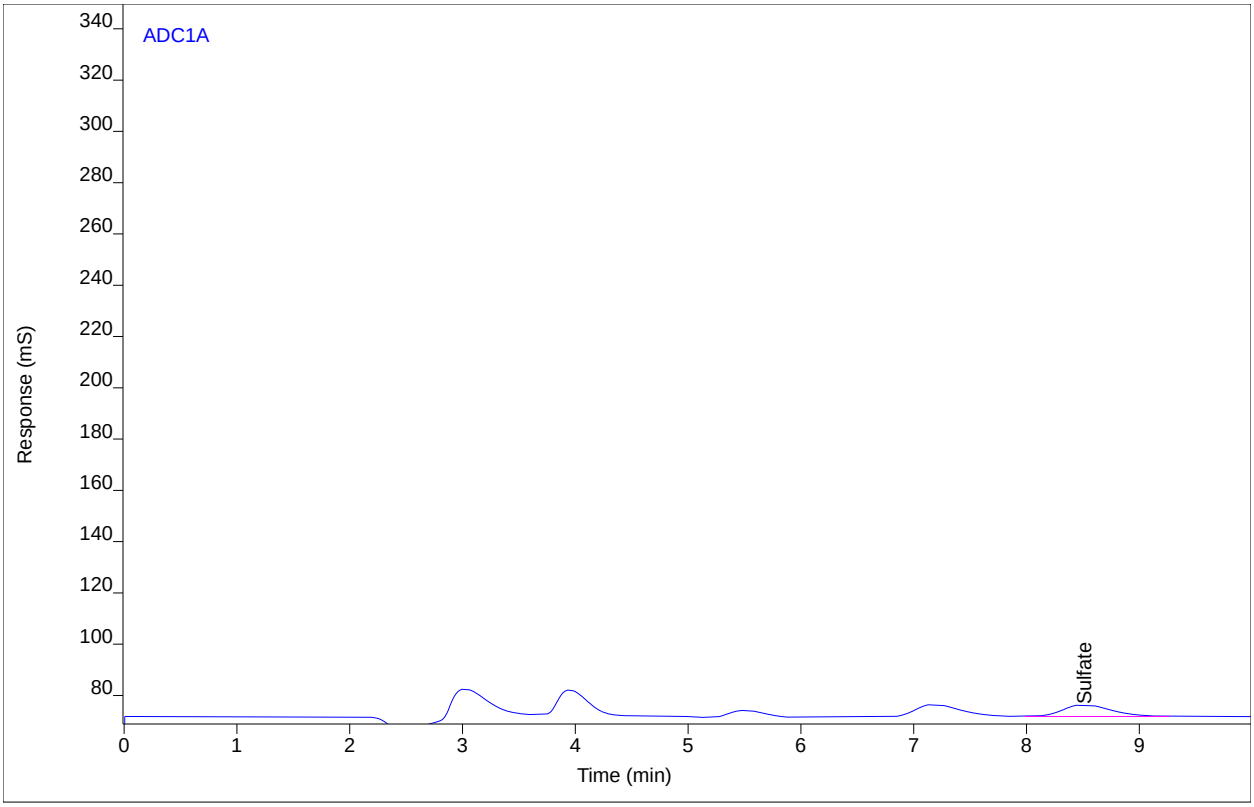
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.20)				1		ug/mL

Chromatogram Report

Sample Name	0317-144.MS-R1.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	025-0901.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 7:18 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Enthalpy Analytical

Sample Type	Sample
Vial Number	25
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.51	137.308	4.66906	2.19412	1	2.19412	ug/mL

Analyst Peak Integration Comments

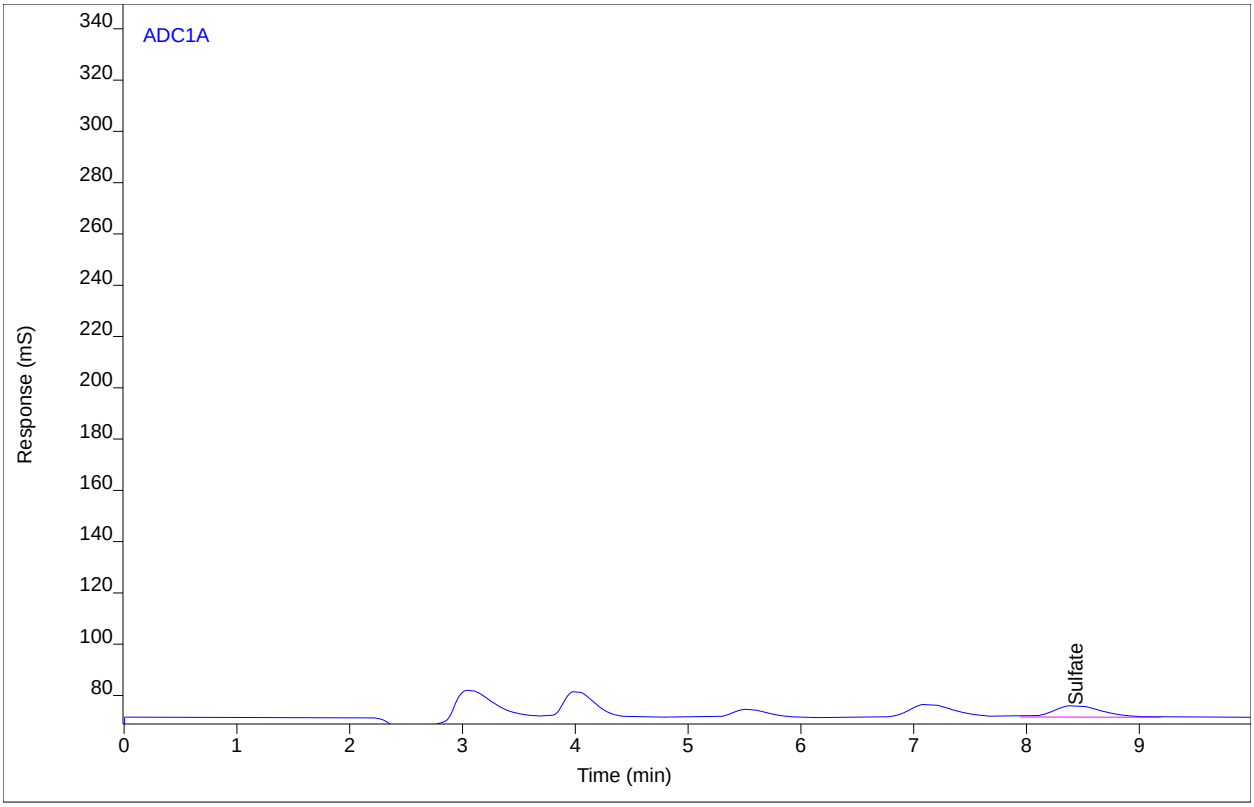
10:26:04 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MS-R1.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	025-0902.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 7:30 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	25
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



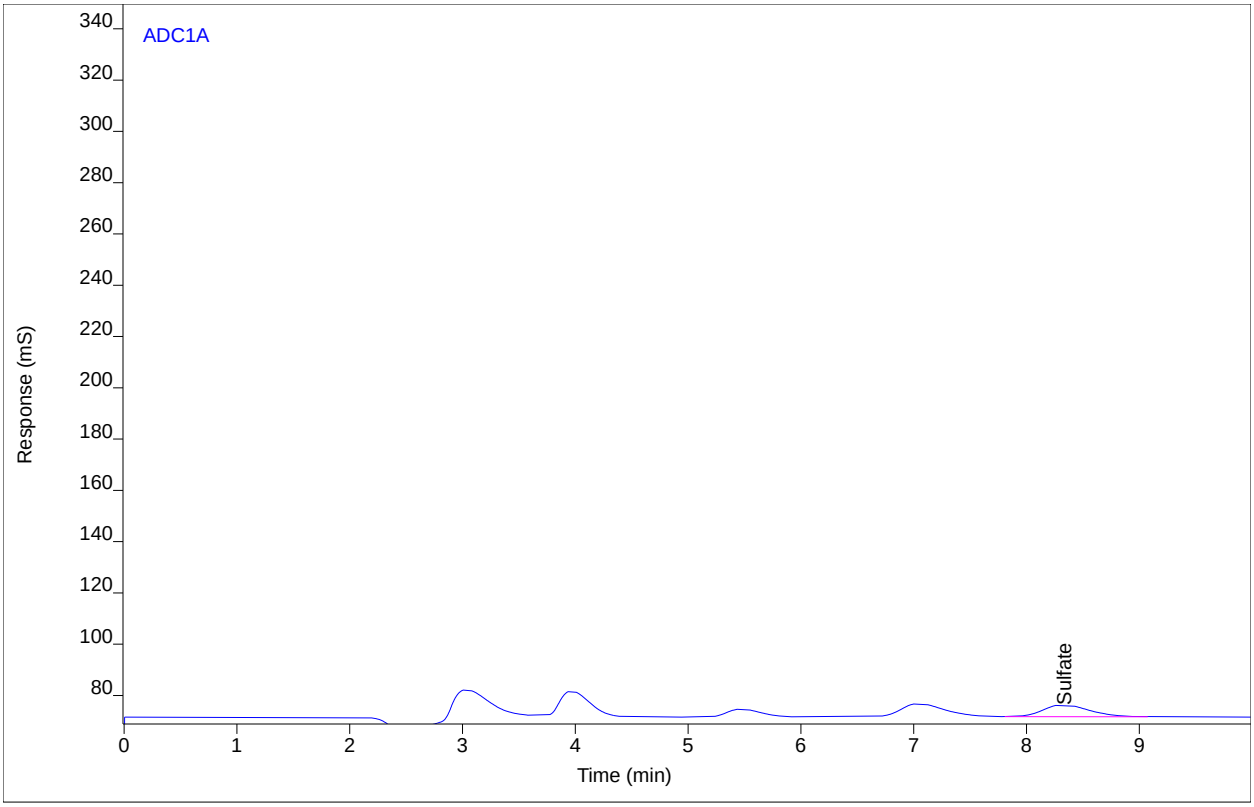
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.44	132.460	4.63010	2.11692	1	2.11692	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MSD-R1.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	026-1001.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 7:42 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	26
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.34	134.011	4.69384	2.14163	1	2.14163	ug/mL

Analyst Peak Integration Comments

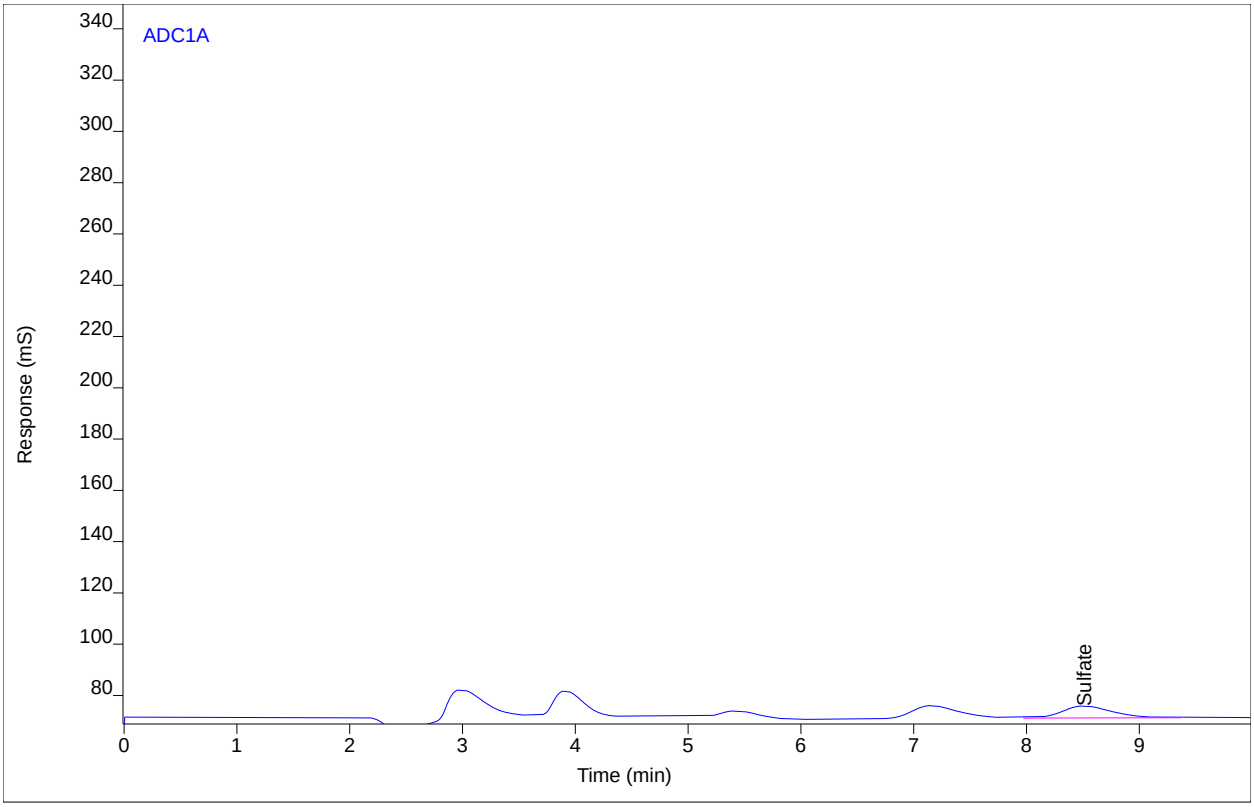
10:26:23 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.MSD-R1.M8A
Sequence Name	Gonzo228b ver.6
Inj Data File	026-1002.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 7:53 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	26
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.51	143.356	4.69238	2.29042	1	2.29042	ug/mL

Analyst Peak Integration Comments

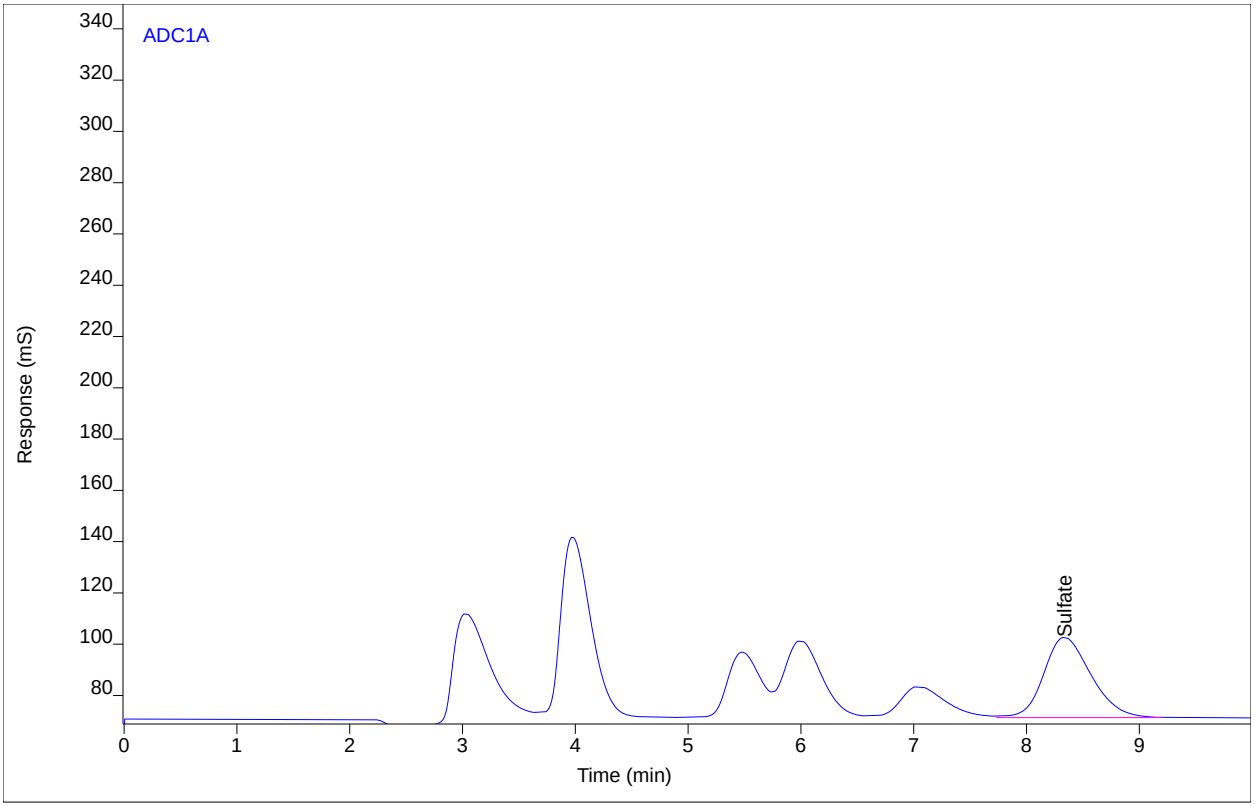
10:26:43 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo228b ver.6
Inj Data File	005-1501.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 9:38 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



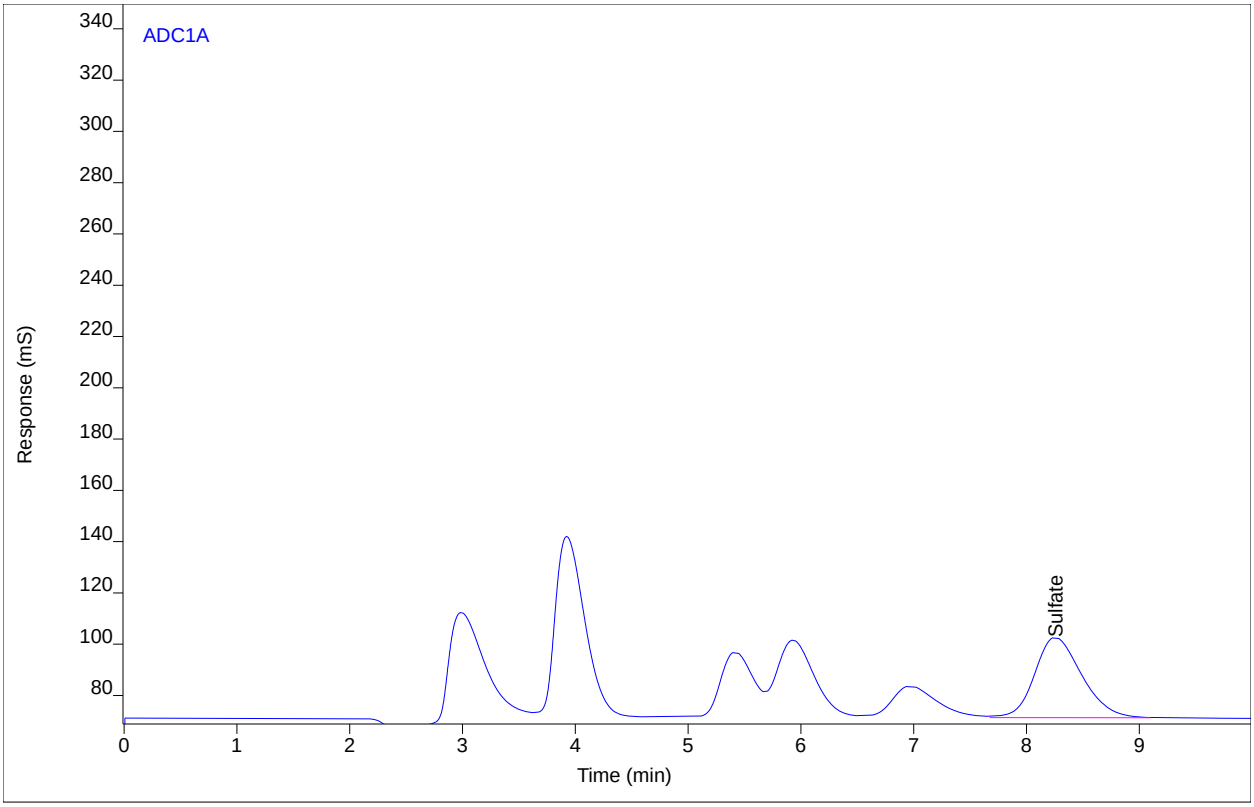
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	8.34	909.927	31.2916	14.4966	1	14.4966	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo228b ver.6
Inj Data File	005-1502.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/6/2017 9:50 PM
File Modified	4/10/2017 3:13 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo230.M
Method Modified	4/10/2017 2:01 PM
Printed	4/13/2017 11:23 AM



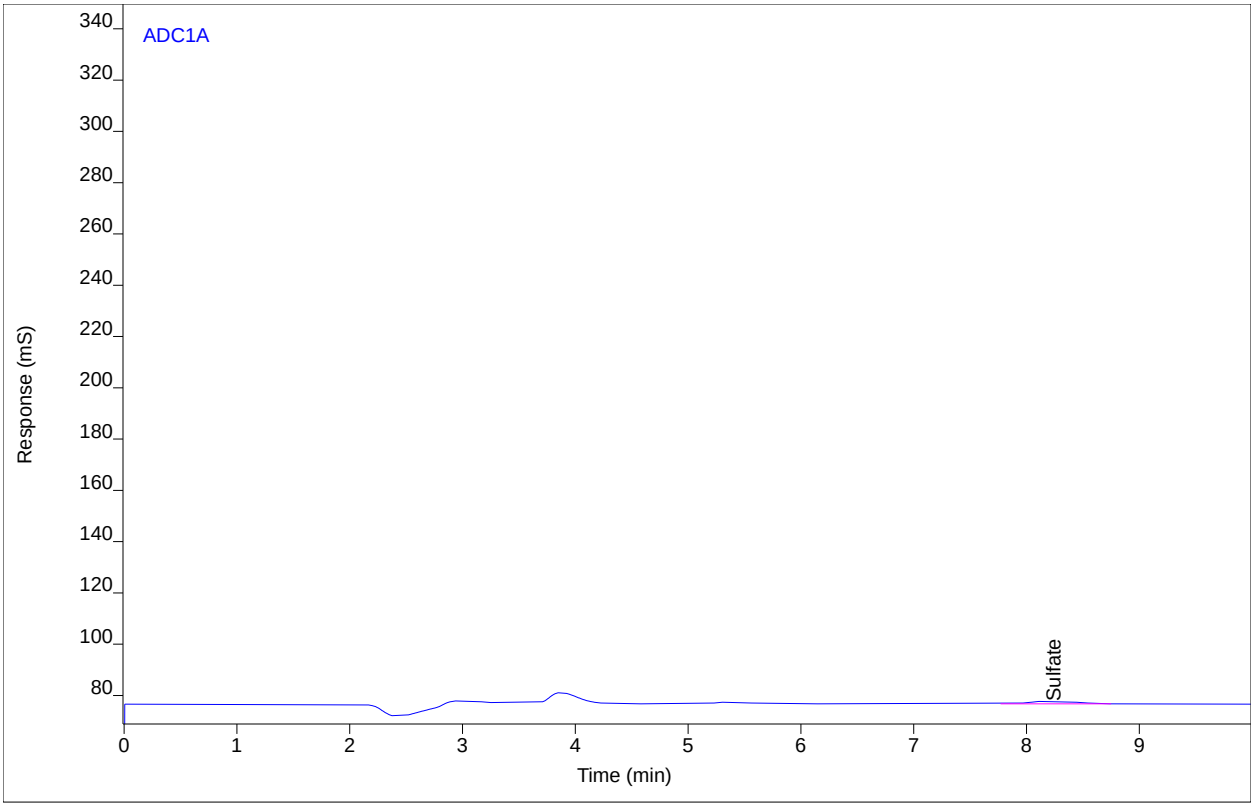
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	8.26	905.359	31.3270	14.4238	1	14.4238	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #1
Sequence Name	Gonzo234 ver.3
Inj Data File	001-0201.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 9:30 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	1
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.24	32.1147	1.21782	0.58533	1	0.58533	ug/mL

Analyst Peak Integration Comments

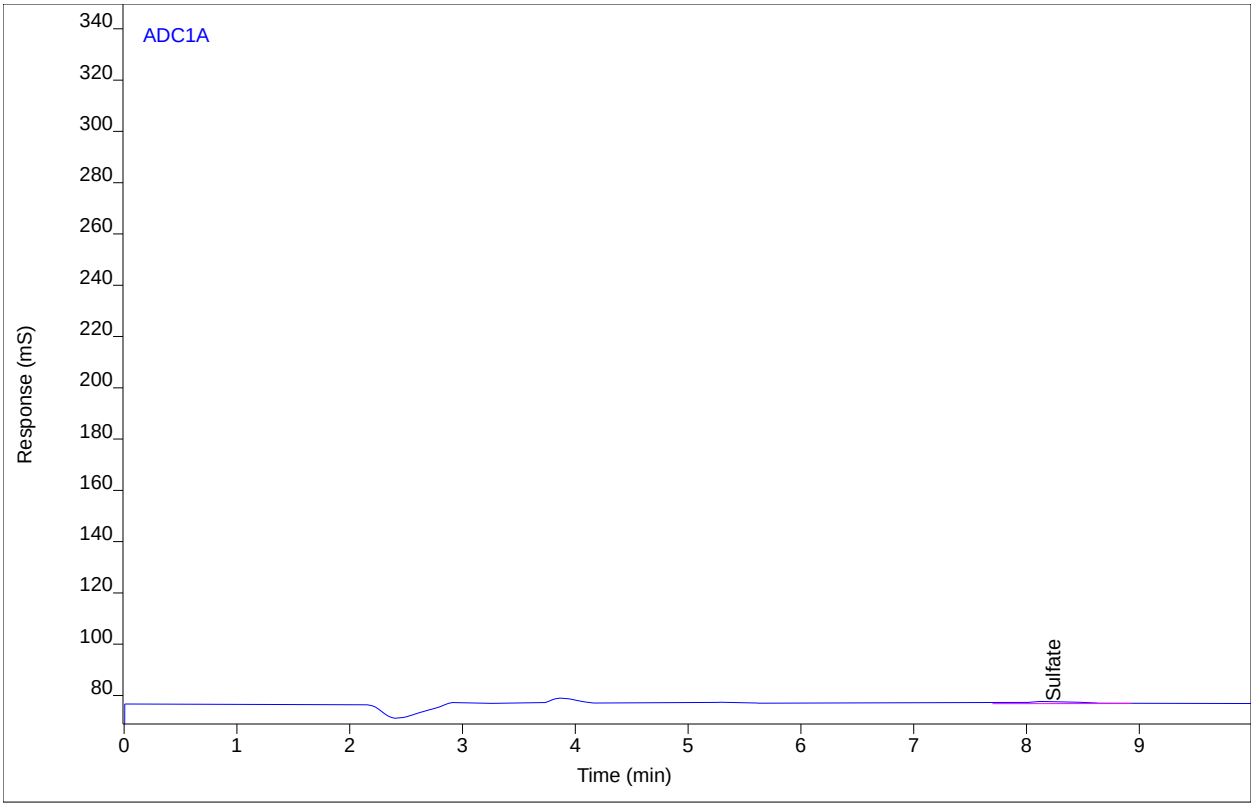
09:31:13 04/10/17 Amelia Paolantonio NI AMP
14:13:43 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #1
Sequence Name	Gonzo234 ver.3
Inj Data File	001-0202.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 9:42 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	1
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.24	29.1878	1.01578	0.53824	1	0.53824	ug/mL

Analyst Peak Integration Comments

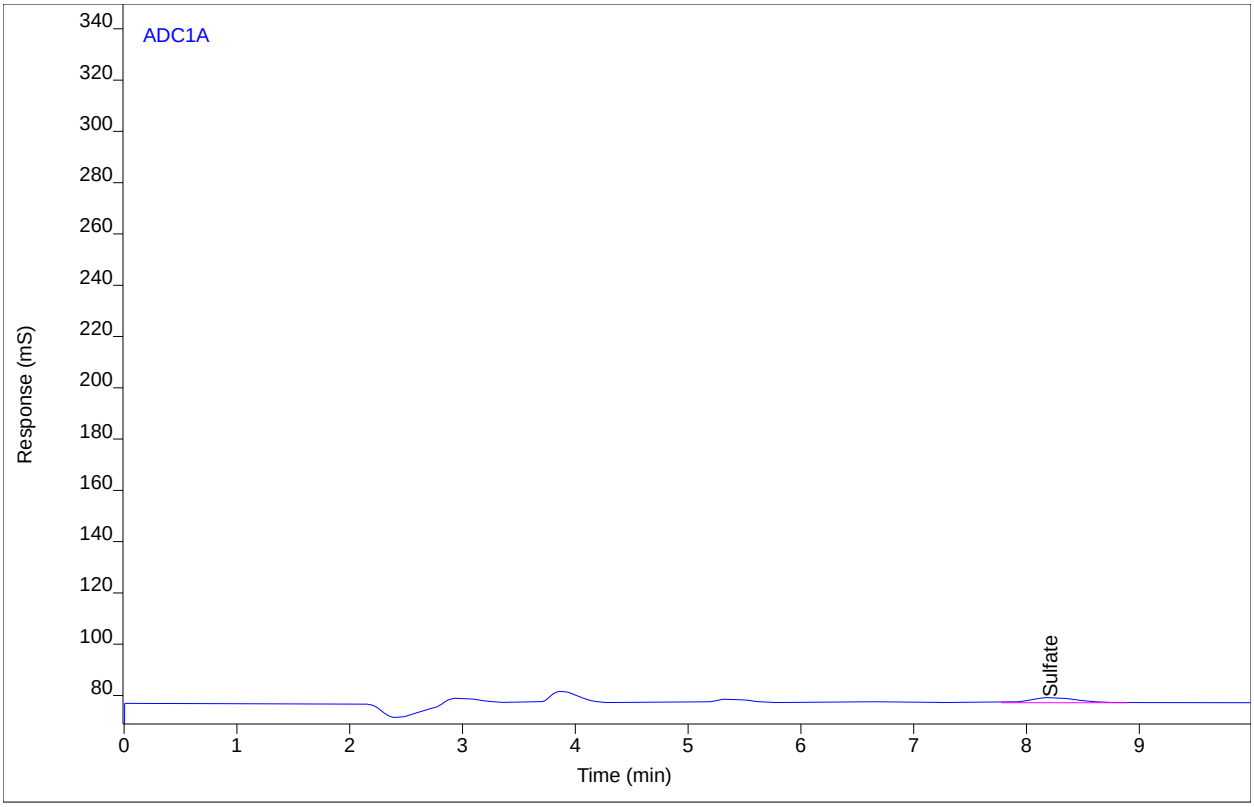
09:31:41 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #2
Sequence Name	Gonzo234 ver.3
Inj Data File	002-0301.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 9:54 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	2
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.21	56.8321	2.04635	0.98302	1	0.98302	ug/mL

Analyst Peak Integration Comments

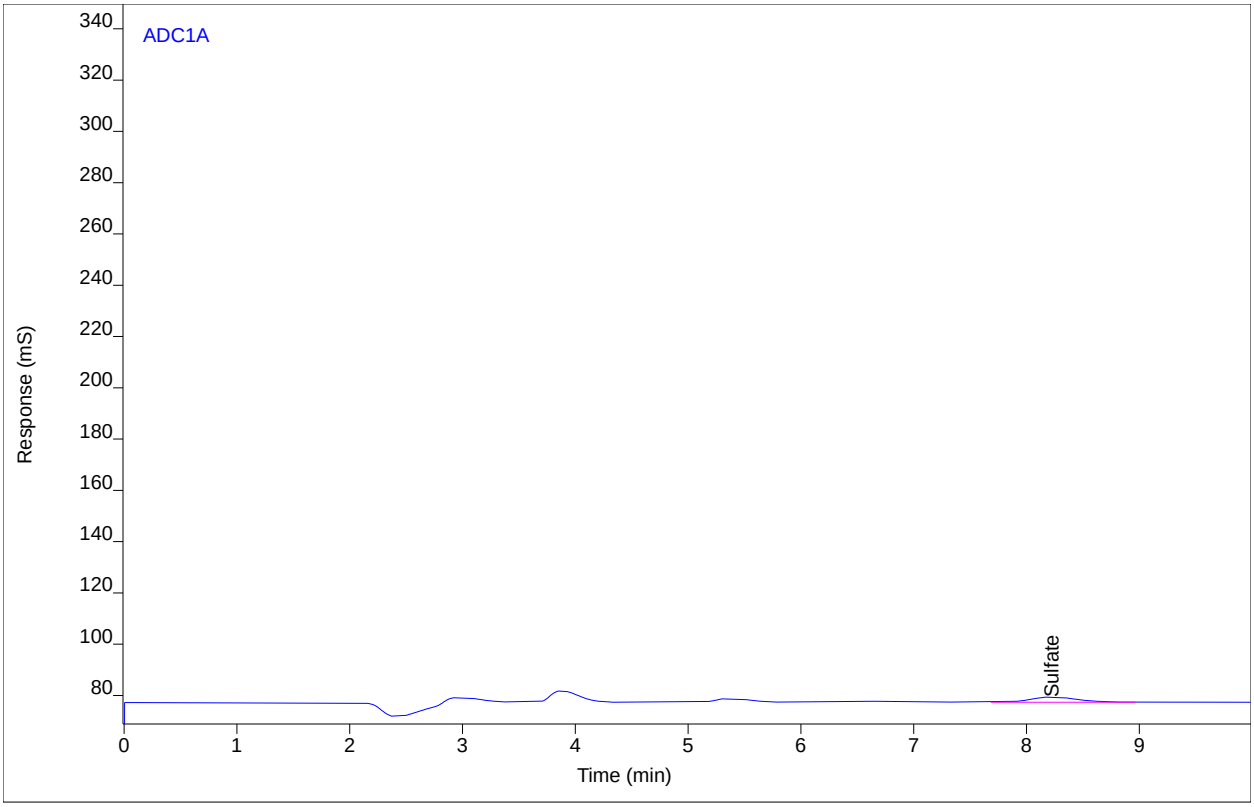
09:32:06 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #2
Sequence Name	Gonzo234 ver.3
Inj Data File	002-0302.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 10:06 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	2
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.22	58.4958	2.06975	1.00979	1	1.00979	ug/mL

Analyst Peak Integration Comments

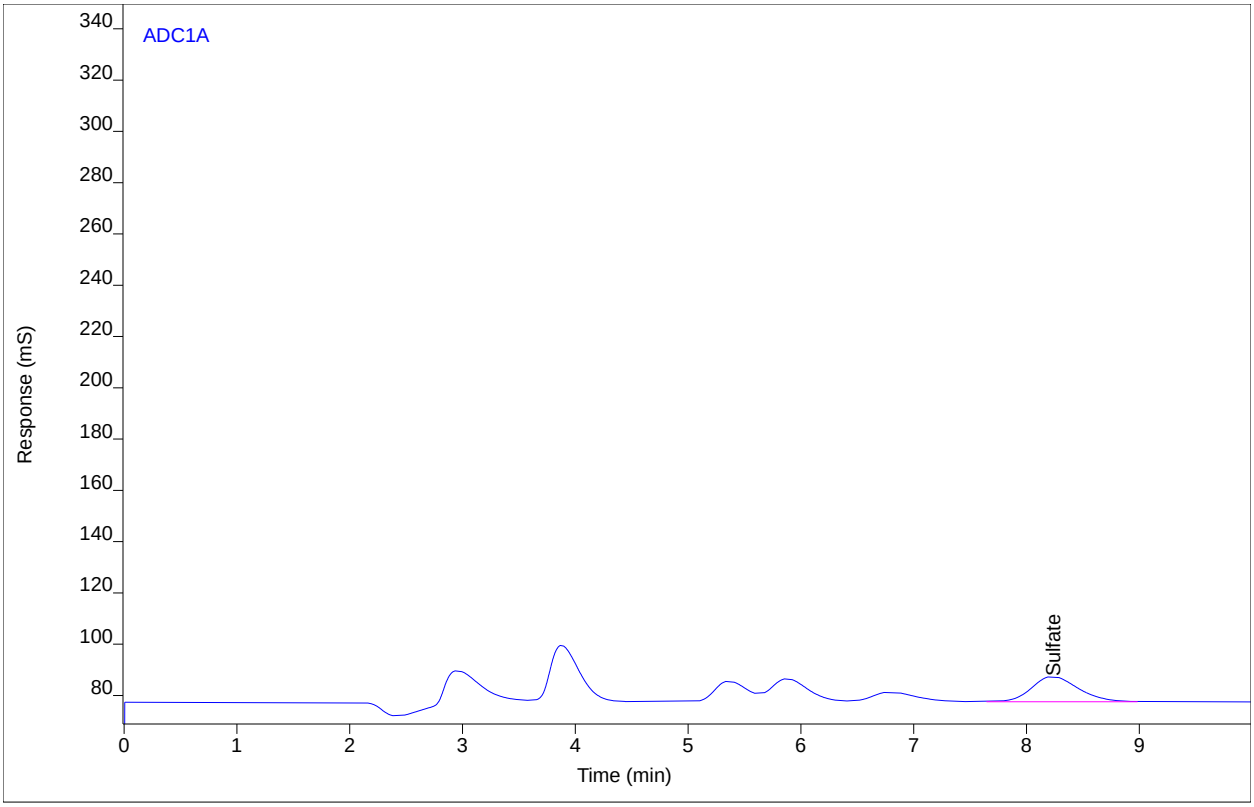
09:32:19 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #3
Sequence Name	Gonzo234 ver.3
Inj Data File	003-0401.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 10:17 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	3
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



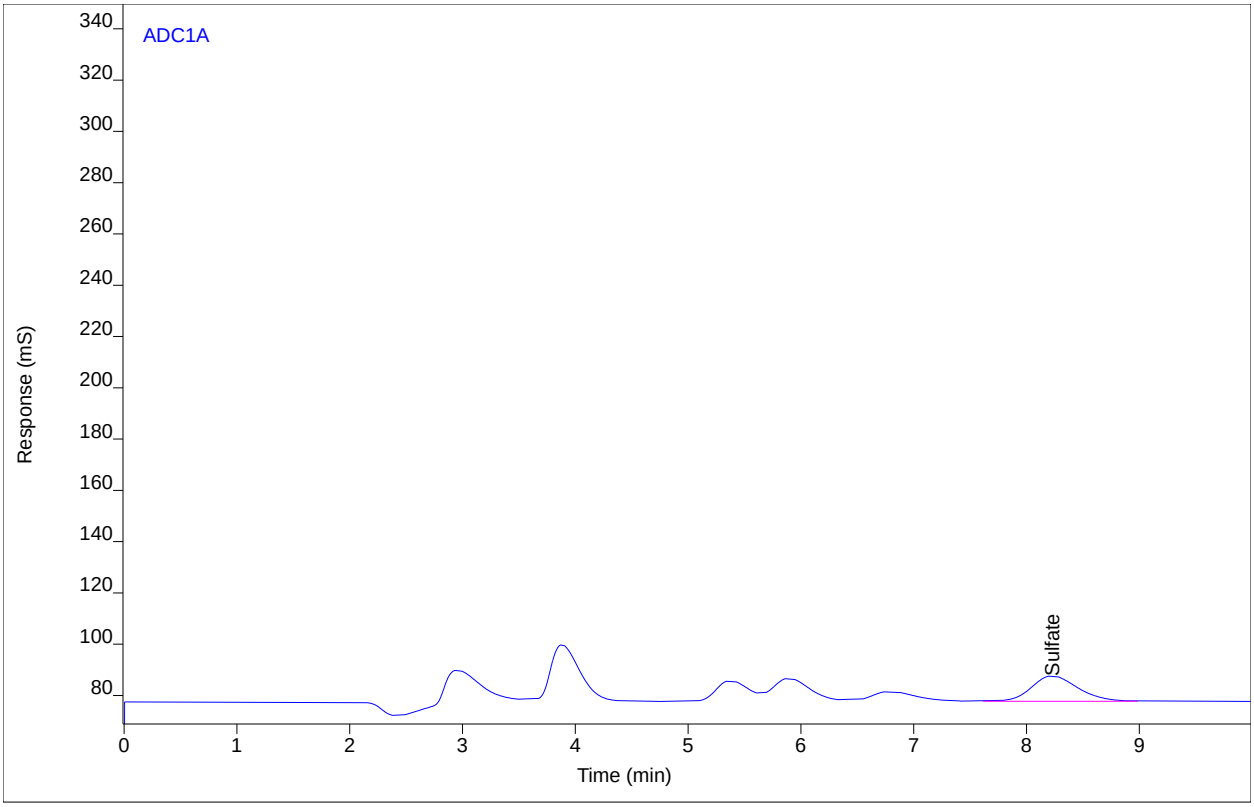
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.24	280.753	9.88196	4.58575	1	4.58575	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #3
Sequence Name	Gonzo234 ver.3
Inj Data File	003-0402.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 10:29 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	3
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



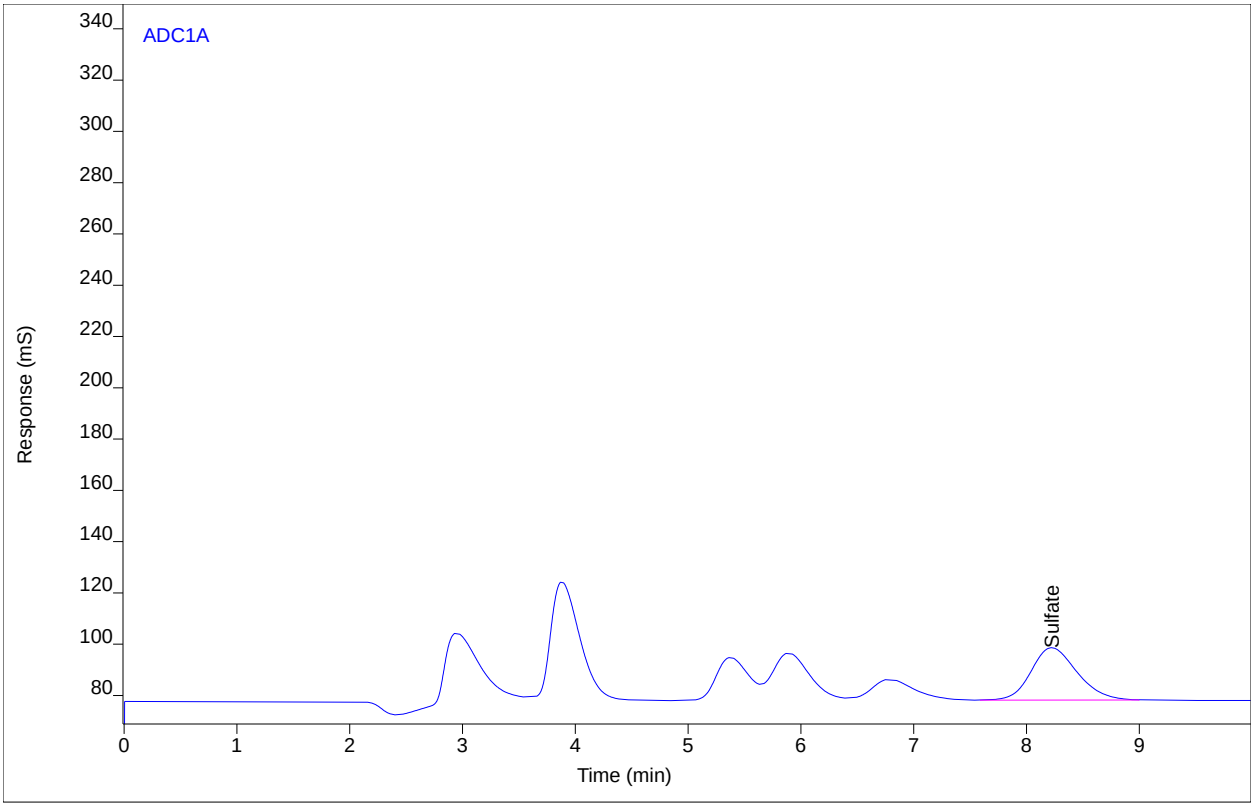
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	281.523	9.93260	4.59815	1	4.59815	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo234 ver.3
Inj Data File	004-0501.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 10:41 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



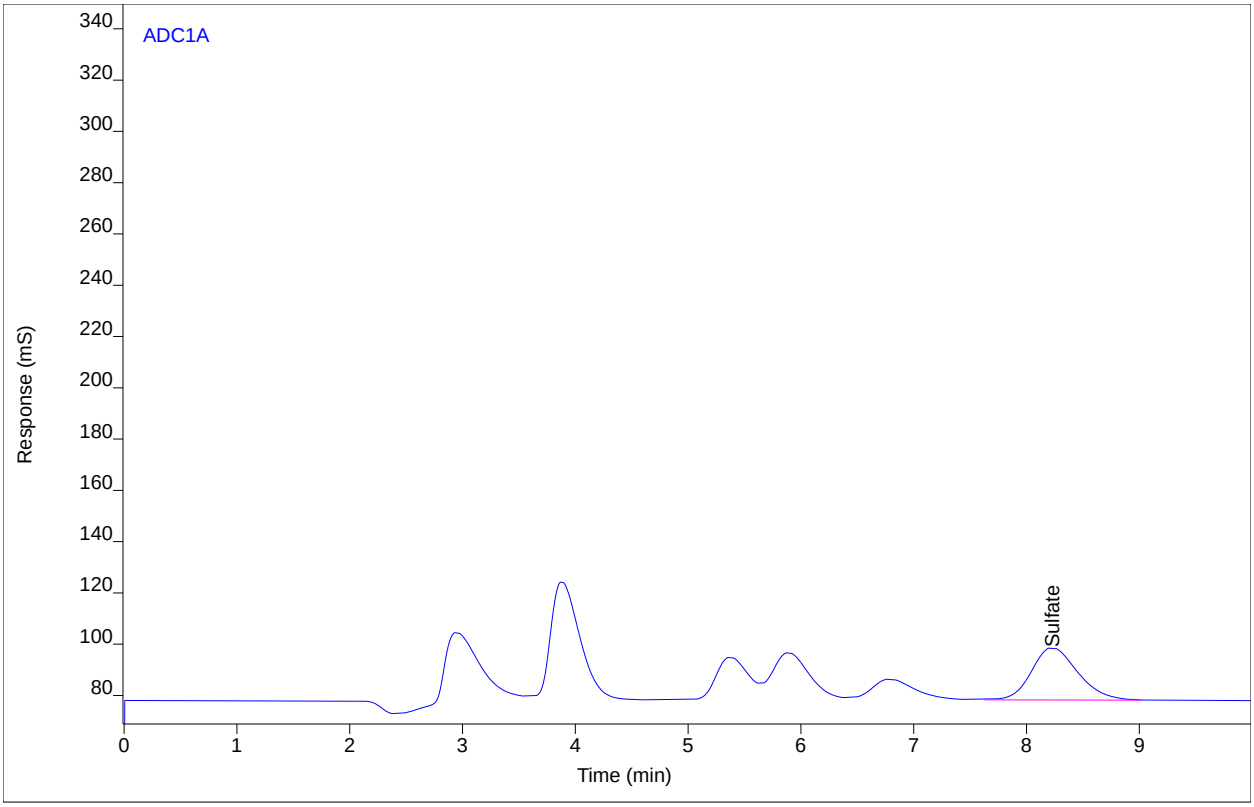
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.22	579.787	20.4716	9.39701	1	9.39701	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo234 ver.3
Inj Data File	004-0502.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 10:52 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



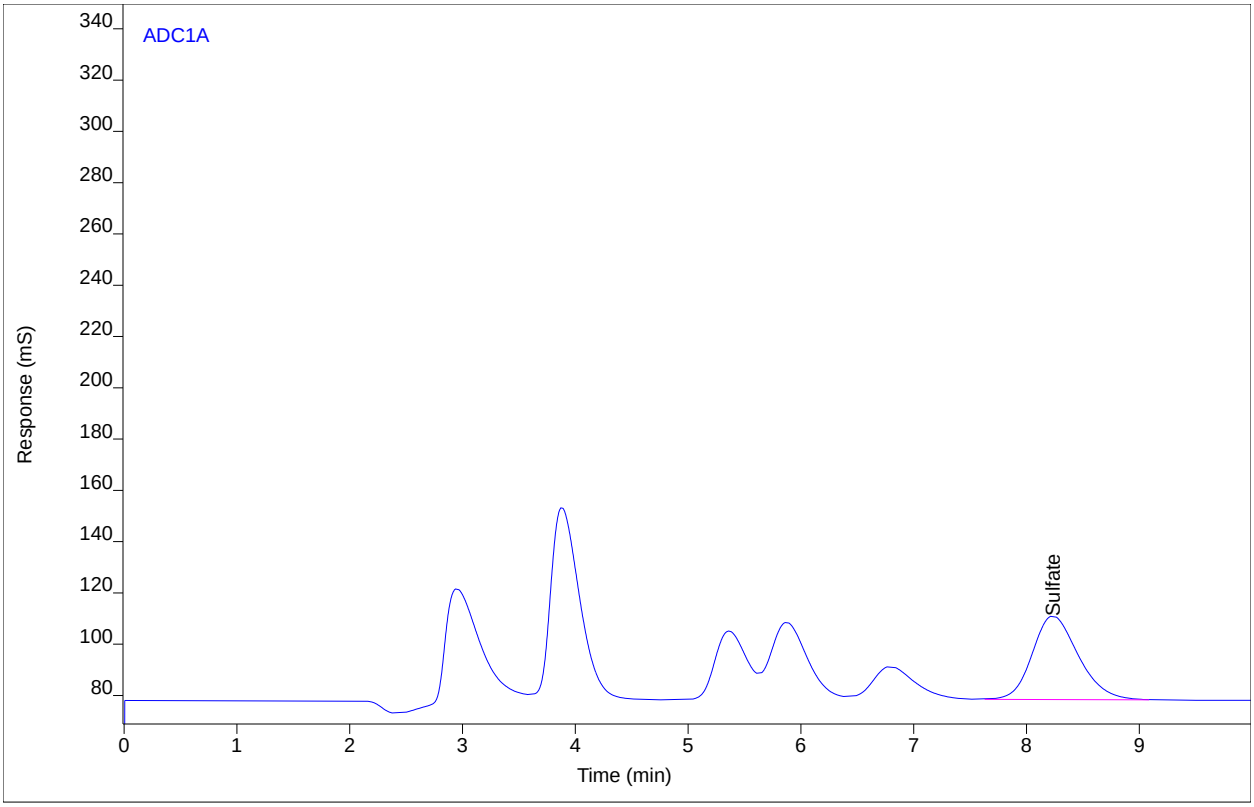
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	580.906	20.5042	9.41502	1	9.41502	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo234 ver.3
Inj Data File	005-0601.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 11:04 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



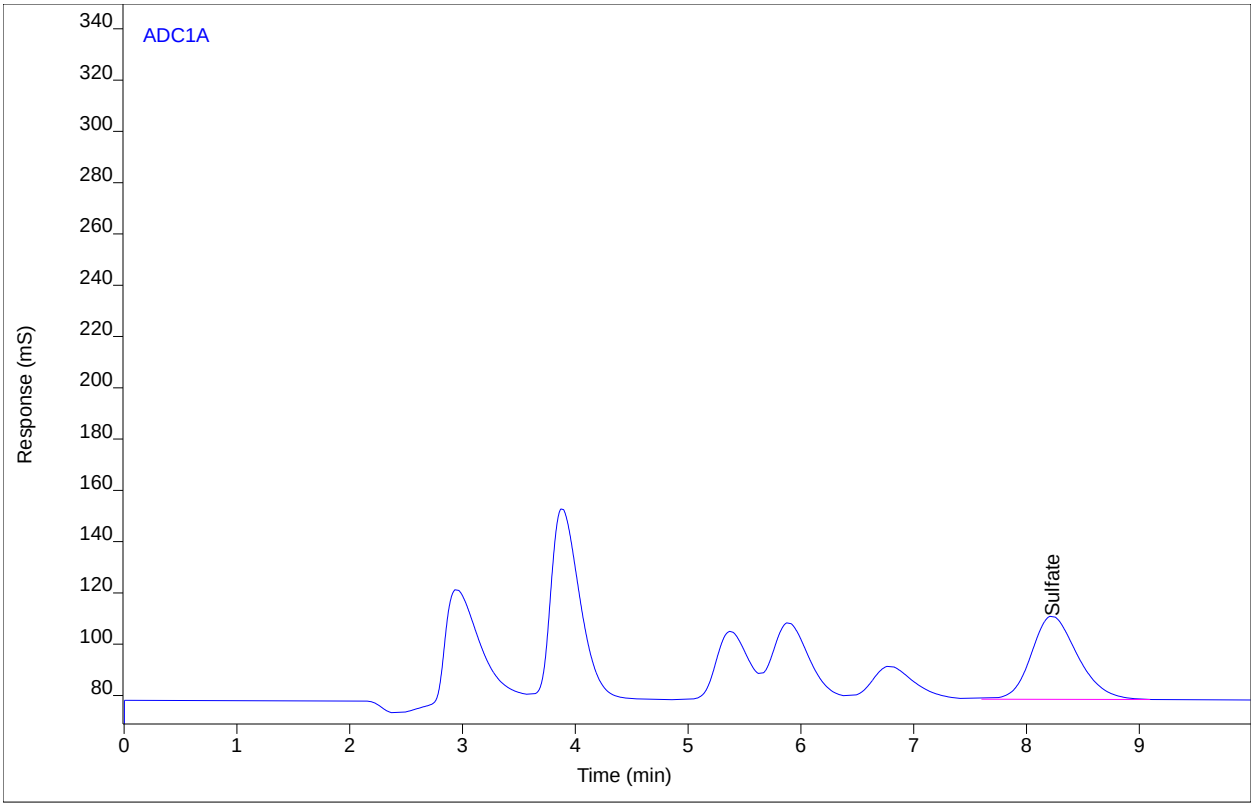
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	923.807	32.6426	14.9321	1	14.9321	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo234 ver.3
Inj Data File	005-0602.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 11:16 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



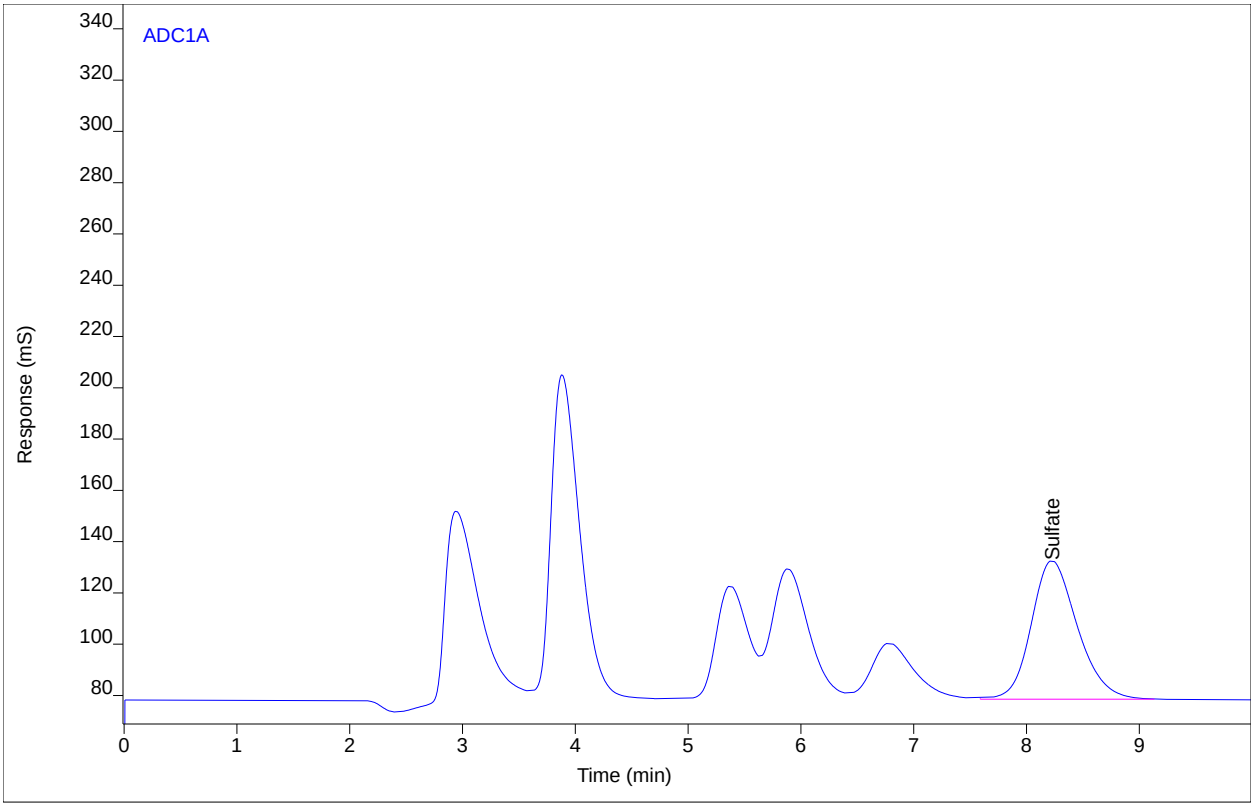
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	921.440	32.5210	14.8940	1	14.8940	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #6
Sequence Name	Gonzo234 ver.3
Inj Data File	006-0701.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 11:27 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	6
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



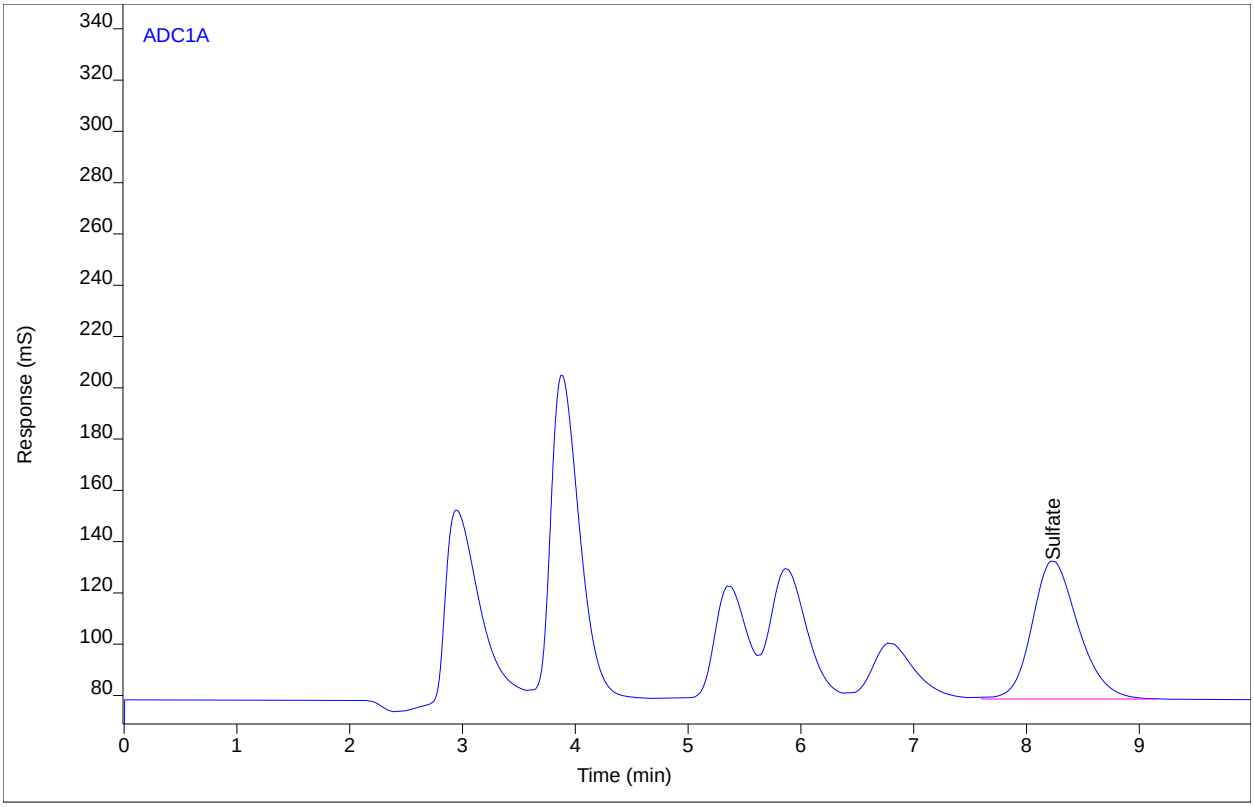
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	1533.37	54.0808	24.7395	1	24.7395	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #6
Sequence Name	Gonzo234 ver.3
Inj Data File	006-0702.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 11:39 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	6
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



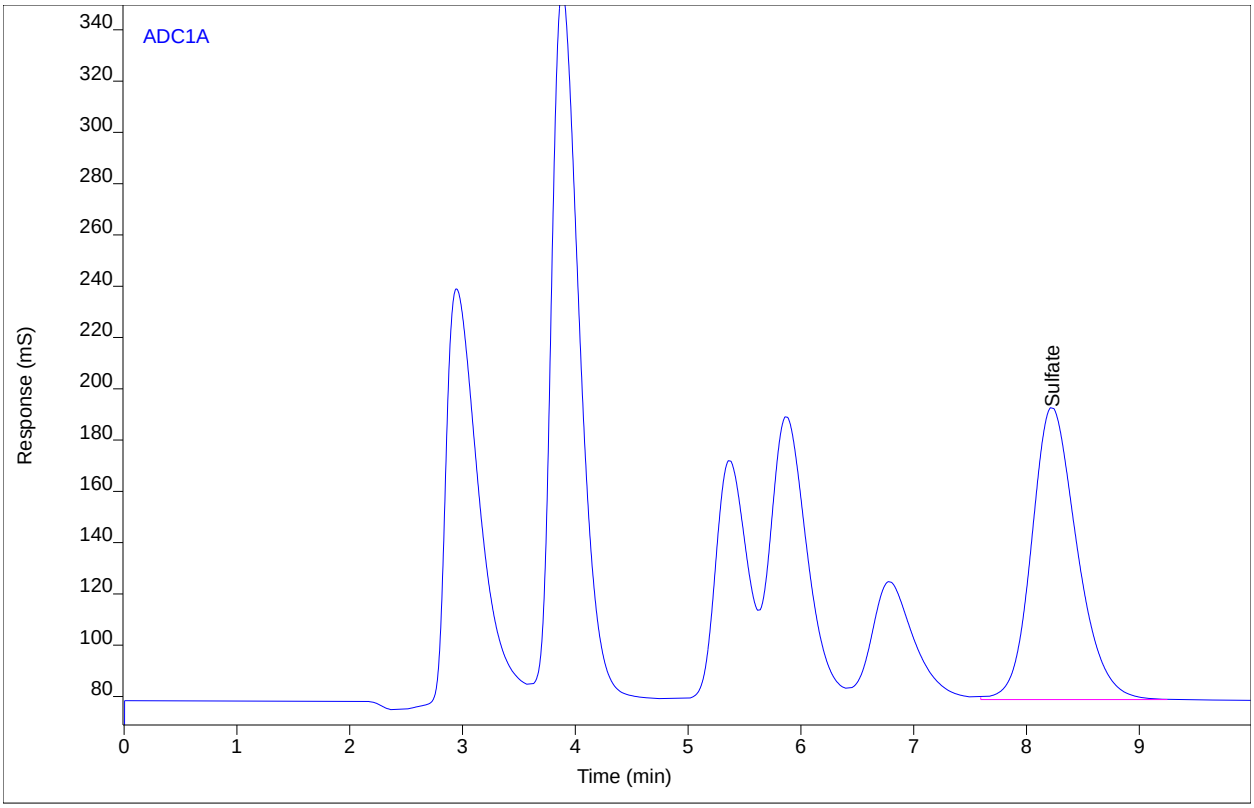
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	1534.42	54.0057	24.7565	1	24.7565	ug/mL

Chromatogram Report

Sample Name	HPLCStds422 #7
Sequence Name	Gonzo234 ver.3
Inj Data File	007-0801.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/8/2017 11:51 PM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Enthalpy Analytical

Sample Type	Calibration
Vial Number	7
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



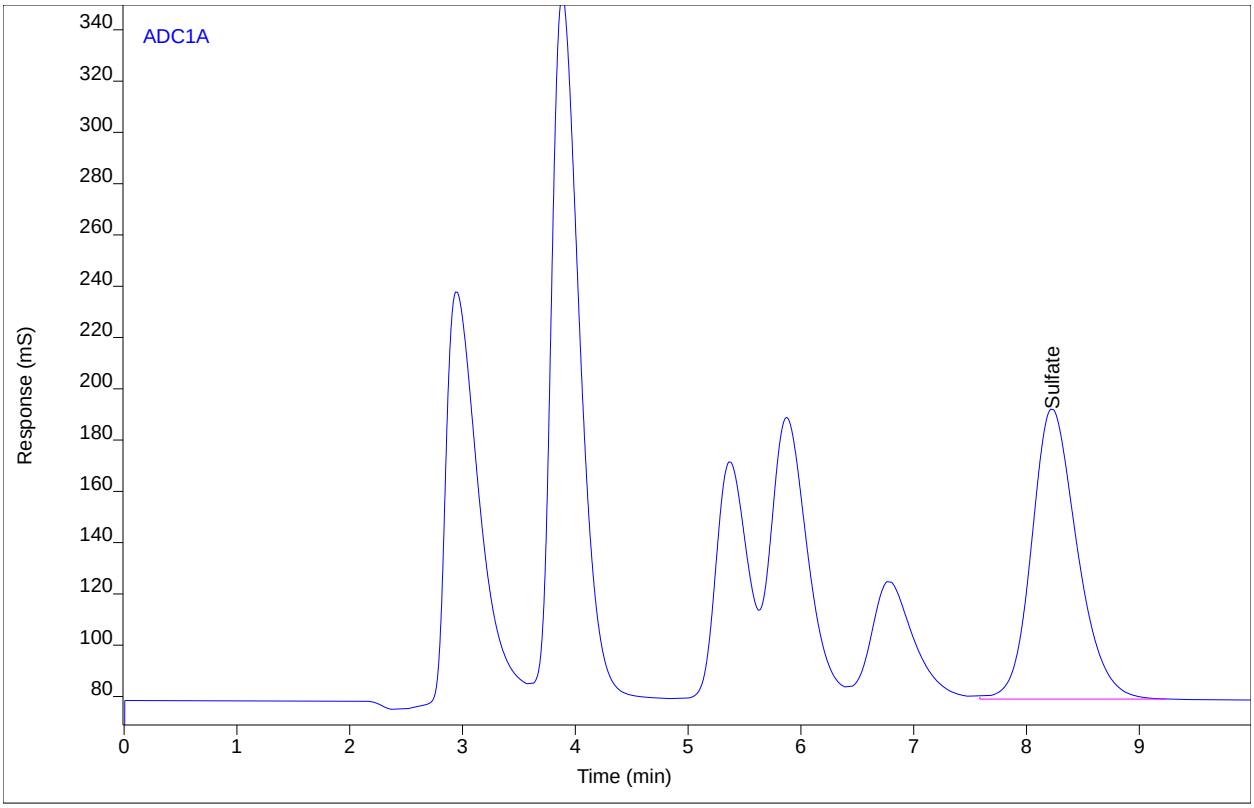
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	3190.47	114.128	51.4011	1	51.4011	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #7
Sequence Name	Gonzo234 ver.3
Inj Data File	007-0802.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 12:02 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	7
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



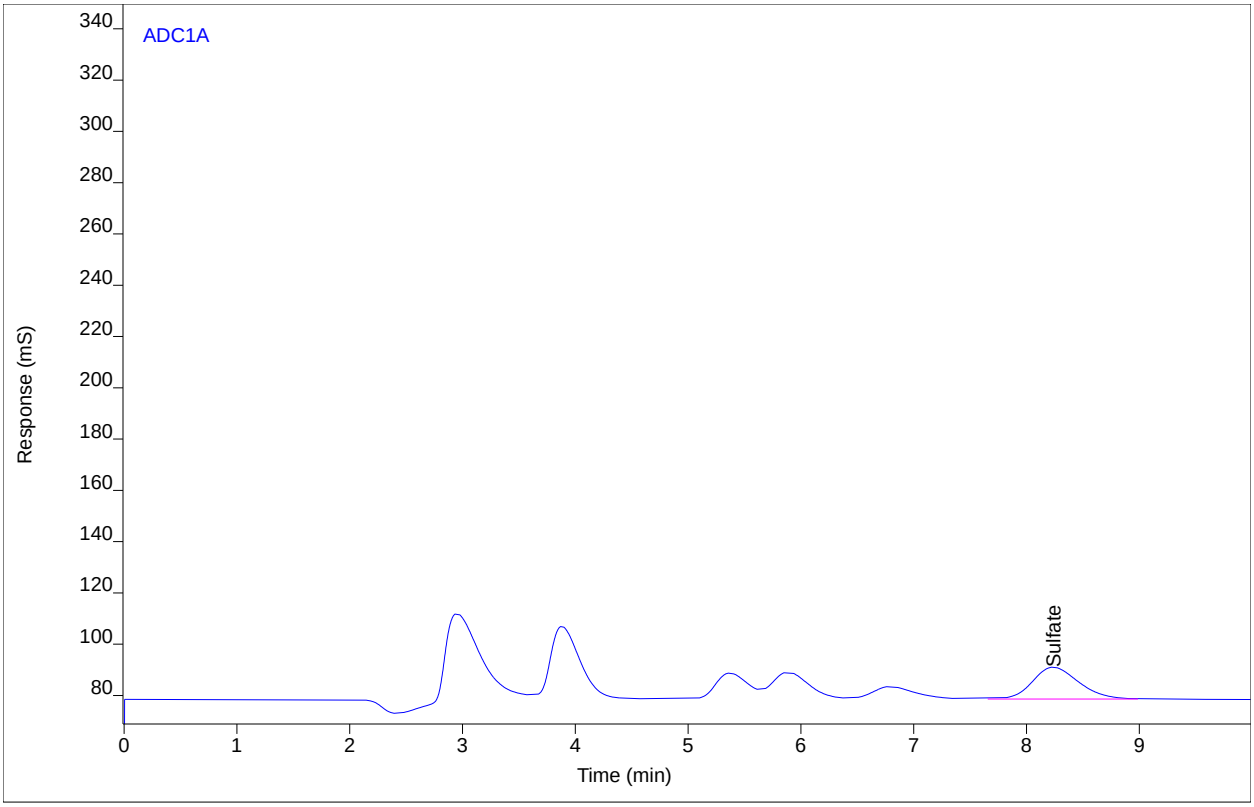
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	3175.14	113.318	51.1546	1	51.1546	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo234 ver.3
Inj Data File	008-0901.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 12:14 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



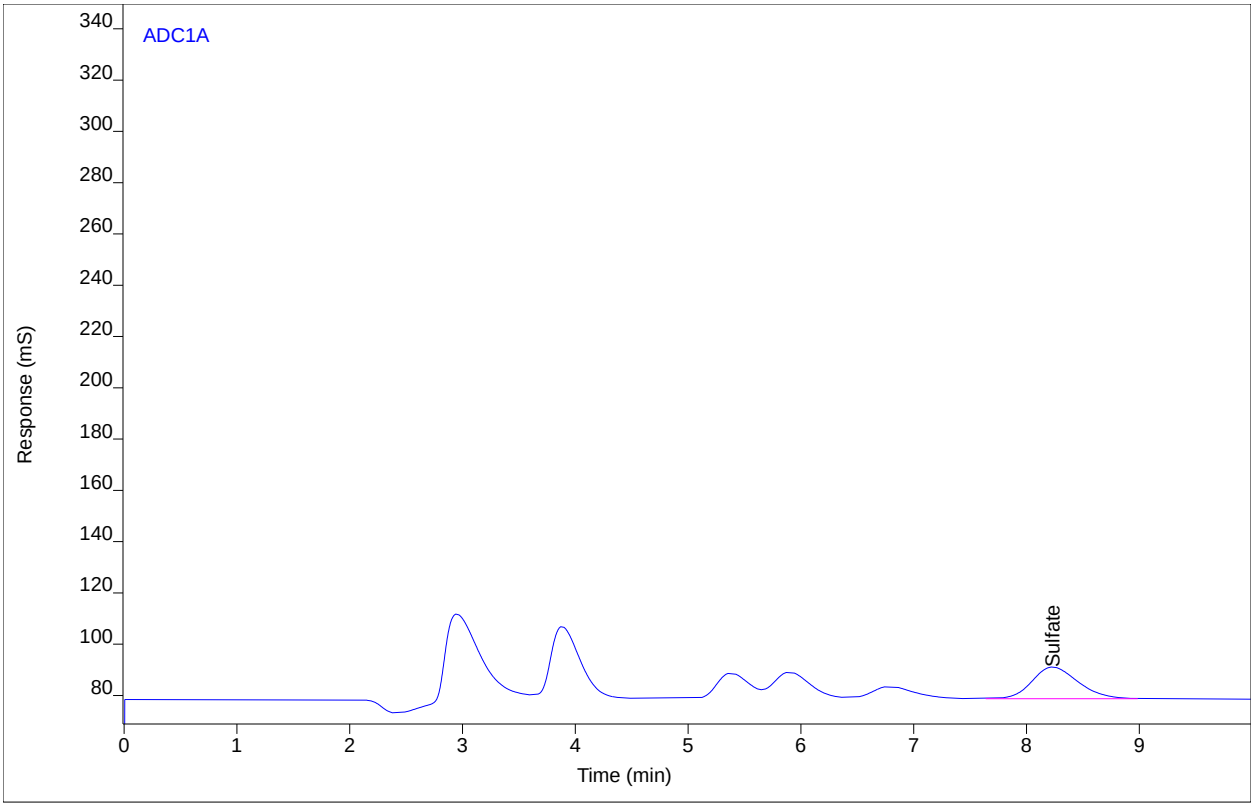
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.24	351.597	12.4511	5.72558	1	5.72558	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo234 ver.3
Inj Data File	008-0902.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 12:26 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



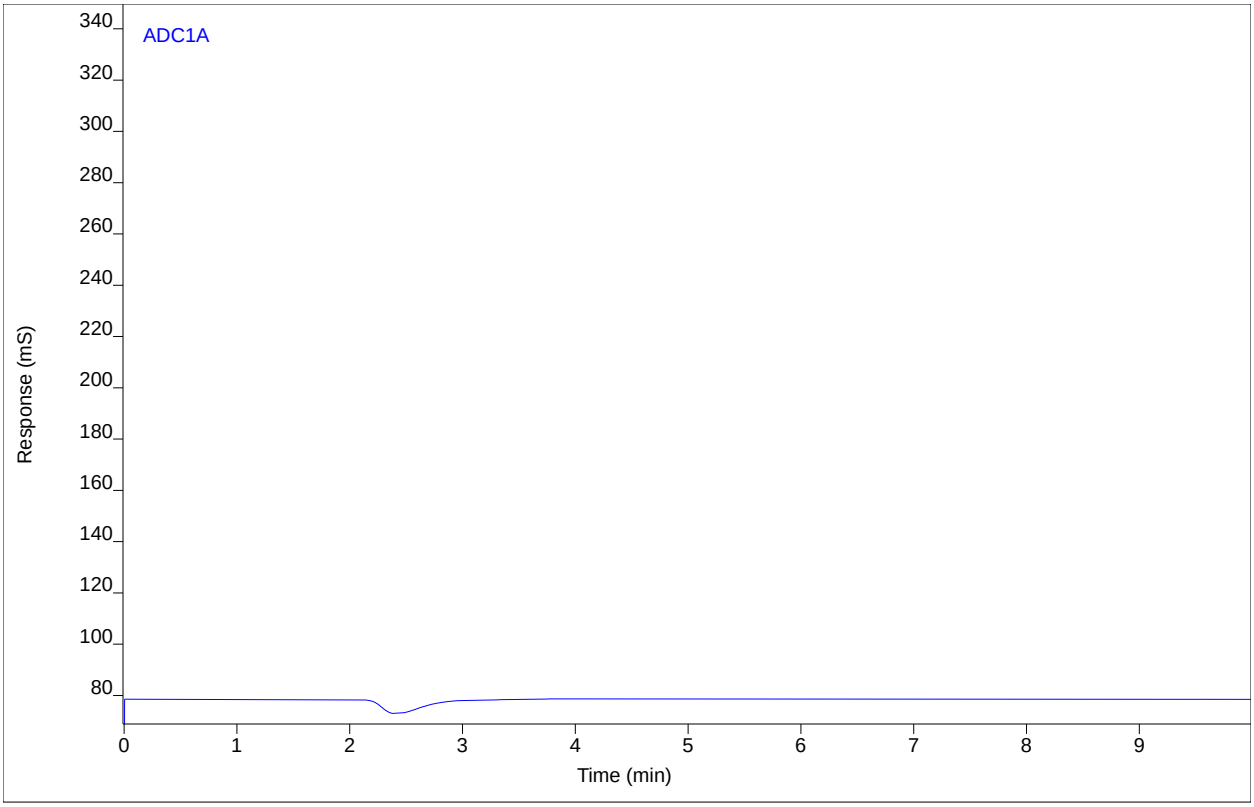
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.23	350.107	12.3695	5.70162	1	5.70162	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo234 ver.3
Inj Data File	009-1001.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 12:37 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



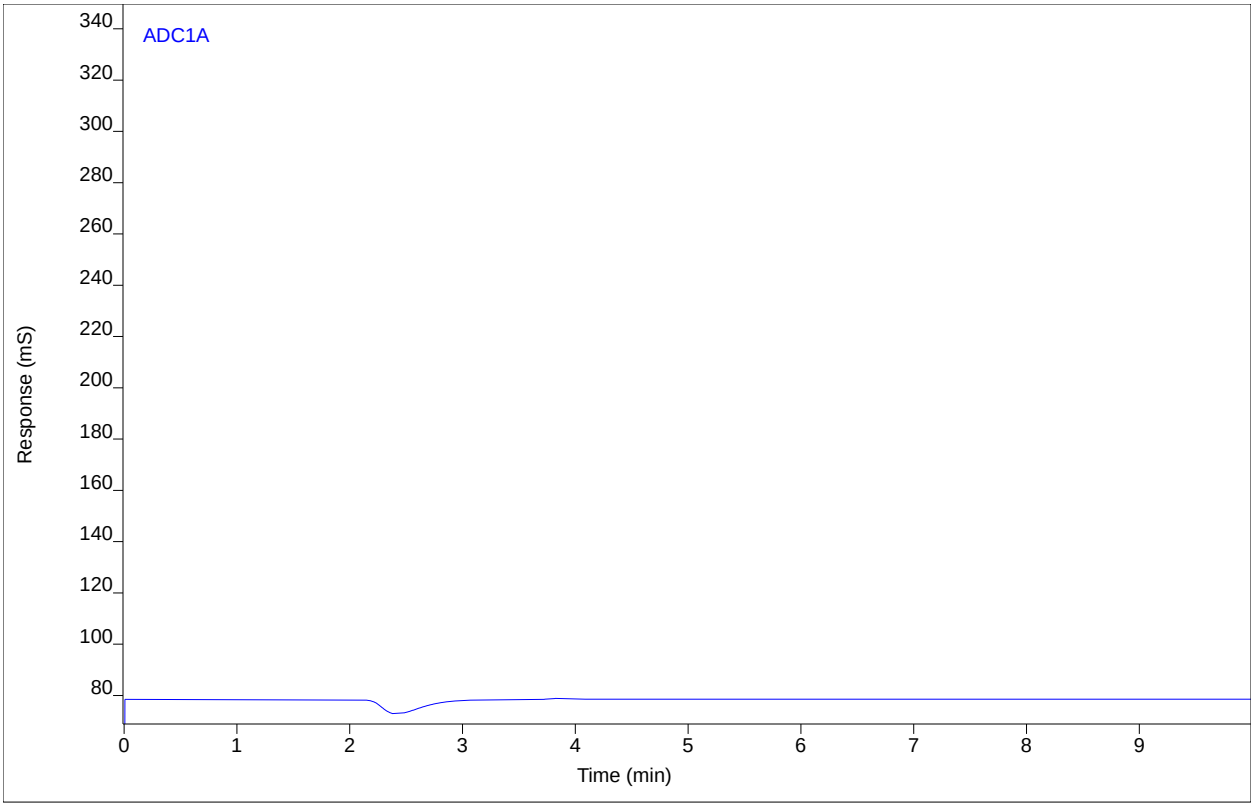
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.24)				1		ug/mL

Chromatogram Report

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo234 ver.3
Inj Data File	009-1002.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 12:49 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Enthalpy Analytical

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



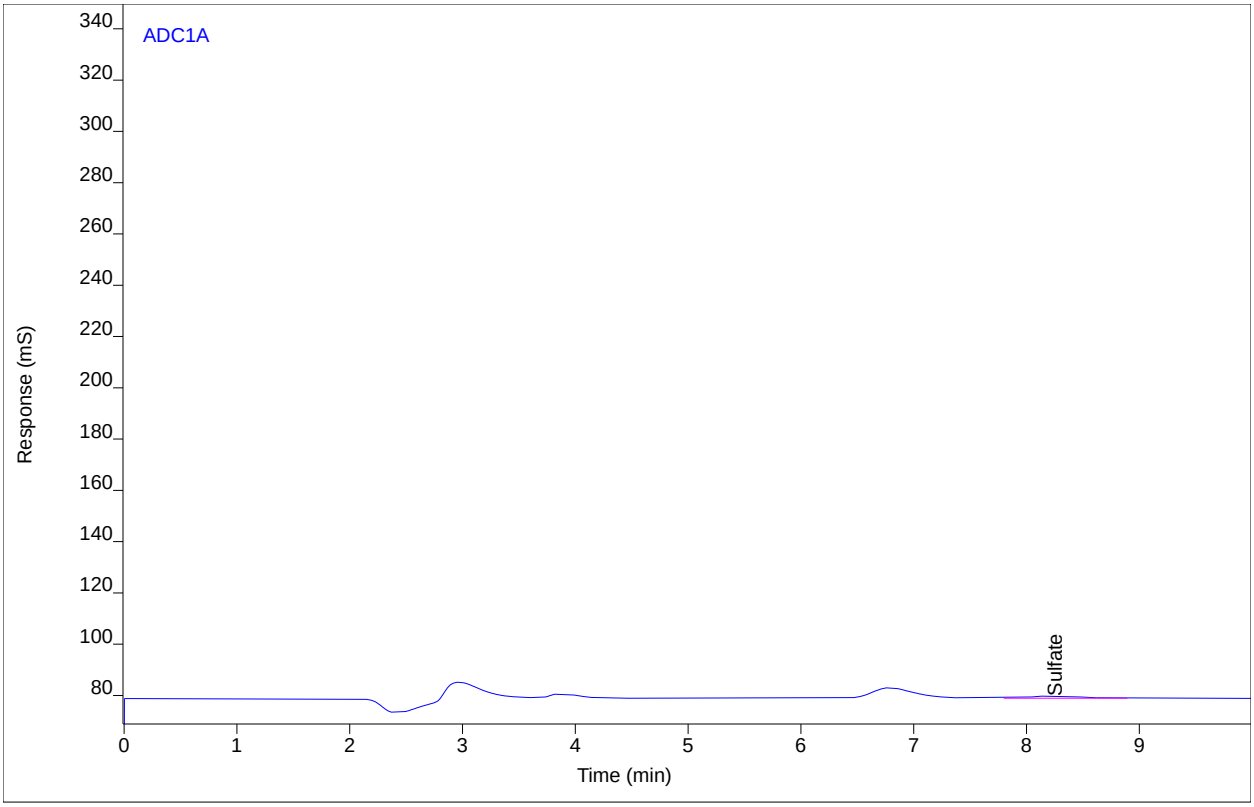
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(8.24)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.M8A
Sequence Name	Gonzo234 ver.3
Inj Data File	023-1301.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 1:47 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	23
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



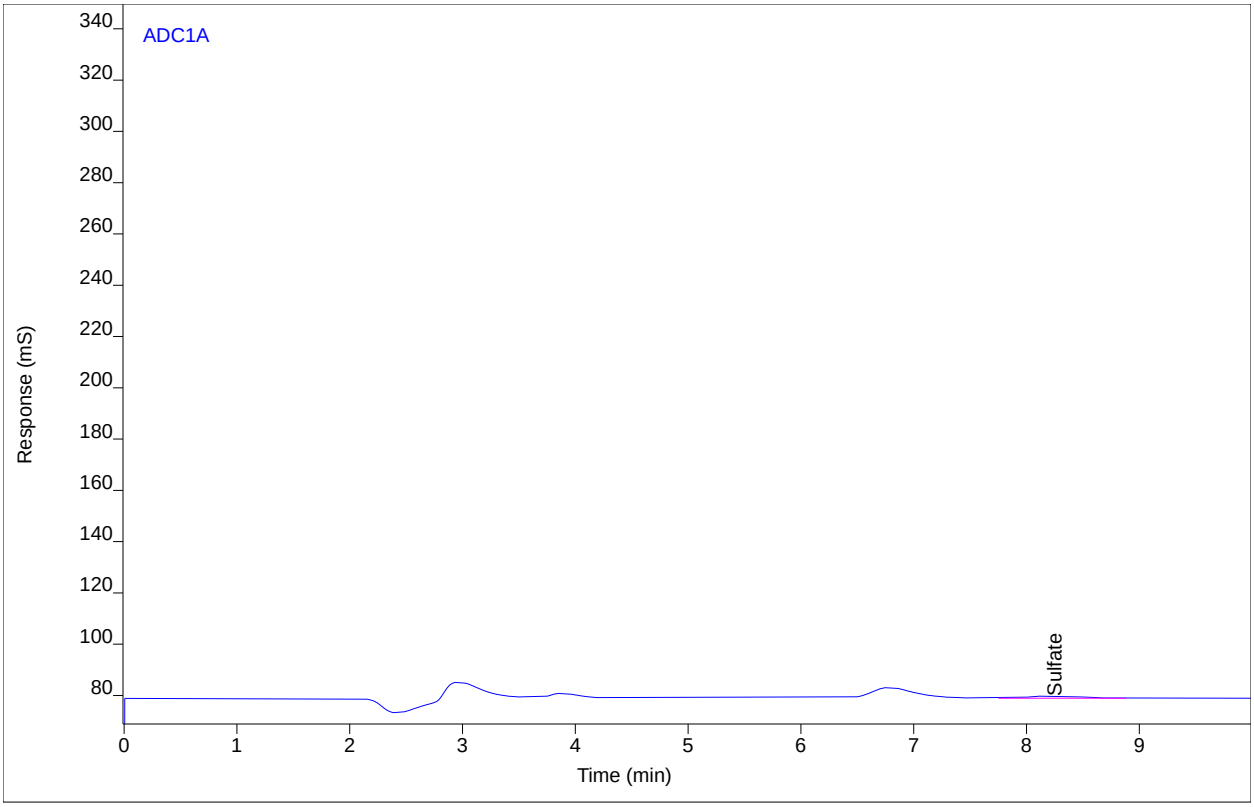
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.25	28.3962	0.99811	0.52551	1	0.52551	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R3.M8A
Sequence Name	Gonzo234 ver.3
Inj Data File	023-1302.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 1:59 AM
File Modified	4/10/2017 3:19 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	23
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	8.25	28.7291	1.02029	0.53086	1	0.53086	ug/mL

Analyst Peak Integration Comments

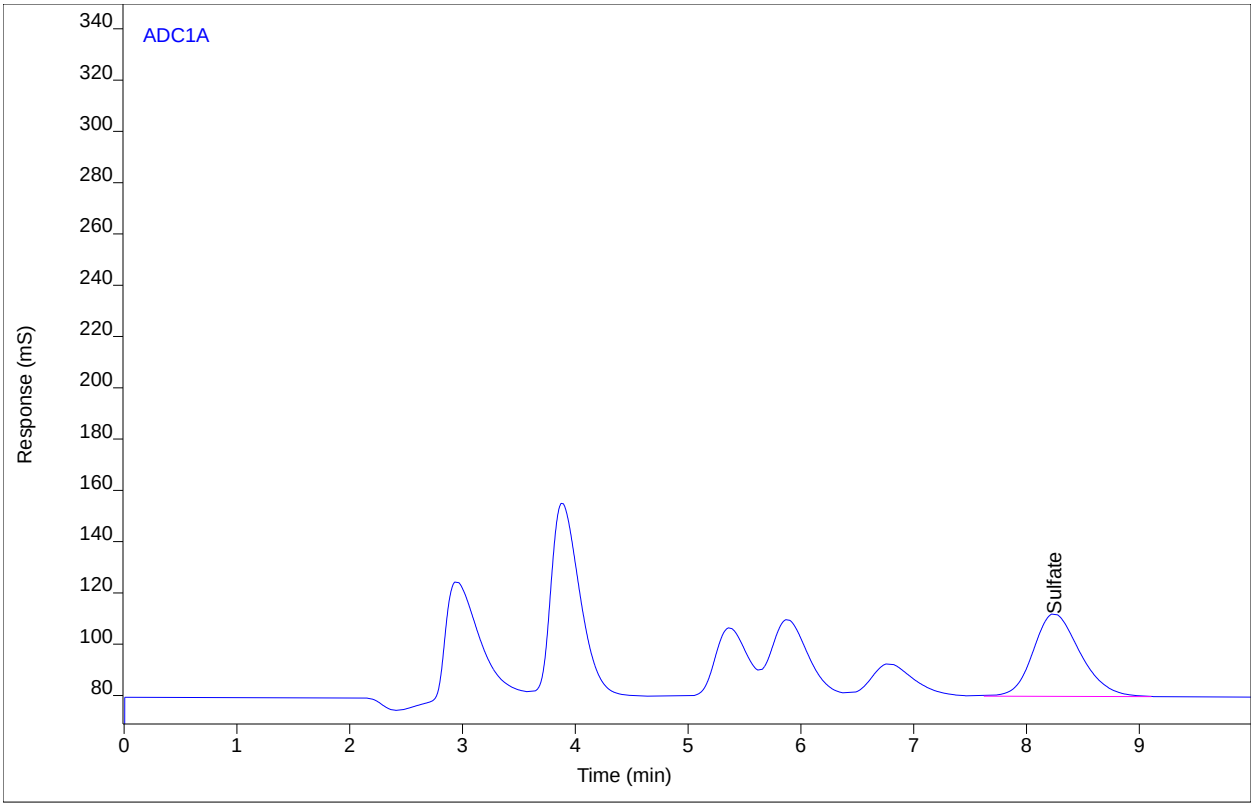
09:47:31 04/10/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo234 ver.3
Inj Data File	005-2201.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 5:17 AM
File Modified	4/10/2017 3:20 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



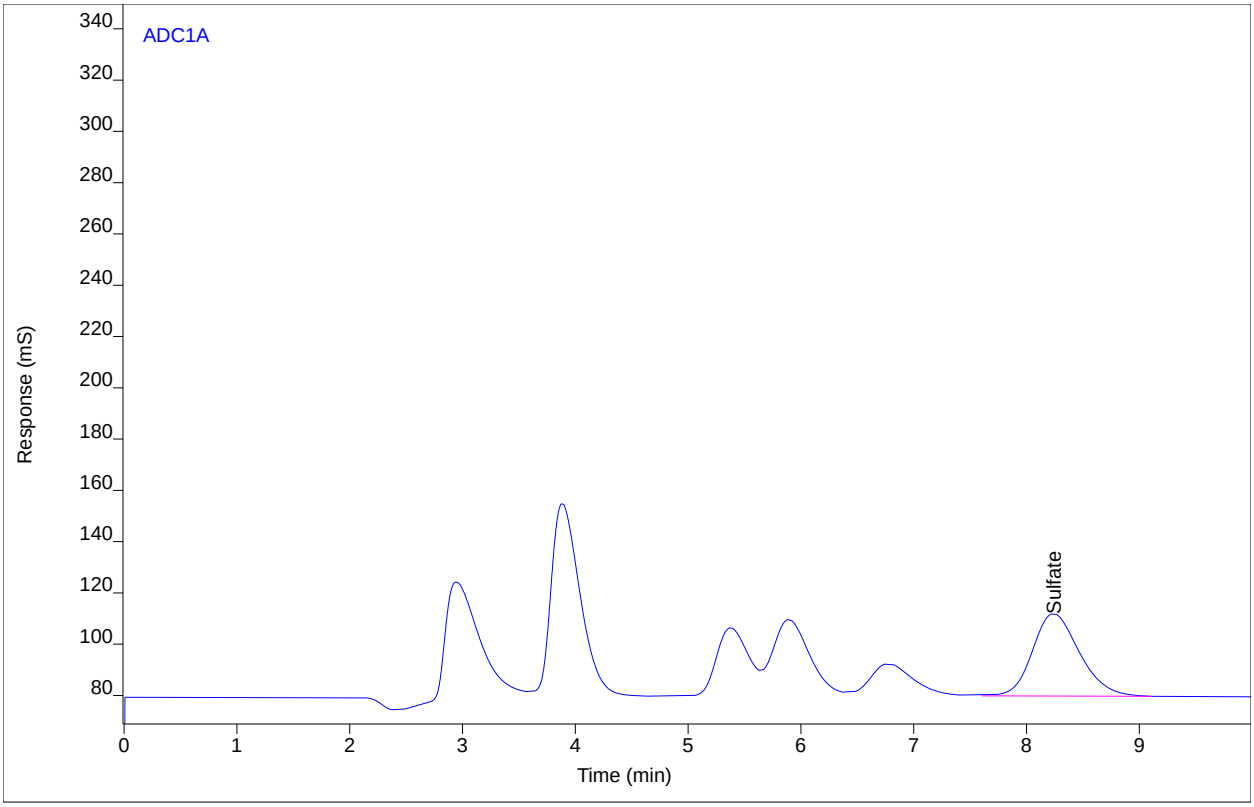
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.25	928.347	32.2493	15.0051	1	15.0051	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo234 ver.3
Inj Data File	005-2202.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/9/2017 5:29 AM
File Modified	4/10/2017 3:20 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo234.M
Method Modified	4/10/2017 2:14 PM
Printed	4/13/2017 11:23 AM



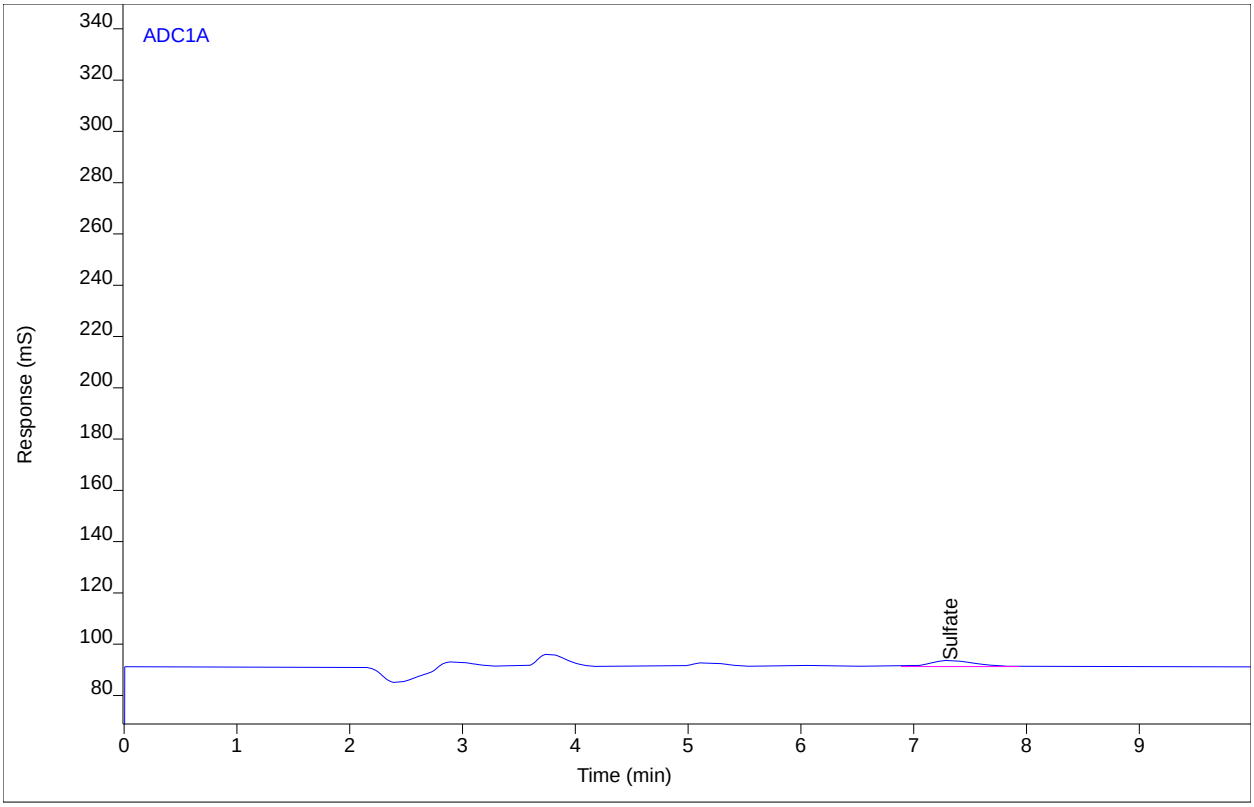
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	8.24	928.902	32.1758	15.0140	1	15.0140	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #2
Sequence Name	Gonzo235 2 ver.11
Inj Data File	002-0301.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 12:26 PM
File Modified	4/13/2017 10:59 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	2
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BV	7.32	64.1008	2.41874	1.10869	1	1.10869	ug/mL

Analyst Peak Integration Comments

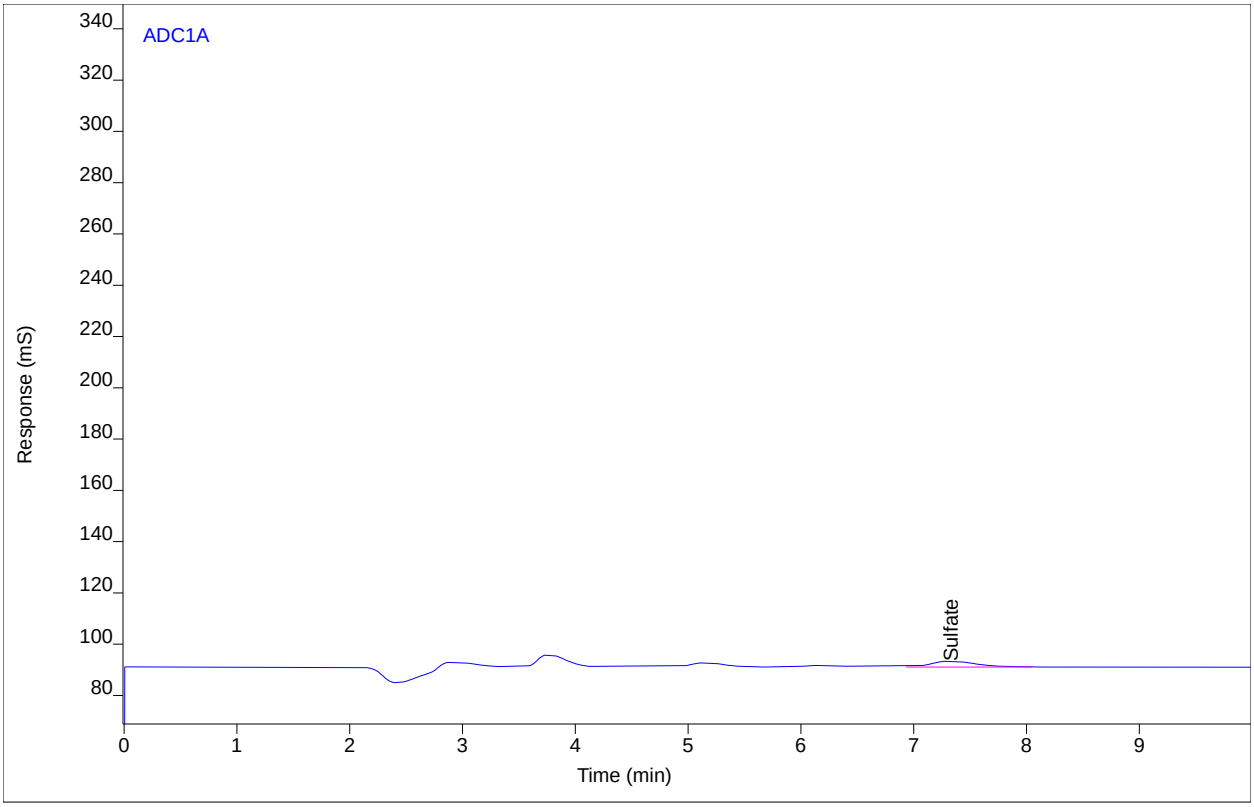
11:16:21 04/12/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #2
Sequence Name	Gonzo235 2 ver.11
Inj Data File	002-0302.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 12:38 PM
File Modified	4/13/2017 10:59 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	2
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.33	62.7169	2.38415	1.08660	1	1.08660	ug/mL

Analyst Peak Integration Comments

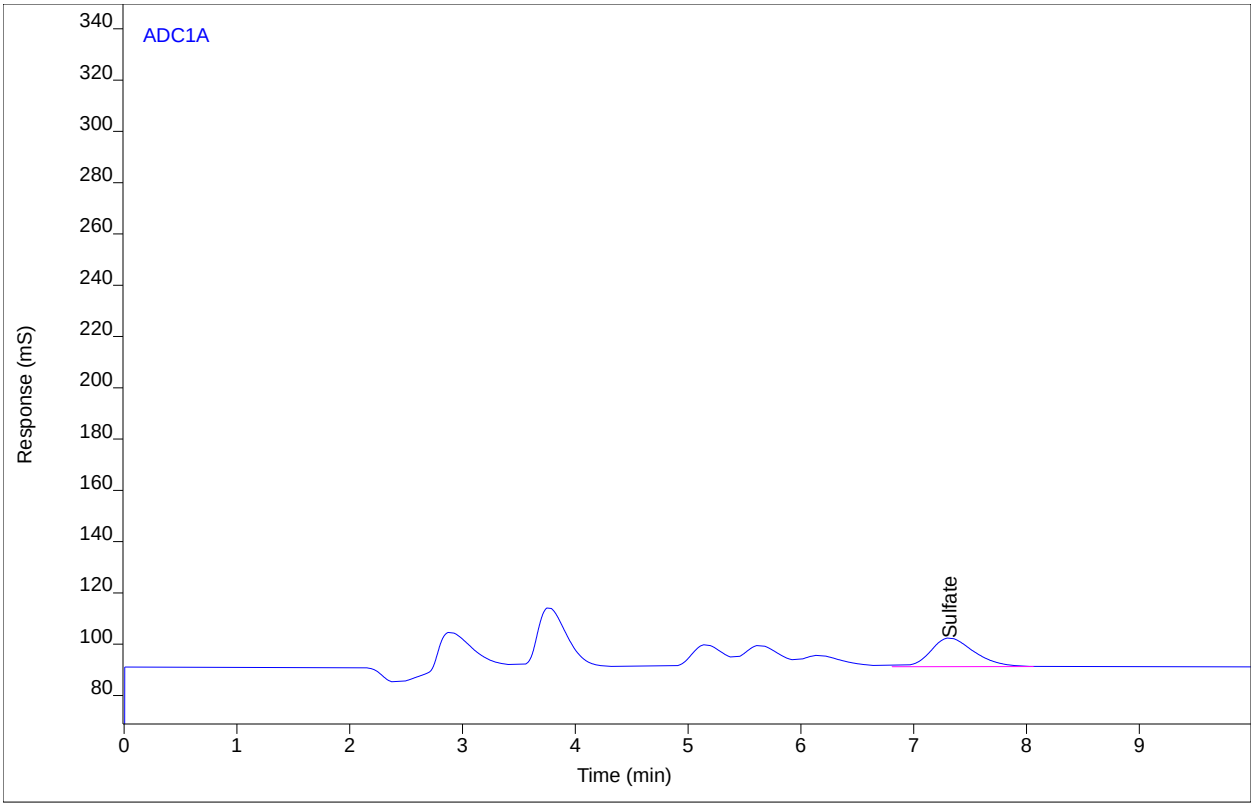
11:16:39 04/12/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #3
Sequence Name	Gonzo235 2 ver.11
Inj Data File	003-0401.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 12:50 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	3
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



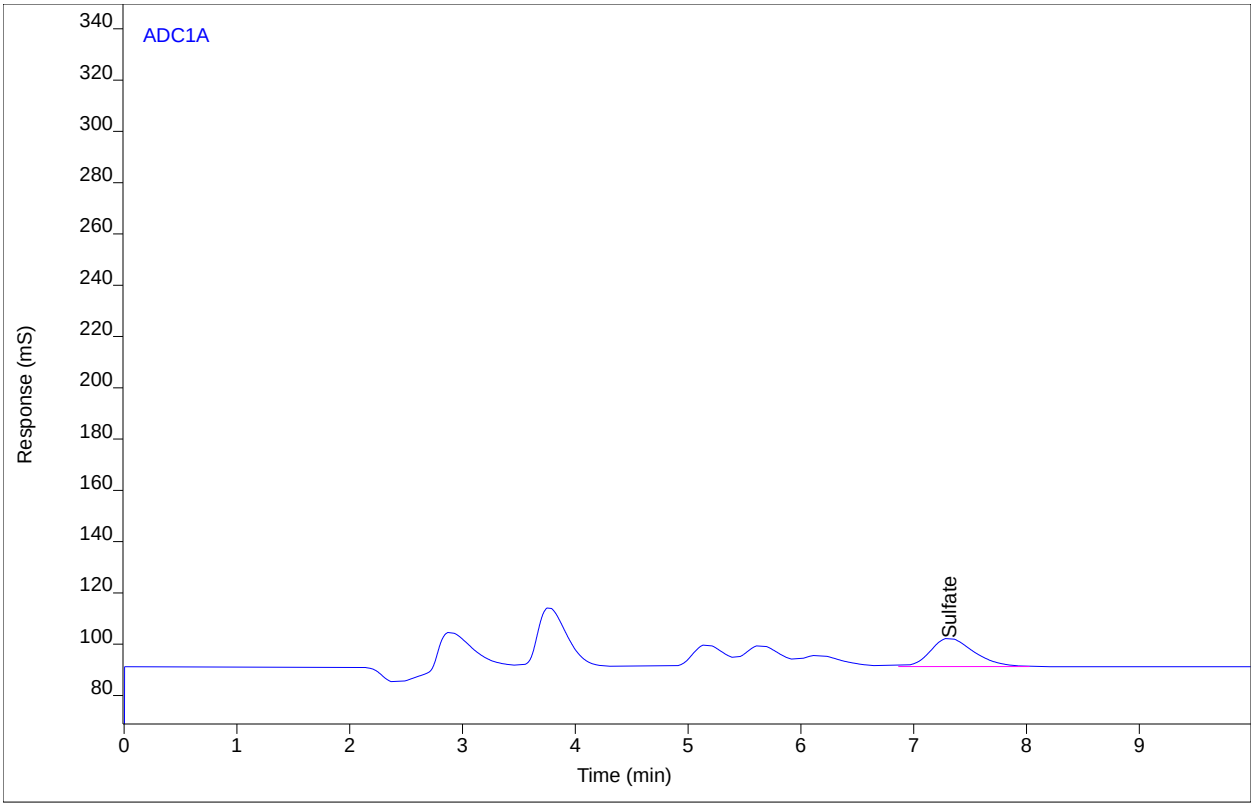
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	7.32	297.634	11.1955	4.83703	1	4.83703	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #3
Sequence Name	Gonzo235 2 ver.11
Inj Data File	003-0402.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 1:01 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	3
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



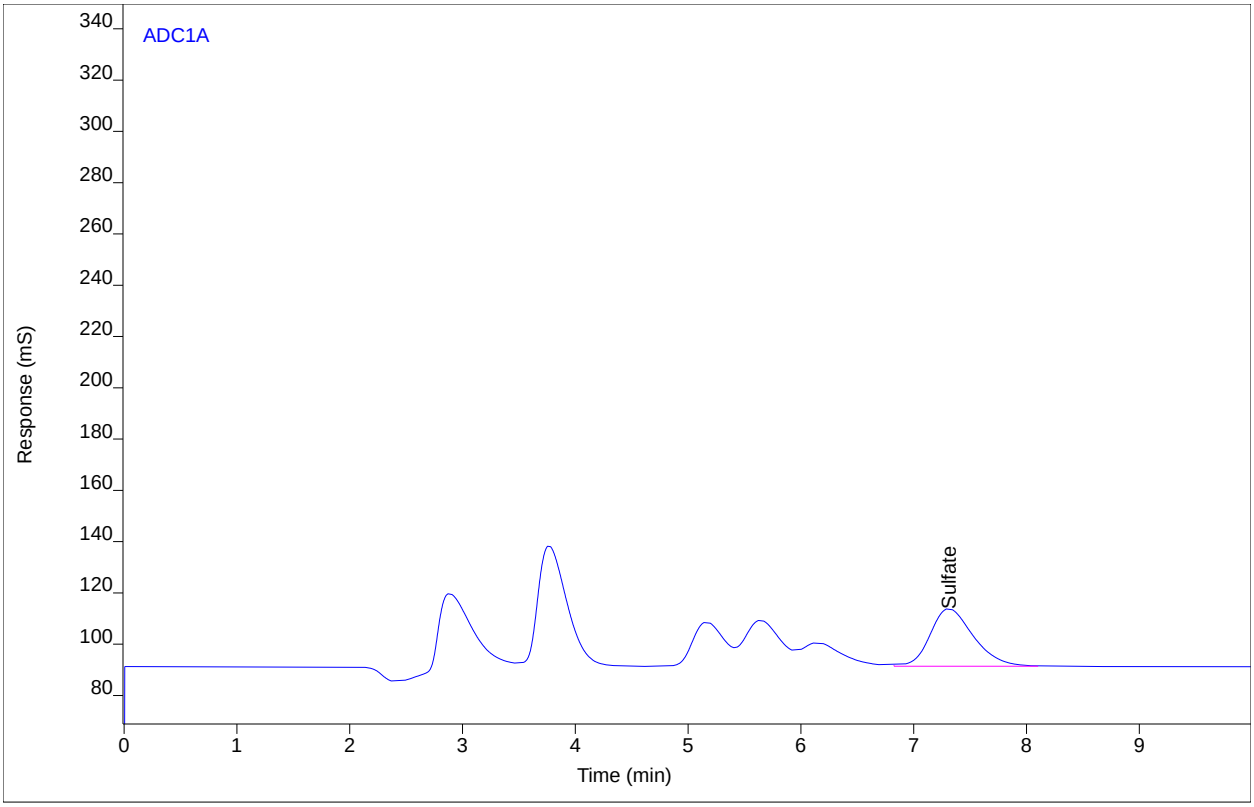
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.31	294.731	11.1342	4.79069	1	4.79069	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo235 2 ver.11
Inj Data File	004-0501.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 1:13 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



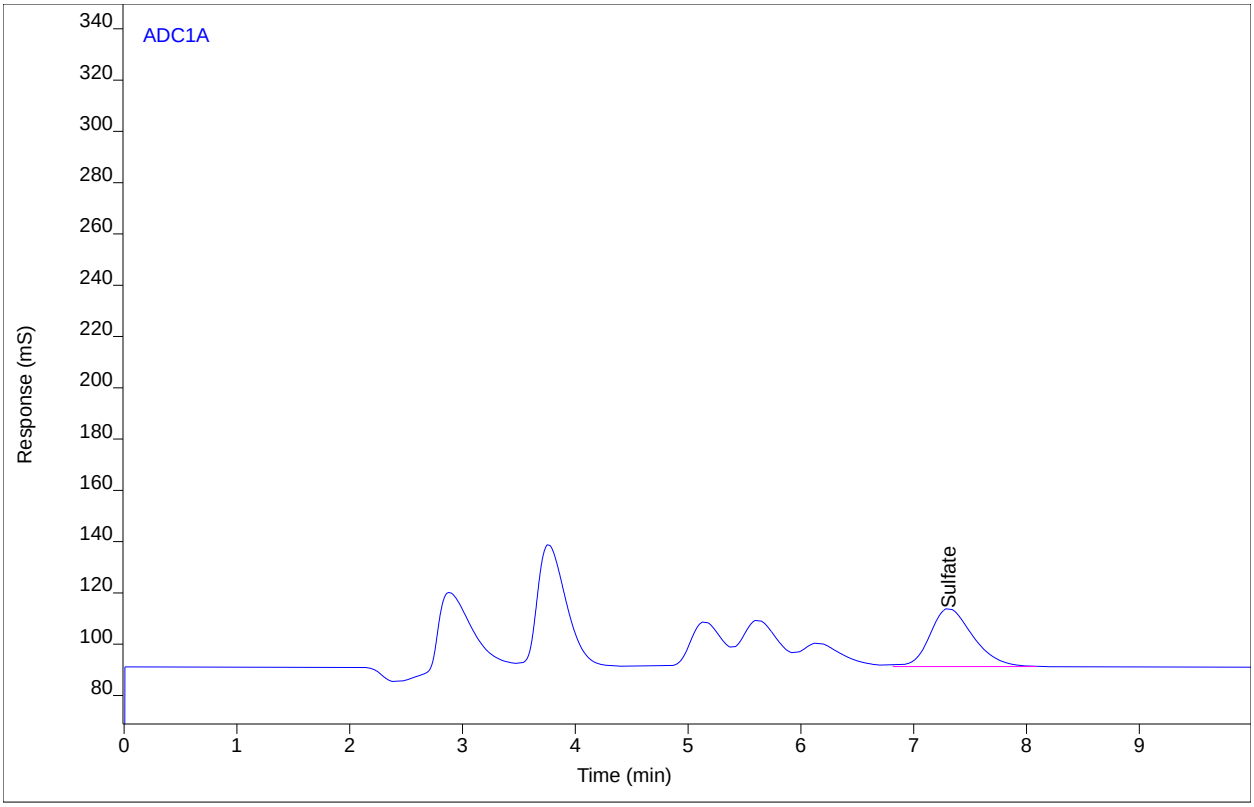
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.31	597.425	22.4800	9.62317	1	9.62317	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo235 2 ver.11
Inj Data File	004-0502.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 1:25 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



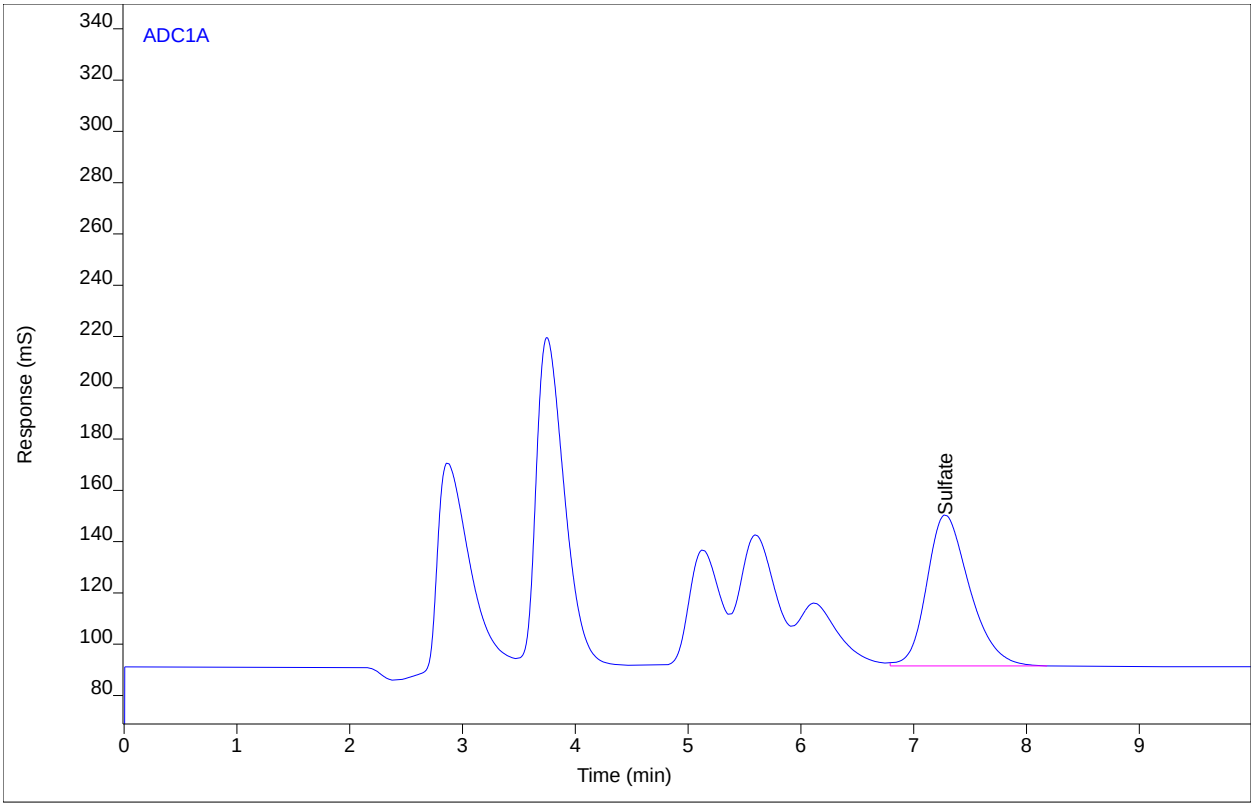
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	7.31	598.837	22.7361	9.64572	1	9.64572	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #6
Sequence Name	Gonzo235 2 ver.11
Inj Data File	006-0701.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 2:00 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	6
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



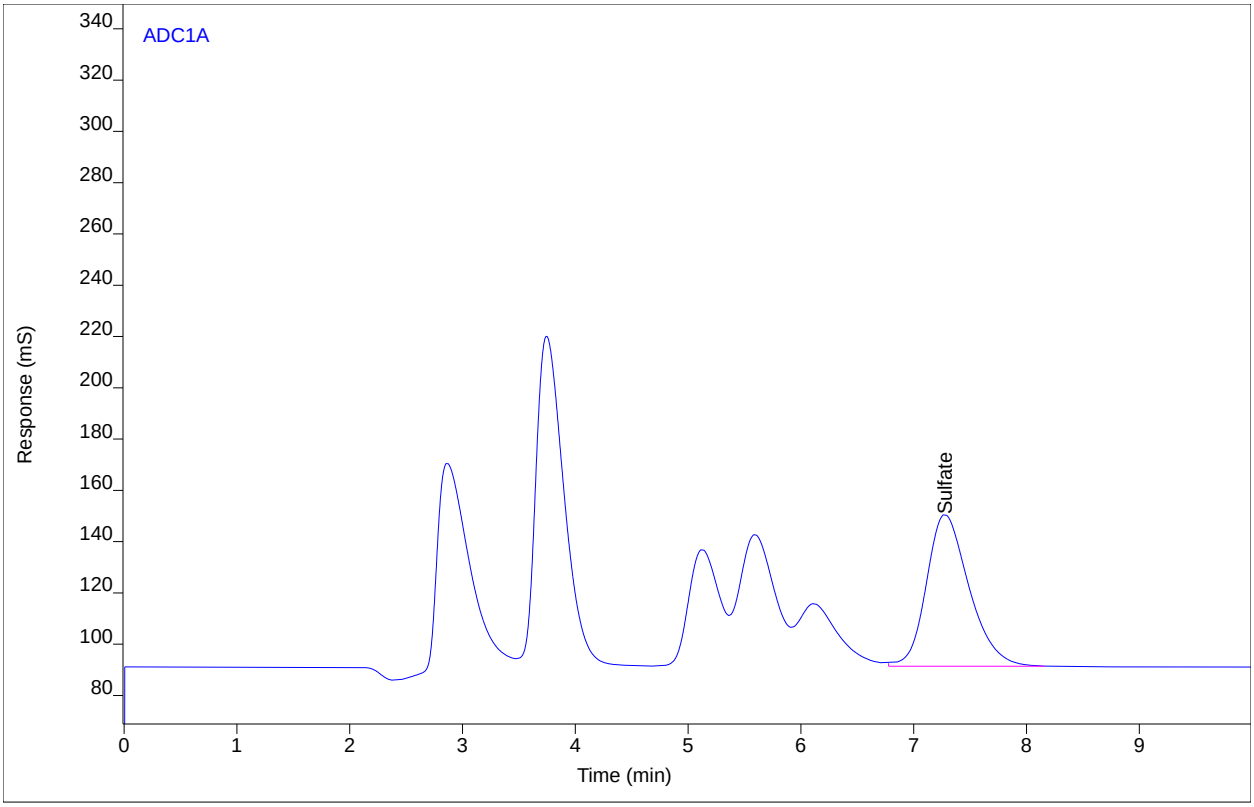
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.28	1550.85	58.9368	24.8445	1	24.8445	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #6
Sequence Name	Gonzo235 2 ver.11
Inj Data File	006-0702.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 2:12 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	6
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



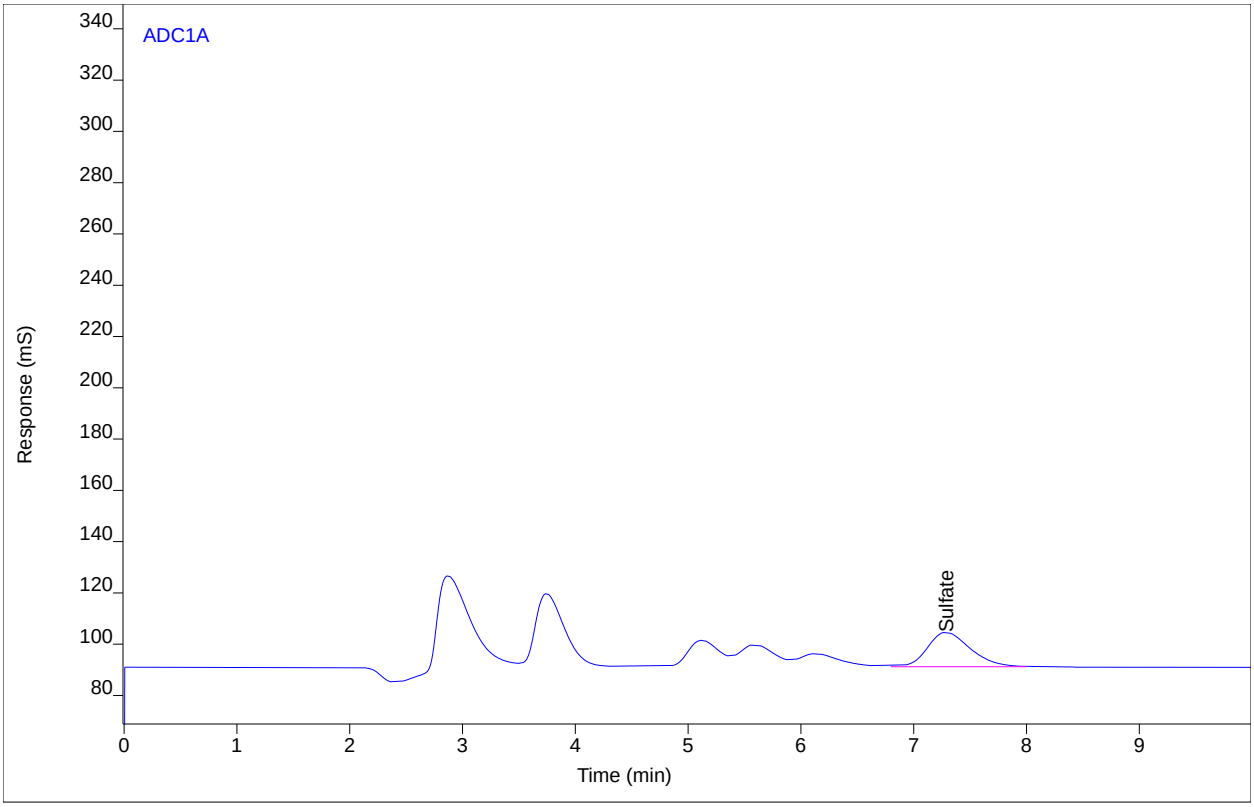
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	7.28	1553.92	59.1980	24.8936	1	24.8936	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo235 2 ver.11
Inj Data File	008-0801.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 2:23 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



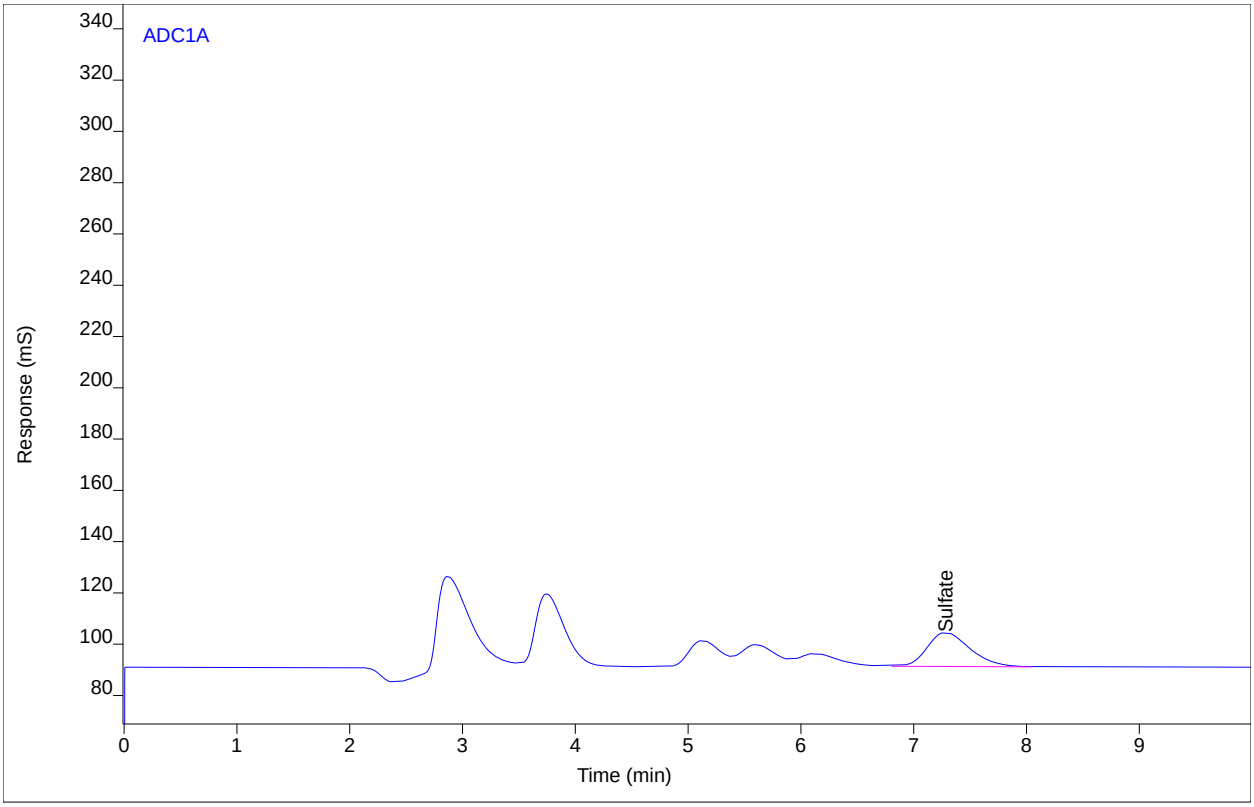
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	7.29	354.681	13.4726	5.74778	1	5.74778	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #SS
Sequence Name	Gonzo235 2 ver.11
Inj Data File	008-0802.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 2:35 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	8
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



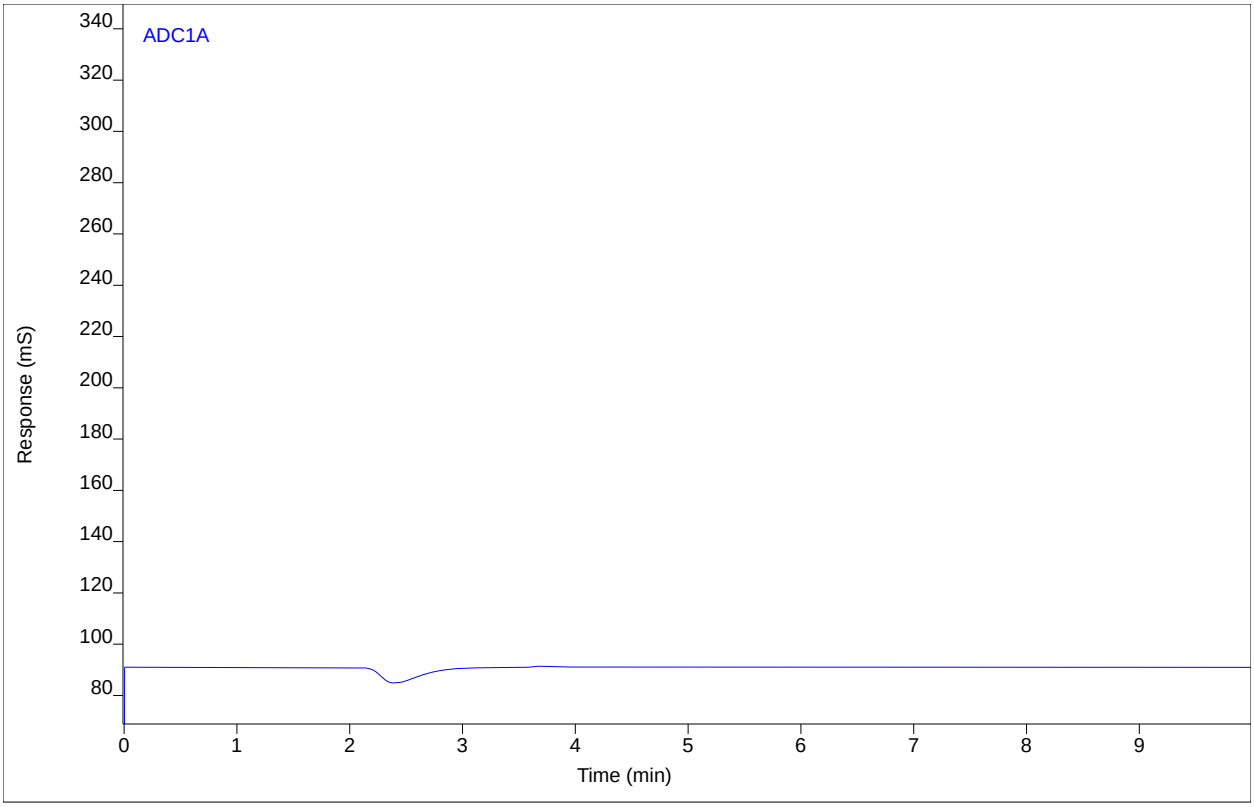
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.28	348.428	13.3387	5.64795	1	5.64795	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo235 2 ver.11
Inj Data File	009-0901.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 2:47 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



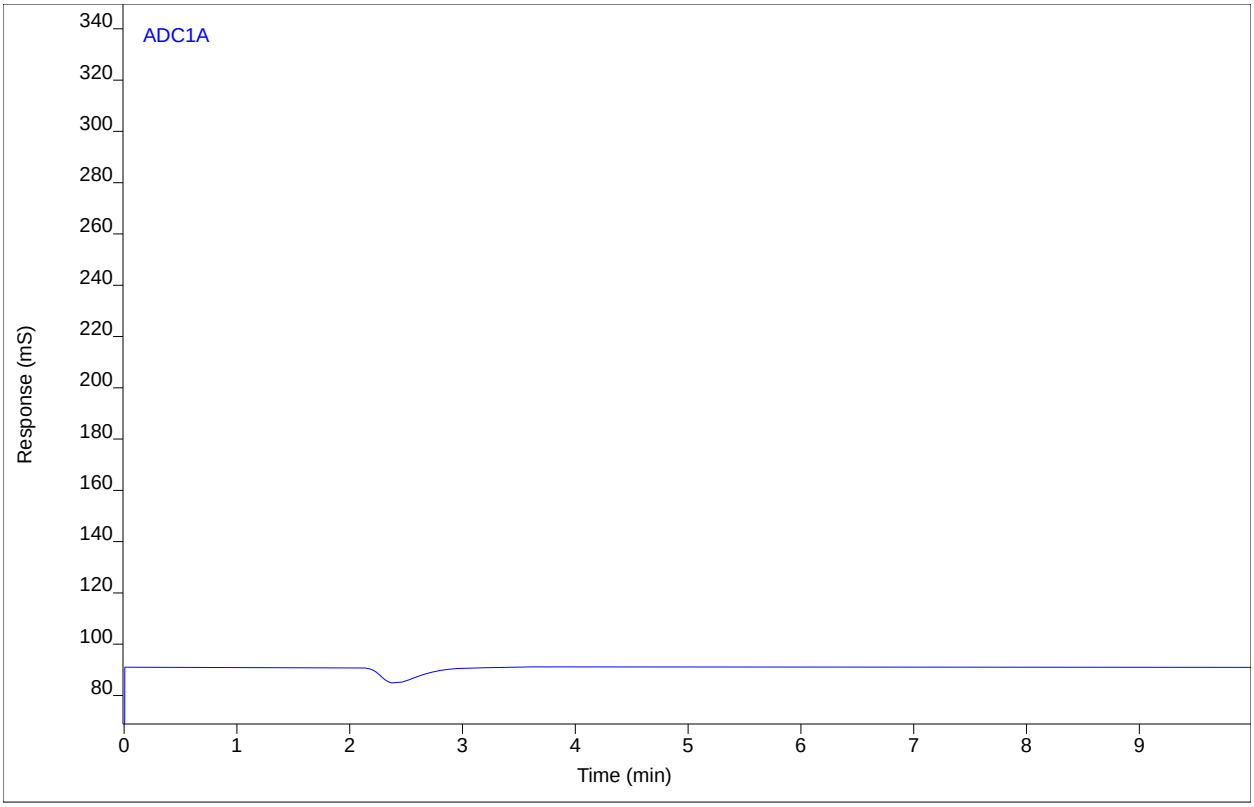
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(7.40)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #RB
Sequence Name	Gonzo235 2 ver.11
Inj Data File	009-0902.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 2:59 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Control
Vial Number	9
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



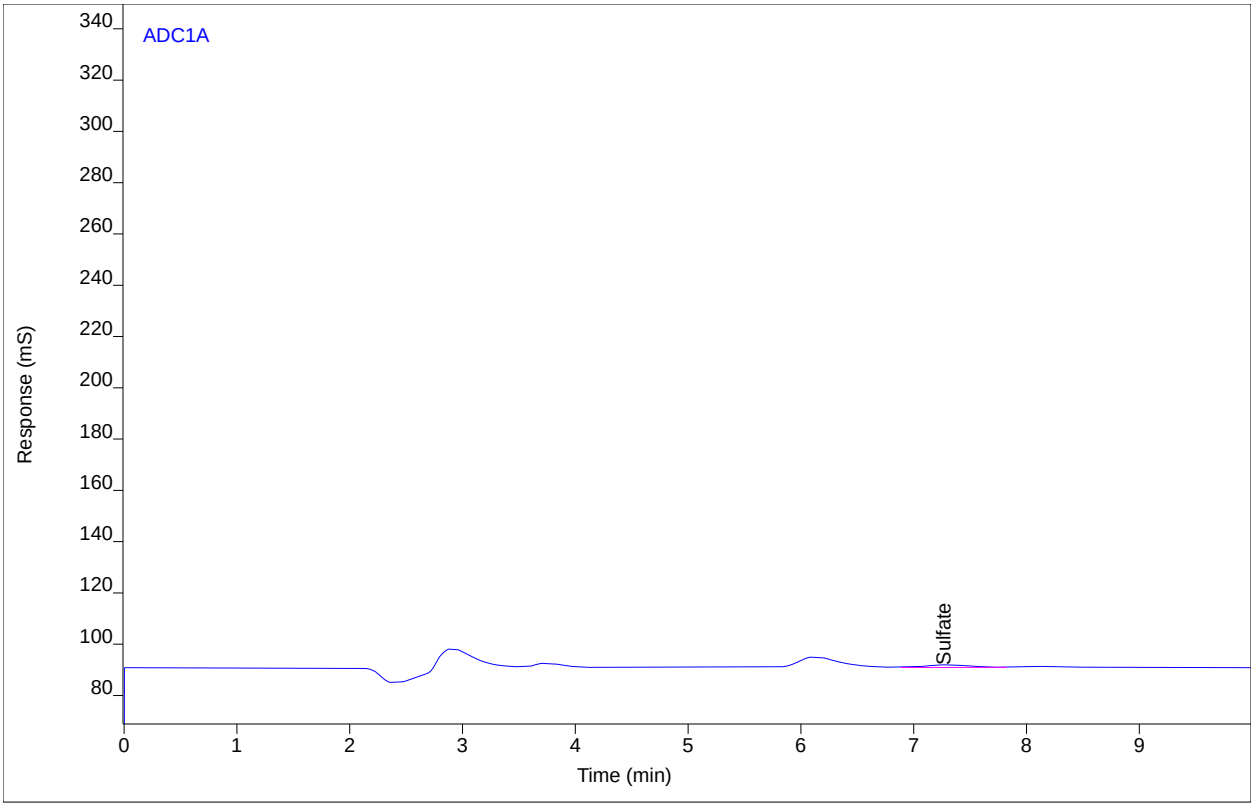
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate		(7.40)				1		ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	0317-144.R2.M8A
Sequence Name	Gonzo235 2 ver.11
Inj Data File	OnlineEdited34.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 6:18 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Sample
Vial Number	31
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	7.27	26.9145	1.05028	0.46977	1	0.46977	ug/mL

Analyst Peak Integration Comments

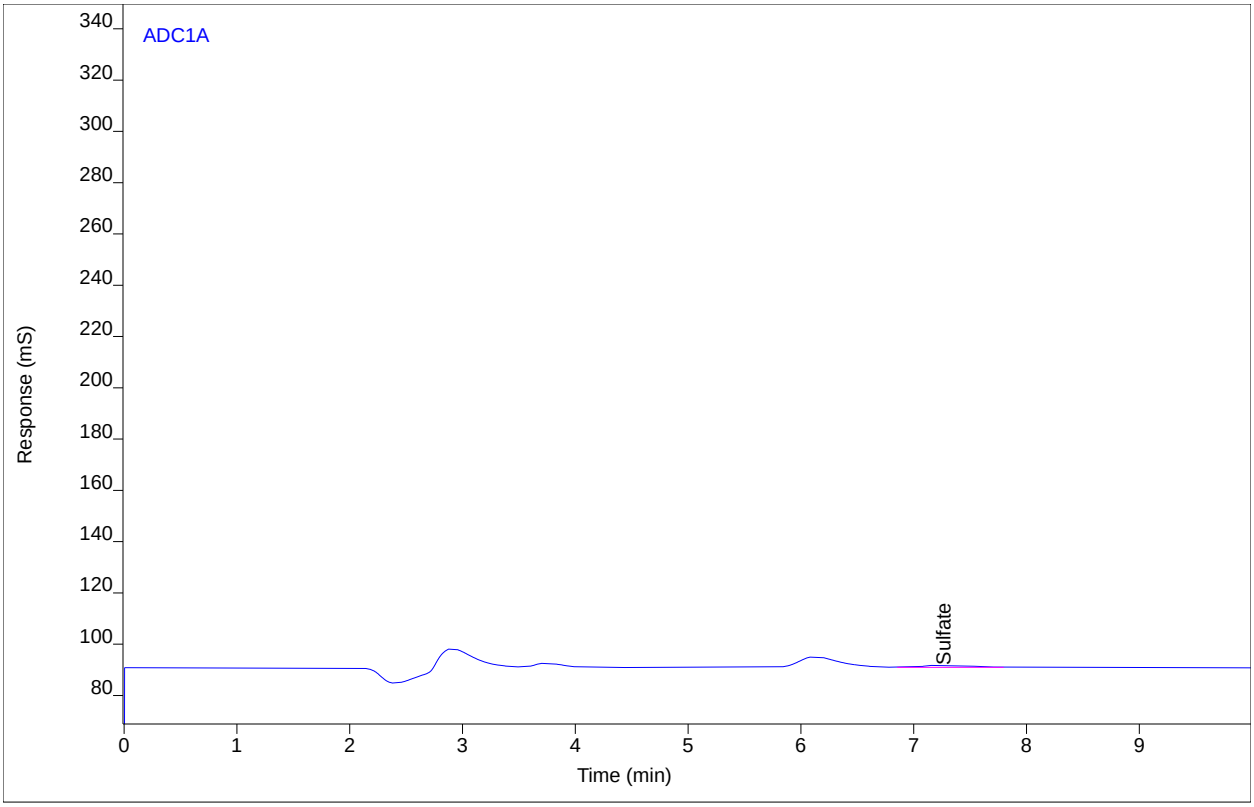
11:35:11 04/12/17 Amelia Paolantonio NI AMP

Chromatogram Report

Sample Name	0317-144.R2.M8A
Sequence Name	Gonzo235 2 ver.11
Inj Data File	OnlineEdited35.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 6:30 PM
File Modified	4/13/2017 11:00 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Enthalpy Analytical

Sample Type	Sample
Vial Number	31
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 10:59 AM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	7.26	25.7724	1.02266	0.44984	1	0.44984	ug/mL

Analyst Peak Integration Comments

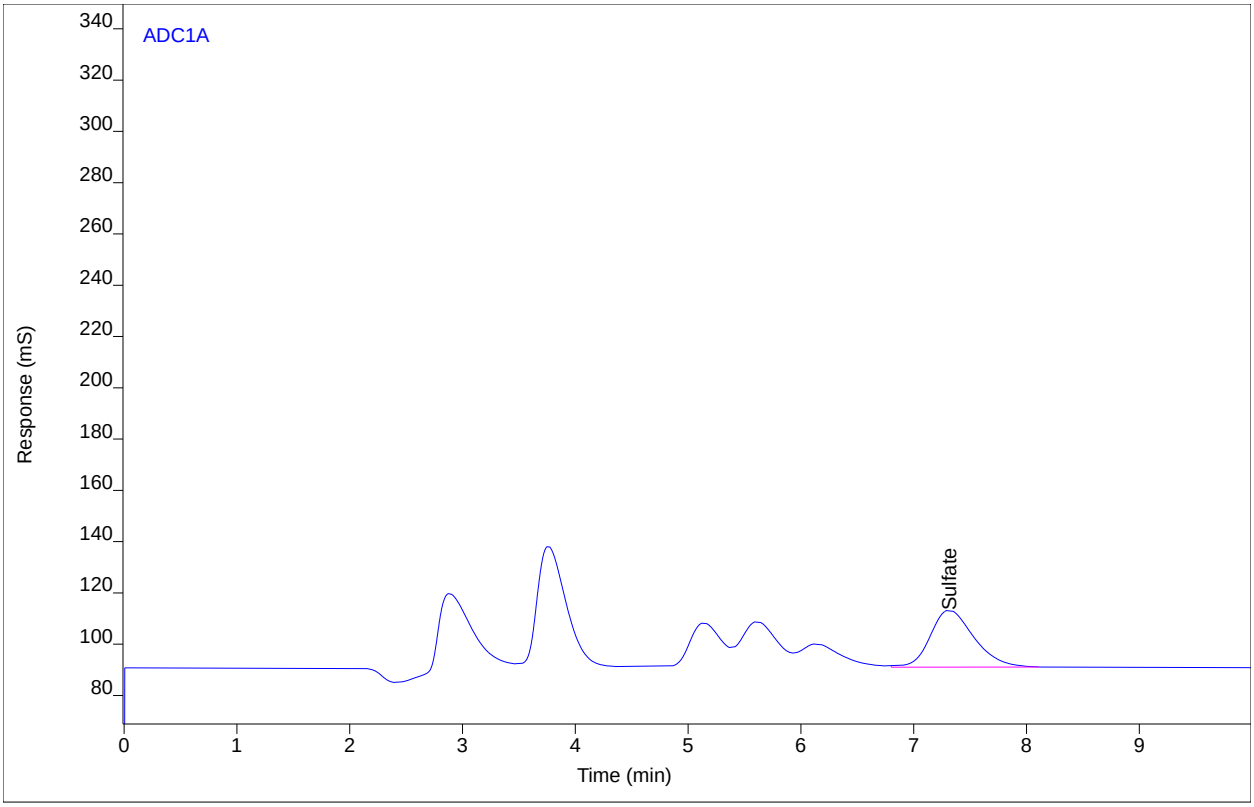
11:35:23 04/12/17 Amelia Paolantonio NI AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo235b ver.5
Inj Data File	004-0101.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 8:50 PM
File Modified	4/13/2017 11:01 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 11:01 AM
Printed	4/13/2017 11:23 AM



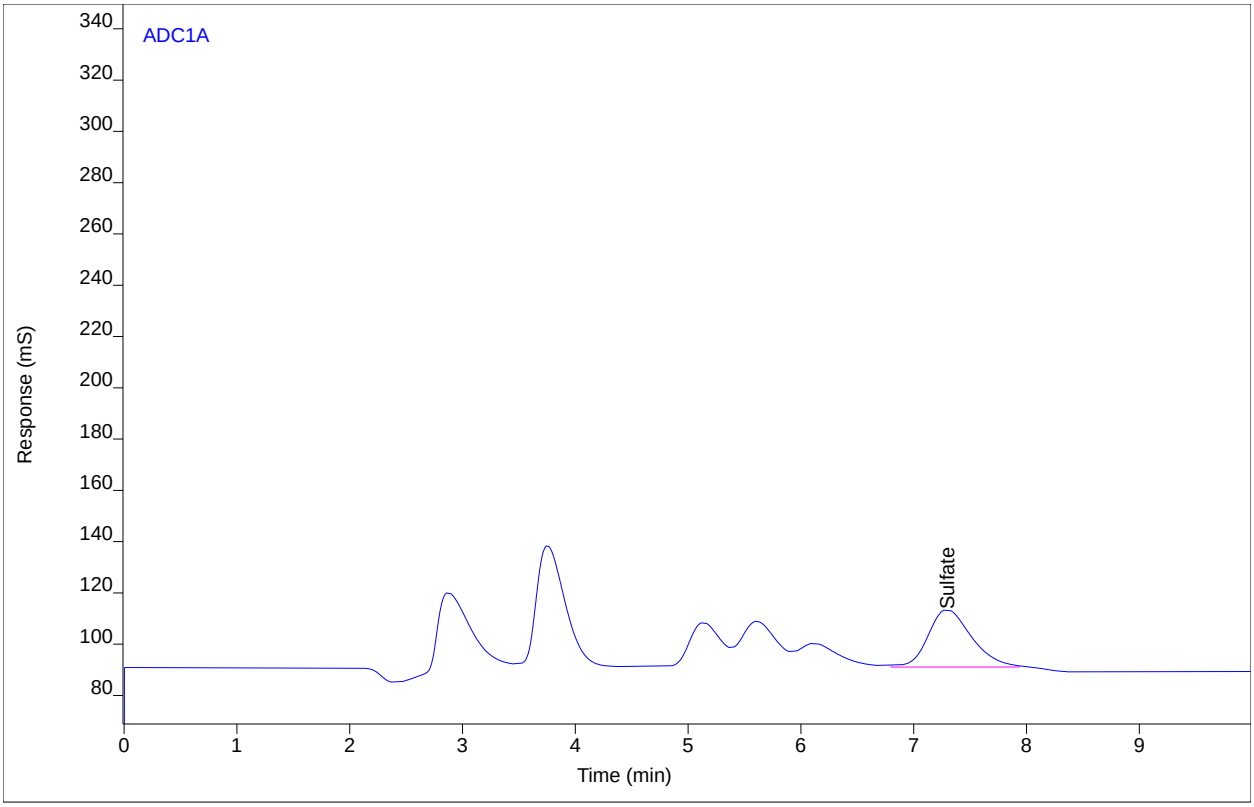
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	VB	7.32	596.261	22.2600	9.60458	1	9.60458	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #4
Sequence Name	Gonzo235b ver.5
Inj Data File	004-0102.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/11/2017 9:01 PM
File Modified	4/13/2017 11:01 AM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	4
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/13/2017 11:01 AM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	MM	7.30	596.318	22.4587	9.60550	1	9.60550	ug/mL

Analyst Peak Integration Comments

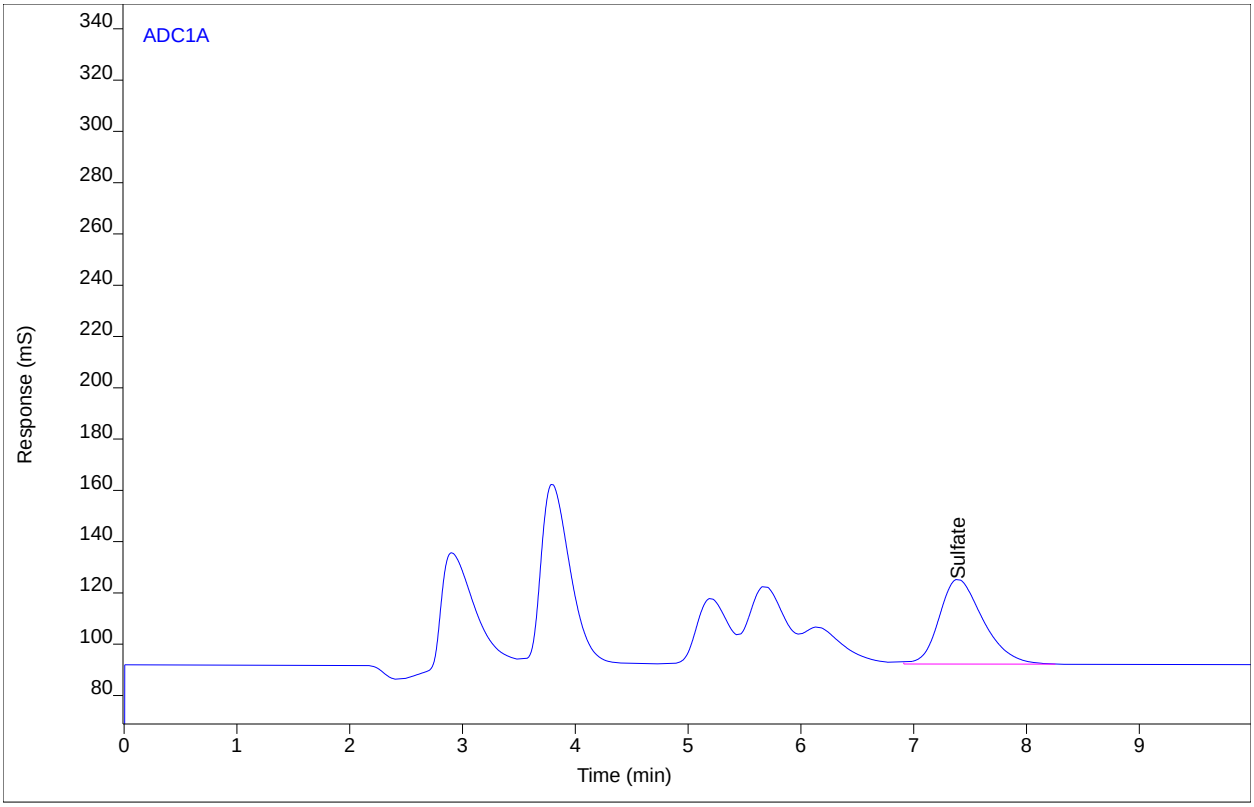
14:54:15 04/12/17 Amelia Paolantonio II AMP

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo235c ver.3
Inj Data File	005-0101.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/12/2017 11:31 AM
File Modified	4/12/2017 5:11 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/12/2017 5:11 PM
Printed	4/13/2017 11:23 AM



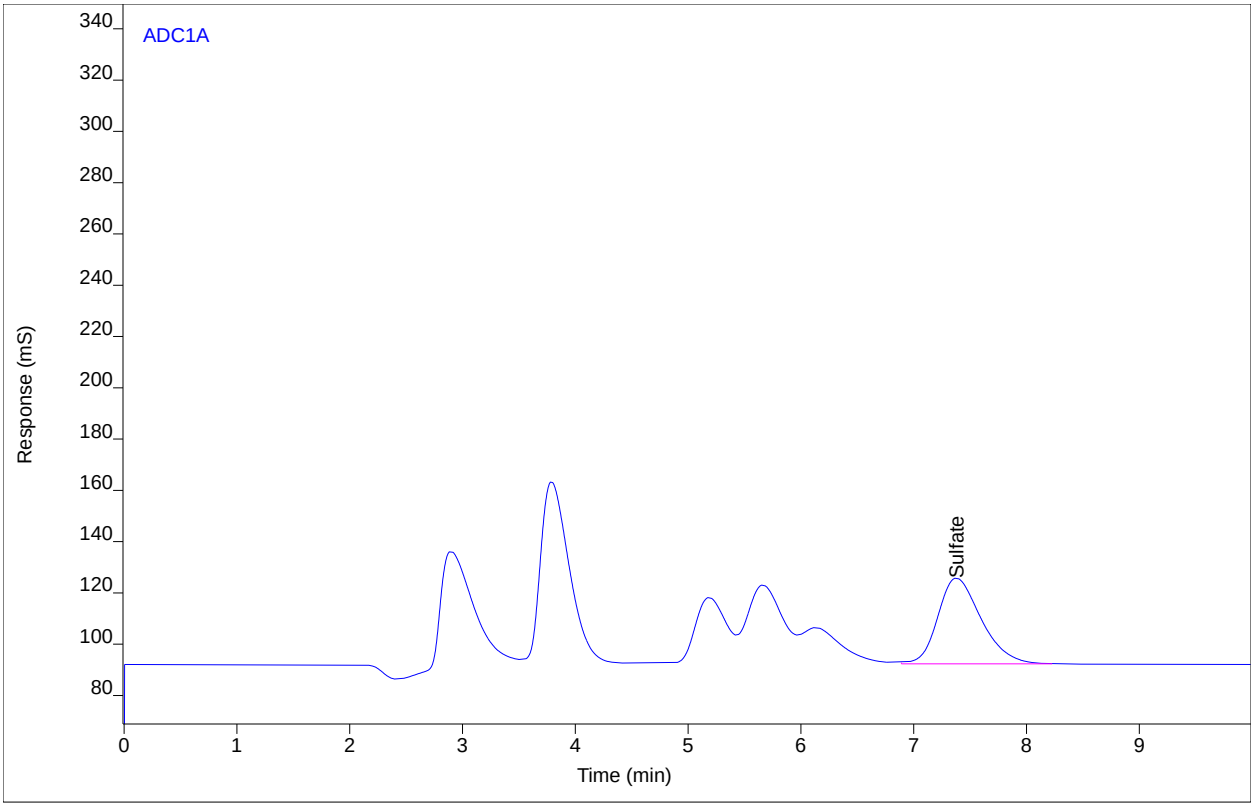
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.39	893.516	33.1237	14.3502	1	14.3502	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #5
Sequence Name	Gonzo235c ver.3
Inj Data File	005-0102.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/12/2017 11:43 AM
File Modified	4/12/2017 5:11 PM
Instrument	Gonzo
Operator	Amelia Paolantonio

Sample Type	Calibration
Vial Number	5
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/12/2017 5:11 PM
Printed	4/13/2017 11:23 AM



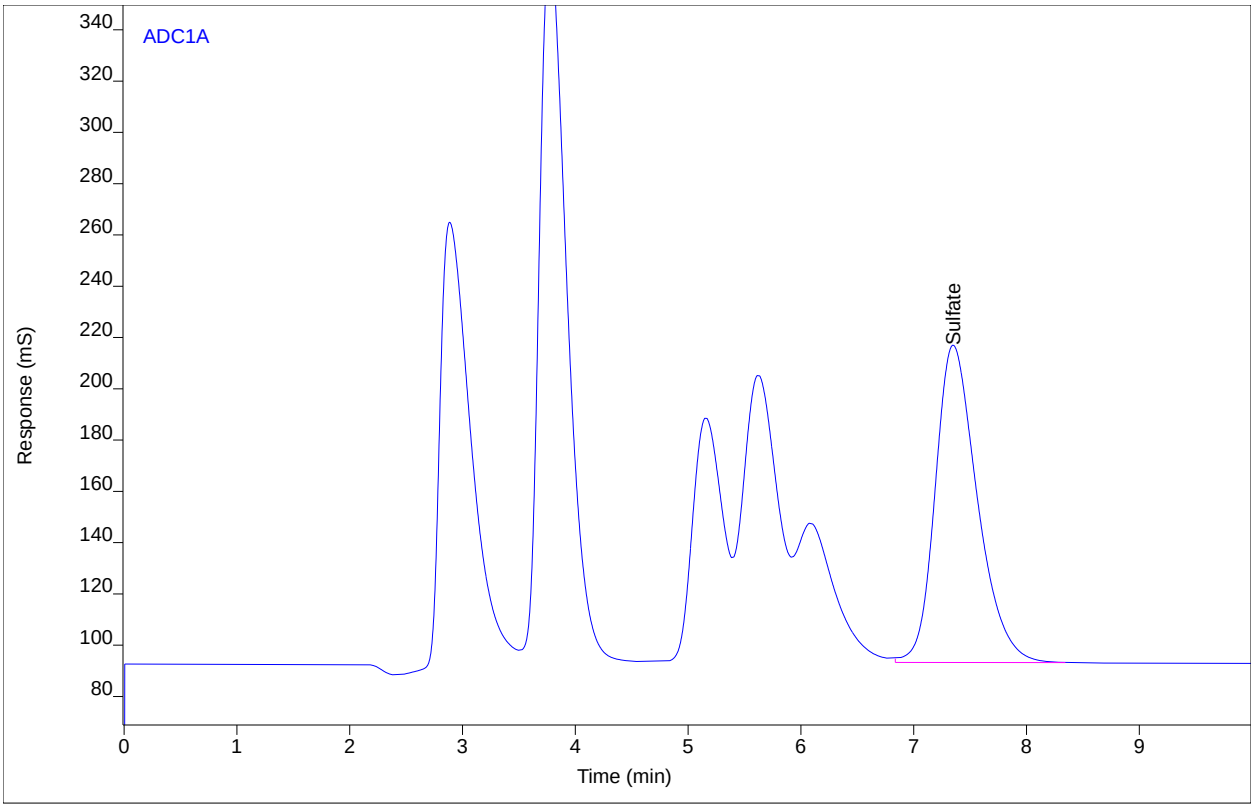
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.38	893.515	33.4808	14.3502	1	14.3502	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #7
Sequence Name	Gonzo235d ver.3
Inj Data File	007-0101.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/12/2017 4:36 PM
File Modified	4/12/2017 5:10 PM
Instrument	Gonzo
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	7
Injection Volume	25
Injection	1 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/12/2017 5:10 PM
Printed	4/13/2017 11:23 AM



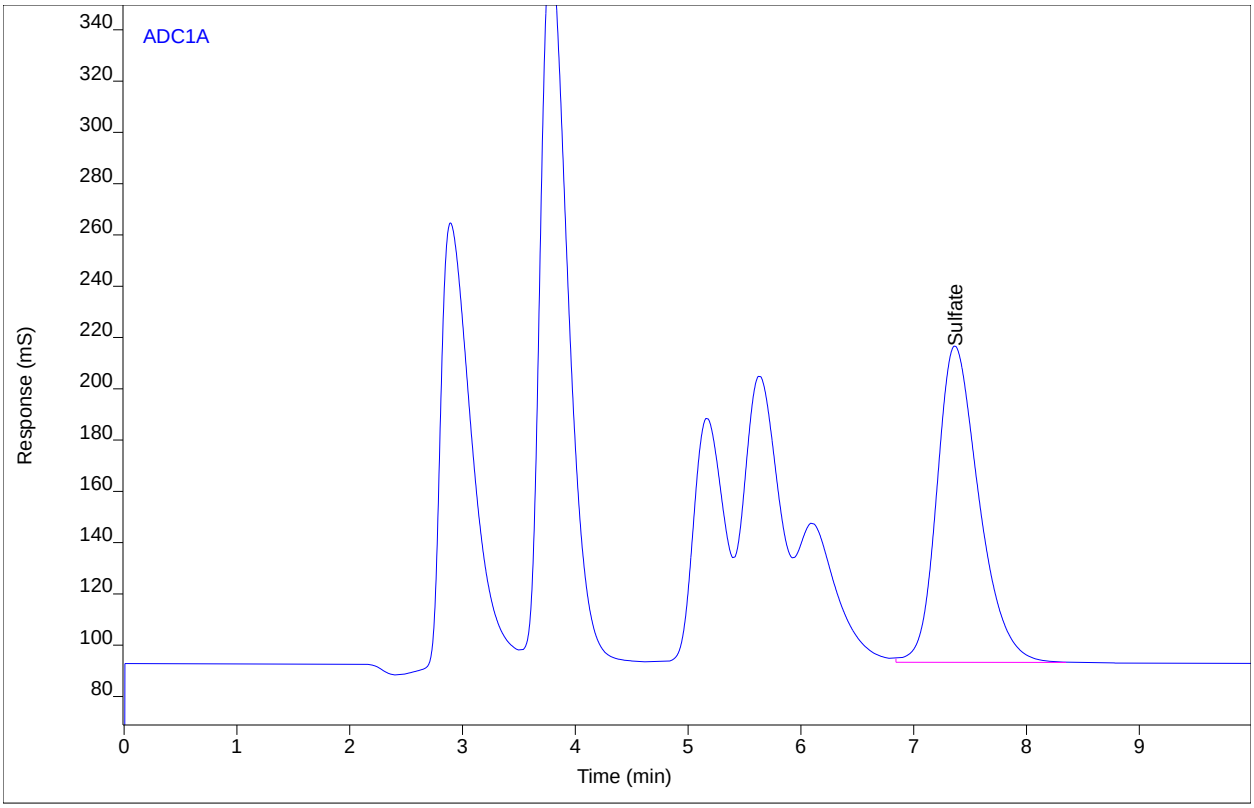
Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.35	3209.77	123.783	51.3291	1	51.3291	ug/mL

Chromatogram Report

Enthalpy Analytical

Sample Name	HPLCStds422 #7
Sequence Name	Gonzo235d ver.3
Inj Data File	007-0102.D
File Location	HPLC/2017/Gonzo/Quarter 2
Injection Date	4/12/2017 4:48 PM
File Modified	4/12/2017 5:10 PM
Instrument	Gonzo
Operator	Scott Wilson

Sample Type	Calibration
Vial Number	7
Injection Volume	25
Injection	2 of 2
Acquisition Method	ANIONS!.M
Analysis Method	Gonzo235.M
Method Modified	4/12/2017 5:10 PM
Printed	4/13/2017 11:23 AM



Compound	Type	RT	Area	Height	Amount	DF	SampAmt	Unit
Sulfate	BB	7.37	3197.96	123.427	51.1405	1	51.1405	ug/mL

Calibration Table

General Calibration Setting

Calib. Data Modified : 4/10/2017 1:18:18 PM
Signals calculated separately : No

Rel. Reference Window : 10.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 10.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Linear (some peaks differ, see below)
Origin : Connected (some peaks differ, see below)
Weight : Linear (Resp) (some peaks differ, see below)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 A, ADC1, A

Overview Table

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD	#	Compound
3.027	1	1	2.47500e-1	30.75359	8.04784e-3	No	No		Fluoride
		2	5.00000e-1	59.91464	8.34521e-3				
		3	2.50000	301.39136	8.29486e-3				
		4	5.00000	594.53281	8.40996e-3				
		5	7.50000	881.81711	8.50516e-3				
		6	12.50000	1495.59534	8.35788e-3				
3.999	1	1	4.95000e-1	39.22009	1.26211e-2	No	No		Chloride
		2	1.00000	83.61354	1.19598e-2				
		3	5.00000	420.72395	1.18843e-2				
		4	10.00000	865.22369	1.15577e-2				

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD	#	Compound
		5	15.00000	1308.46045	1.14639e-2				
		6	25.00000	2264.09570	1.10419e-2				
7.463	1	1	1.60150e-2	1.00000	1.60150e-2	No	No		Sulfite as Sulfate
8.800	1	1	4.95000e-1	33.66049	1.47057e-2	No	No		Sulfate
		2	1.00000	63.18040	1.58277e-2				
		3	5.00000	294.11697	1.70000e-2				
		4	10.00000	603.78125	1.65623e-2				
		5	15.00000	912.85107	1.64320e-2				
		6	25.00000	1557.65417	1.60498e-2				
		7	50.00000	3219.44824	1.55306e-2				

More compound-specific settings

Compound: Fluoride
- Curve Type : Linear
- Origin : Connected
- Calibration Level Weights:/
  - Level 1 : 1
  - Level 2 : 0.495
  - Level 3 : 0.099
  - Level 4 : 0.0495
  - Level 5 : 0.033
  - Level 6 : 0.0198

Compound: Chloride
- Curve Type : Linear
- Origin : Connected
- Calibration Level Weights:/
  - Level 1 : 1
  - Level 2 : 0.495
  - Level 3 : 0.099
  - Level 4 : 0.0495
  - Level 5 : 0.033
  - Level 6 : 0.0198

Compound: Sulfite as Sulfate
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 1 : 1

Compound: Sulfate
- Curve Type : Linear
- Origin : Connected
- Calibration Level Weights:/
  - Level 1 : 1
  - Level 2 : 0.495
  - Level 3 : 0.099
  - Level 4 : 0.0495
  - Level 5 : 0.033
  - Level 6 : 0.0198
  - Level 7 : 0.0099

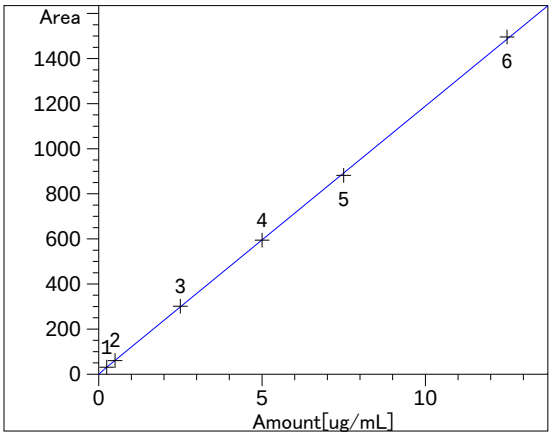
Peak Sum Table

No Entries in table

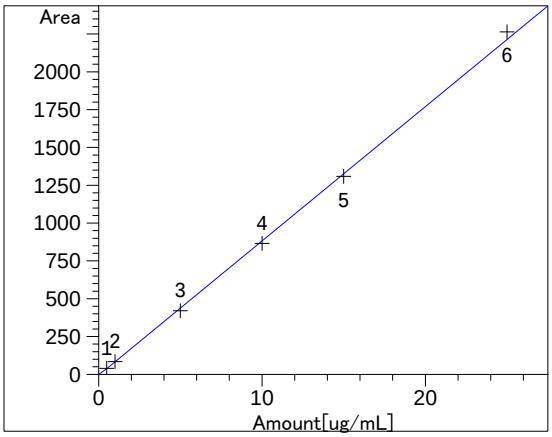
==========

Calibration Curves

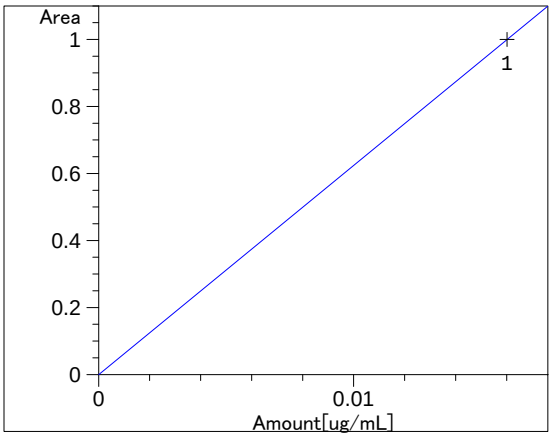
==========



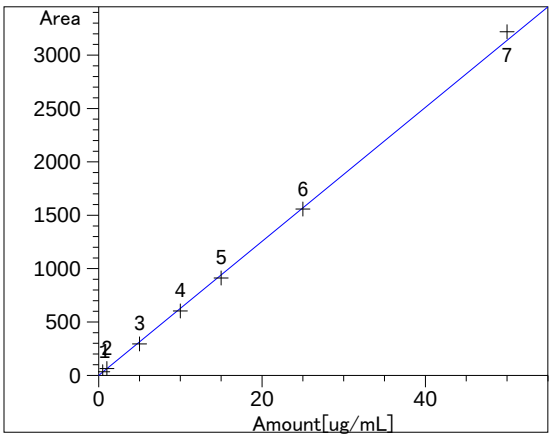
Fluoride at exp. RT: 3.027
ADC1 A, ADC1, A
Correlation: 0.99996
Residual Std. Dev.: 7.12704
Formula: y = mx + b
m: 118.85316
b: 1.11670
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.495
Level 3 : 0.099
Level 4 : 0.0495
Level 5 : 0.033
Level 6 : 0.0198



Chloride at exp. RT: 3.999
ADC1 A, ADC1, A
Correlation: 0.99971
Residual Std. Dev.: 28.85323
Formula: y = mx + b
m: 88.84809
b: -6.35589
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.495
Level 3 : 0.099
Level 4 : 0.0495
Level 5 : 0.033
Level 6 : 0.0198



Sulfite as Sulfate at exp. RT: 7.463
ADC1 A, ADC1, A
Correlation: 1.00000
Residual Std. Dev.: 0.00000
Formula: y = mx + b
m: 62.44146
b: 0.00000
x: Amount[ug/mL]
y: Area



Sulfate at exp. RT: 8.800
ADC1 A, ADC1, A
Correlation: 0.99953
Residual Std. Dev.: 40.71689
Formula: y = mx + b
m: 62.80204
b: -4.87260e-1
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.495
Level 3 : 0.099
Level 4 : 0.0495
Level 5 : 0.033
Level 6 : 0.0198
Level 7 : 0.0099

==========

Calibration Table

General Calibration Setting

Calib. Data Modified : 4/13/2017 10:59:10 AM
Signals calculated separately : No

Rel. Reference Window : 10.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 10.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Linear (some peaks differ, see below)
Origin : Connected (some peaks differ, see below)
Weight : Linear (Resp) (some peaks differ, see below)

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal Details

Signal 1: ADC1 A, ADC1, A

Overview Table

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD	#	Compound
2.924	1	2	5.00000e-1	55.49994	9.00902e-3	No	No		Fluoride
		3	2.50000	347.93784	7.18519e-3				
		4	5.00000	635.66467	7.86578e-3				
		5	7.50000	955.97281	7.84541e-3				
		6	12.50000	1524.34753	8.20023e-3				
3.799	1	2	1.00000	88.78718	1.12629e-2	No	No		Chloride
		3	5.00000	438.63573	1.13990e-2				
		4	10.00000	863.52417	1.15805e-2				
		5	15.00000	1289.20551	1.16351e-2				
		6	25.00000	2217.13843	1.12758e-2				

RT	Sig	Lvl	Amount [ug/mL]	Area	Rsp.Factor	Ref	ISTD #	Compound
7.400	1	2	1.00000	63.40882	1.57707e-2	No	No	Sulfate
		3	5.00000	296.18256	1.68815e-2			
		4	10.00000	598.13101	1.67187e-2			
		5	15.00000	893.51544	1.67876e-2			
		6	25.00000	1552.38635	1.61042e-2			
		7	50.00000	3203.86230	1.56062e-2			

More compound-specific settings

Compound: Fluoride
- Curve Type : Linear
- Origin : Connected
- Calibration Level Weights:/
  - Level 2 : 1
  - Level 3 : 0.2
  - Level 4 : 0.1
  - Level 5 : 0.066667
  - Level 6 : 0.04

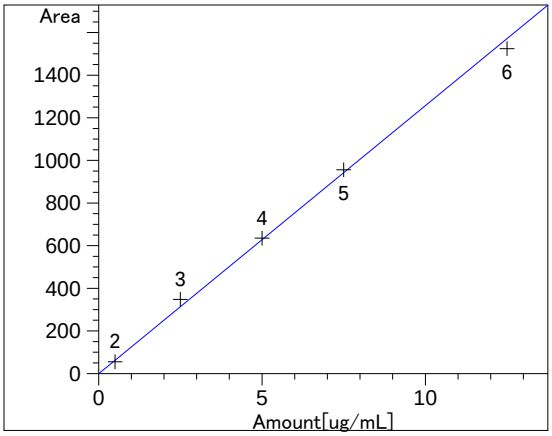
Compound: Chloride
- Curve Type : Linear
- Origin : Connected
- Calibration Level Weights:/
  - Level 2 : 1
  - Level 3 : 0.2
  - Level 4 : 0.1
  - Level 5 : 0.066667
  - Level 6 : 0.04

Compound: Sulfate
- Curve Type : Linear
- Origin : Connected
- Calibration Level Weights:/
  - Level 2 : 1
  - Level 3 : 0.2
  - Level 4 : 0.1
  - Level 5 : 0.066667
  - Level 6 : 0.04
  - Level 7 : 0.02

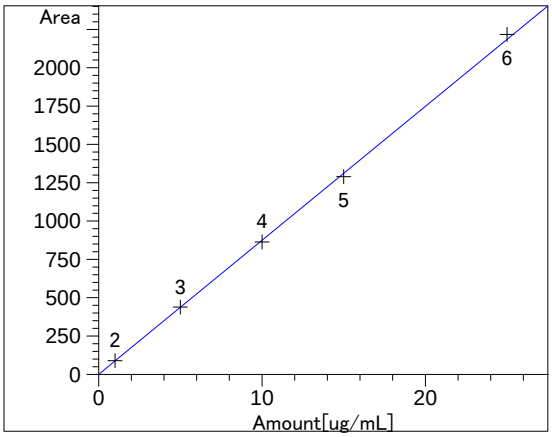
Peak Sum Table

No Entries in table

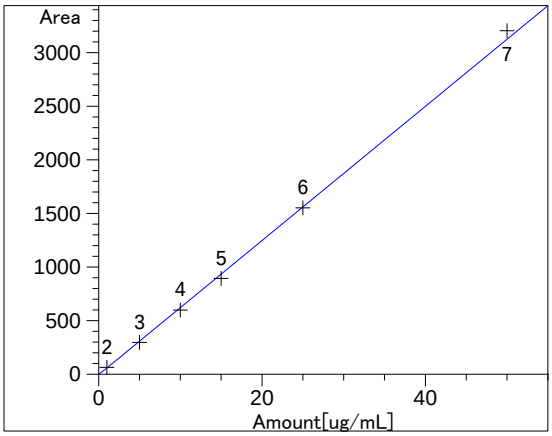
Calibration Curves



Fluoride at exp. RT: 2.924
ADC1 A, ADC1, A
Correlation: 0.99873
Residual Std. Dev.: 35.27349
Formula: y = mx + b
m: 125.85635
b: -9.11004e-1
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 2 : 1
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.066667
Level 6 : 0.04



Chloride at exp. RT: 3.799
ADC1 A, ADC1, A
Correlation: 0.99985
Residual Std. Dev.: 23.09739
Formula: y = mx + b
m: 87.42920
b: 2.51173e-1
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 2 : 1
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.066667
Level 6 : 0.04



Sulfate at exp. RT: 7.400
ADC1 A, ADC1, A
Correlation: 0.99945
Residual Std. Dev.: 45.83420
Formula: y = mx + b
m: 62.63730
b: -5.34463
x: Amount[ug/mL]
y: Area
Calibration Level Weights:
Level 2 : 1
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.066667
Level 6 : 0.04
Level 7 : 0.02

method: C:\HPLC\2014\Gonzo\Methods\ANIONS!.M
Modified on: 1/21/2014 at 1:54:20 PM

Method Information

Method: C:\HPLC\2014\Gonzo\Methods\ANIONS!.M
Modified: 1/21/2014 at 1:54:20 PM

Column: Dionex AS14A 250*4mm Anion Exchange Column
Mobile Phase: 8mm Na2CO3/1mm NaHCO3
Flow Rate: 1.2mL/min

Method Audit Trail

Operator : Amelia Paolantonio
Date : 1/21/2014 1:54:19 PM
Change Info: This method was created at 1/21/2014 1:54:19 PM and based on method C:\HPLC\2014\GONZO\METHODS\ANIONS_SLOW.M

Operator : Amelia Paolantonio
Date : 1/21/2014 1:54:20 PM
Change Info: Method saved. User comment: ""

Run Time Checklist

Pre-Run Cmd/Macro: off

Data Acquisition: on

Standard Data Analysis: on

Customized Data Analysis: off

Save GLP Data: off

Post-Run Cmd/Macro: off

Save Method with Data: off

ANALOG DIGITAL CONVERTER

	Signal 1
Description:	ADC1 CHANNEL B
Source:	Signal
Unit:	mAU
Units/Volt:	1000.000
Peakwidth (Data Rate):	0.027 Min (10.00 Hz)
Stop Time:	No Limit
Data Storage:	All

Start Signal Source: External Device Will Start 35900

Timed Event Table:
<no events>

method: C:\HPLC\2014\Gonzo\Methods\ANIONS!.M
Modified on: 1/21/2014 at 1:54:20 PM

==========

Agilent 1100 Autosampler 1

==========

Injection

Injection Mode	:	Needle Wash
Injector volume	:	25.00 µl
Wash Vial	:	100
Optimization	:	Prefetch Sample Vial 9.00 min. after Injection

Auxiliary

Drawspeed	:	100 µl/min
Ejectspeed	:	100 µl/min
Draw position	:	0.0 mm

Time

Stoptime	:	As Pump
Posttime	:	Off

This Is The Last Page Of This Report.

ENTHALPY
ANALYTICAL

ERA
A Waters Company

April 21, 2017

Joseph Conti
CEM Solutions
1183 E. Overdrive Circle
Harnando, FL 34442

Enclosed is your final report for ERA's Stationary Source Audit Sample (SSAS) Program. Your final report includes an evaluation of all results submitted by your laboratory to ERA.

Data Evaluation Protocols: All analytes in ERA's SSAS Program have been evaluated comparing the reported result to the acceptance limits generated using the criteria contained in the TNI SSAS Table.

For any "Not Acceptable" results, please contact your state regulator for any corrective action requirements.

Thank you for your participation in ERA's SSAS Program. If you have any questions, please contact our Proficiency Testing Department at 1-800-372-0122.

Sincerely,

Pat Larson

Patrick Larson
Quality Officer

cc: Project File Number 101315B

ERA
A Waters Company

Recipient Type	Report Recipient	Contact	Project ID
Agency	FL DEP - NE District (SSAS) 8800 Baymeadows Way West Suite 100 Jacksonville, FL 32256 USA	Christopher Kirts christopher.kirts@dep.state.fl.us Phone: 904-256-1700	
Facility	GREC 11201 NW US Hwy 441 Gainesville, FL 32653 USA	Ali Leaphart ali.leaphart@grecbiomass.com Phone: 386-315-8019	
Lab	Enthalpy Analytical Inc 800-1 Capitola Drive Durham, NC 27713 USA	Bryan Tyler bryan.tyler@enthalpy.com Phone: 919-850-4392 Fax: 919-850-9012	
Tester	CEM Solutions 1183 E. Overdrive Circle Harnando, FL 34442 USA	Joseph Conti jconti@cem-solutions.com Phone: (352) 489-4337	

101315B Laboratory Exception Report

Bryan Tyler
Enthalpy Analytical Inc
800-1 Capitola Drive
Durham, NC 27713
919-850-4392

EPA ID: **Not Reported**
ERA Customer Number: **E778021**

Evaluation Checks

There are no values reported with < where the assigned value was greater than 0.

Not Acceptable Evaluations

There were no Not Acceptable evaluations for this study.

ERA

A Waters Company

Final Report Results For Laboratory
Enthalpy Analytical Inc

ERA
A Waters Company

SSAP Evaluation Report

Project Number: **101315B**

ERA Customer Number: **E778021**

Laboratory Name: **Enthalpy Analytical Inc**

Inorganic Results

101315B Evaluation Final Complete Report

Bryan Tyler
Enthalpy Analytical Inc
800-1 Capitola Drive
Durham, NC 27713
919-850-4392

EPA ID: **Not Reported**
ERA Customer Number: **E778021**

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
SSAP Hydrogen Halides in Impinger Solution (cat# 1440, lot# 101315B) Study Dates: 10/13/15 - 04/21/17									
1770	Hydrogen Chloride	mg/L	19.6	19.2	17.3 - 21.1	Acceptable	EPA 26A 2000	4/5/2017	
1775	Hydrogen Fluoride	mg/L	18.1	17.9	16.1 - 19.7	Acceptable	EPA 26A 2000	4/5/2017	

FINAL LAB REPORT

11542

A9782

07-Apr-2017

Prepared by

SGS NORTH AMERICA

Prepared for

C.E.M. Solutions, Inc.

Charles Horton

1183 E. Overdrive Circle
Hernando, FL 34442
Phone: 352-489-4337
Email: chorton@cem-solutions.com

This report is approved by

tamara.morgan@sgs.com
2017-04-07 15:55:36

for Amy Boehm
Senior Project Manager

PROJECT INFORMATION SUMMARY *(When applicable, see QC Annotations for details)*

Client Project	11542
SGS Project #	A9782
Analytical Protocol(s)	M23
No. Samples Submitted	3
Additional QC Sample(s)	0
No. Laboratory Method Blanks	1
No. OPRs / Batch CS3	1
Date Received	28-Mar-17
Condition Received	Good
Temperature upon Receipt (ºC)	6.4 (Traps & Filters), 6.4 (Solvents)
Extraction within Holding Time	Yes
Analysis within Holding Time	Yes

QC ANNOTATIONS:

1. Please see Appendices attached for data qualifier/attribute and lab identifier descriptions which may be contained in the project.

APPENDIX A: GENERAL DATA QUALIFIERS / DATA ATTRIBUTES

B	The analyte was found in the method blank, at a concentration that was at least 10% of the concentration in the sample.
C	Two or more congeners co-elute. In EDDs, C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group are shown with the number of the lowest IUPAC co-eluter.
E	The reported concentration exceeds the calibration range (upper point of the calibration curve) and is an estimated value.
EMPC	Represents an Estimated Maximum Possible Concentration. EMPCs arise in cases where the signal/noise ratio is not sufficient for peak identification (the determined ion-abundance ratio is outside the allowed theoretical range), or where there is a co-eluting interference.
H/h	If the standard recovery is below the method or SOP specified value “H” is assigned. If the obtained value is less than half the specified value “h” is assigned.
J	Indicates that an analyte has a concentration below the reporting limit (lowest point of the calibration curve) and is an estimated value.
ND	Indicates a non-detect.
NR or R	Indicates a value that is not reportable.
PR	Due to interference, the associated congener is poorly resolved.
QI	Indicates the presence of a quantitative interference.
SI	Denotes “Single Ion Mode” and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates.
U	The analyte was not detected. The estimated detection limit (EDL) may be reported for this analyte.
V	The labeled standard recovery was found to be outside of the method control limits.

APPENDIX B: DRBC/TMDL SPECIFIC DATA QUALIFIERS / DATA ATTRIBUTES

J	The reported result is an estimate. The value is less than the minimum calibration level but greater than the estimated detection limit (EDL).
U	The analyte was not detected in the sample at the estimated detection limit (EDL).
E	The reported concentration is an estimate. The value exceeds the upper calibration range (upper point of the calibration curve).
D	Dilution Data. Result was obtained from the analysis of a dilution.
B	Analyte found in the sample and associated method blank.
C	Co-eluting congener
Cxx	Co-elutes with the indicated congener, data is reported under the lowest IUPAC congener. 'Xx' denotes the IUPAC number with the lowest numerical designated congener.
NR	Analyte is not reportable because of problems in sample preparation or analysis.
V	Labeled standard recovery is not within method control limits.
X	Results from re-injection/repeat/second-column analysis.
EMPC	Estimated maximum possible concentration. Indicates that a peak is identified but did not meet the method specified ion-abundance ratio.

APPENDIX C: LAB IDENTIFIERS

AR	Indicates use of the archived portion of the sample extract.
CU	Indicates a sample that required additional clean-up prior to MS injection/processing.
D	Indicates a dilution of the sample extract. The number that follows the "D" indicates the dilution factor.
DE	Indicates a dilution performed with the addition of ES (extraction standard) solution.
DUP	Designation for a duplicate sample.
MS	Designation for a matrix spike.
MSD	Designation for a matrix spike duplicate.
RJ	Indicates a reinjection of the sample extract.
S	Indicates a sample split. The number that follows the "S" indicates the split factor.

SGS CERTIFICATIONS

Arkansas	88-0682
California (ELAP)	ELAP Cert #2914
CLIA	34D1013708
Connecticut	PH-0258
USDA Soil Permit	P330-14-00135
DoD	2726.01
Florida (Primary NELAP)	E87634
ISO 17025/IEC	2726.01
Louisiana	4115
Maine	#2016028
Massachusetts	M-NC919
Minnesota (Primary NELAP For Method 23)	Lab #037-999-459 Cert #981125
New Jersey	NC100
New York	11685
North Carolina DWR	481
North Dakota	R-197
Oregon	NC200002
Pennsylvania	68-03675
South Carolina	Lab #99029 Cert #99029002
Texas	T104704260-16-9
US Coast Guard	16714/159.317/SGS
Virginia	Lab #460214 Cert #8722
Washington	C913
West Virginia	293

Rev. 12-Sep-2016

A9782 - TEQ

Project ID: 11542

Sample Summary Part 1

Method 23

Analyte	Method Blank A9782_14768	Run 1	Run 2	Run 3
	pg	pg	pg	pg
2,3,7,8-TCDD	(3.34)	(3.63)	(4.74)	(3.23)
1,2,3,7,8-PeCDD	(2.98)	(4.06)	(5.67)	(4.04)
1,2,3,4,7,8-HxCDD	(3.22)	(3.12)	(6.02)	(3.6)
1,2,3,6,7,8-HxCDD	(3.23)	(3.34)	(6.08)	(3.69)
1,2,3,7,8,9-HxCDD	(3.51)	(3.47)	(6.05)	(3.87)
1,2,3,4,6,7,8-HpCDD	(4.8)	(3.99)	(5.39)	(4.8)
OCDD	(9.1)	(9.63)	(14.6)	(11.1)
2,3,7,8-TCDF	(3.07)	(3.63)	(4.54)	(3.2)
1,2,3,7,8-PeCDF	(2.56)	(2.75)	(4.11)	(2.68)
2,3,4,7,8-PeCDF	(2.59)	(2.59)	(4.06)	(2.58)
1,2,3,4,7,8-HxCDF	(2.79)	(2.64)	(4.62)	(3.09)
1,2,3,6,7,8-HxCDF	(2.48)	(2.35)	(4.24)	(2.86)
2,3,4,6,7,8-HxCDF	(2.64)	(2.64)	(4.81)	(3.01)
1,2,3,7,8,9-HxCDF	(3)	(3.17)	(5.33)	(3.44)
1,2,3,4,6,7,8-HpCDF	(3.15)	(2.61)	(3.78)	(3.07)
1,2,3,4,7,8,9-HpCDF	(4.21)	(3.97)	(4.33)	(4.28)
OCDF	(9.35)	(8.59)	(12.9)	(9.05)
WHO-2005 TEQ (ND=0; EMPC=0)	**0**	**0**	**0**	**0**
WHO-2005 TEQ (ND=0; EMPC=EMPC)	**0**	**0**	**0**	**0**
WHO-2005 TEQ (ND=DL/2; EMPC=0)	**4.84**	**5.55**	**8.03**	**5.47**
WHO-2005 TEQ (ND=DL/2; EMPC=EMPC)	**4.84**	**5.55**	**8.03**	**5.47**
WHO-2005 TEQ (ND=DL; EMPC=EMPC)	**9.69**	**11.1**	**16.1**	**10.9**
Checkcode	688-738-KHC	346-815-FKJ	042-346-WHX	381-737-YCT
Lab ID	MB1_14768_DF_SDS	A9782_14768_DF_001	A9782_14768_DF_002	A9782_14768_DF_003

( ) = DL
[ ] = EMPC

A9782 - Totals

Project ID: 11542

Sample Summary Part 2

SGS

Method 23

Analyte	Method Blank A9782_14768	Run 1	Run 2	Run 3
	pg	pg	pg	pg
Totals				
TCDDs	0	20.2	0	0
PeCDDs	0	8.14	17.4	0
HxCDDs	0	6.39	0	0
HpCDDs	0	0	0	0
OCDD	0	0	0	0
TCDFs	0	0	0	0
PeCDFs	0	0	0	0
HxCDFs	0	0	0	0
HpCDFs	0	0	0	0
OCDF	0	0	0	0
Total PCDD/Fs (ND=0; EMPC=0)	**0**	**34.7**	**17.4**	**0**
Total PCDD/Fs (ND=0; EMPC=EMPC)	**0**	**34.7**	**26.7**	**9.18**
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	**66**	**101**	**128**	**80.7**
Total 2378s (ND=0; EMPC=0)	**0**	**0**	**0**	**0**
Total 2378s (ND=0.5; EMPC=0)	**33**	**33.1**	**50.6**	**35.8**
Total 2378s (ND=1; EMPC=0)	**66**	**66.2**	**101**	**71.6**
Total 2378s (ND=0; EMPC=1)	**0**	**0**	**0**	**0**
Total 2378s (ND=0.5; EMPC=1)	**33**	**33.1**	**50.6**	**35.8**
Total 2378s (ND=1; EMPC=1)	**66**	**66.2**	**101**	**71.6**
Checkcode	688-738-KHC	346-815-FKJ	042-346-WHX	381-737-YCT
Lab ID	MB1_14768_DF_SDS	A9782_14768_DF_001	A9782_14768_DF_002	A9782_14768_DF_003

Total 2378s = Sum of 17 2378-substituted PCDD/PCDF congeners (SARA 313)

( ) = DL
[ ] = EMPC

A9782 - Others
Project ID: 11542

Sample Summary Part 3

Method 23

Analyte	Method Blank A9782_14768	Run 1	Run 2	Run 3
	pg	pg	pg	pg
Other PCDD/Fs (ND=0, EMPC=0)				
Other TCDD	0	20.2	0	0
Other PeCDD	0	8.14	17.4	0
Other HxCDD	0	6.39	0	0
Other HpCDD	0	0	0	0
Other TCDF	0	0	0	0
Other PeCDF	0	0	0	0
Other HxCDF	0	0	0	0
Other HpCDF	0	0	0	0
Other PCDD/Fs (ND=0, EMPC=EMPC)				
Other TCDD	0	20.2	9.34	9.18
Other PeCDD	0	8.14	17.4	0
Other HxCDD	0	6.39	0	0
Other HpCDD	0	0	0	0
Other TCDF	0	0	0	0
Other PeCDF	0	0	0	0
Other HxCDF	0	0	0	0
Other HpCDF	0	0	0	0
Checkcode	688-738-KHC	346-815-FKJ	042-346-WHX	381-737-YCT
Lab ID	MB1_14768_DF_SDS	A9782_14768_DF_001	A9782_14768_DF_002	A9782_14768_DF_003

( ) = DL
[ ] = EMPC

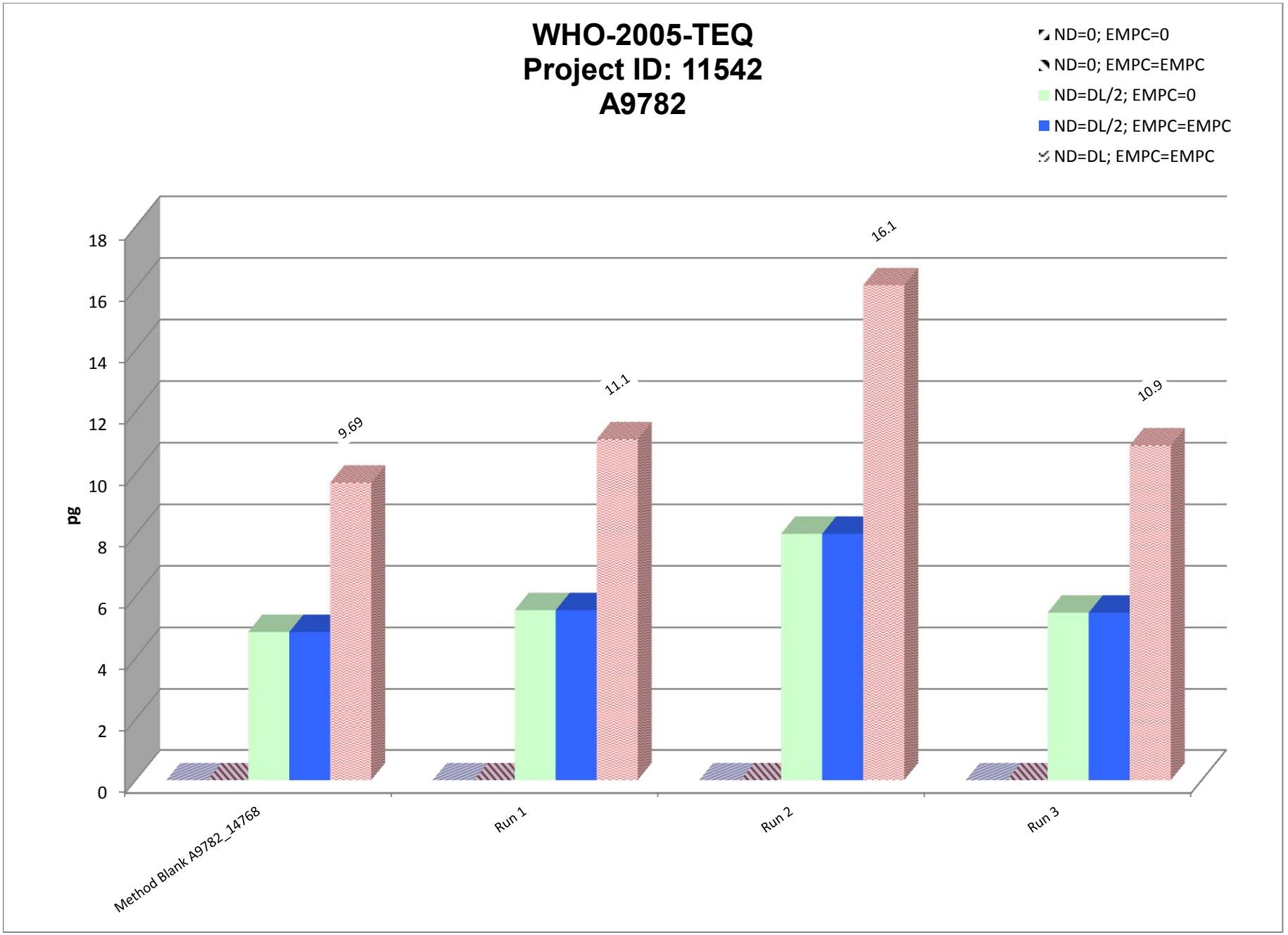
A9782 - DLs

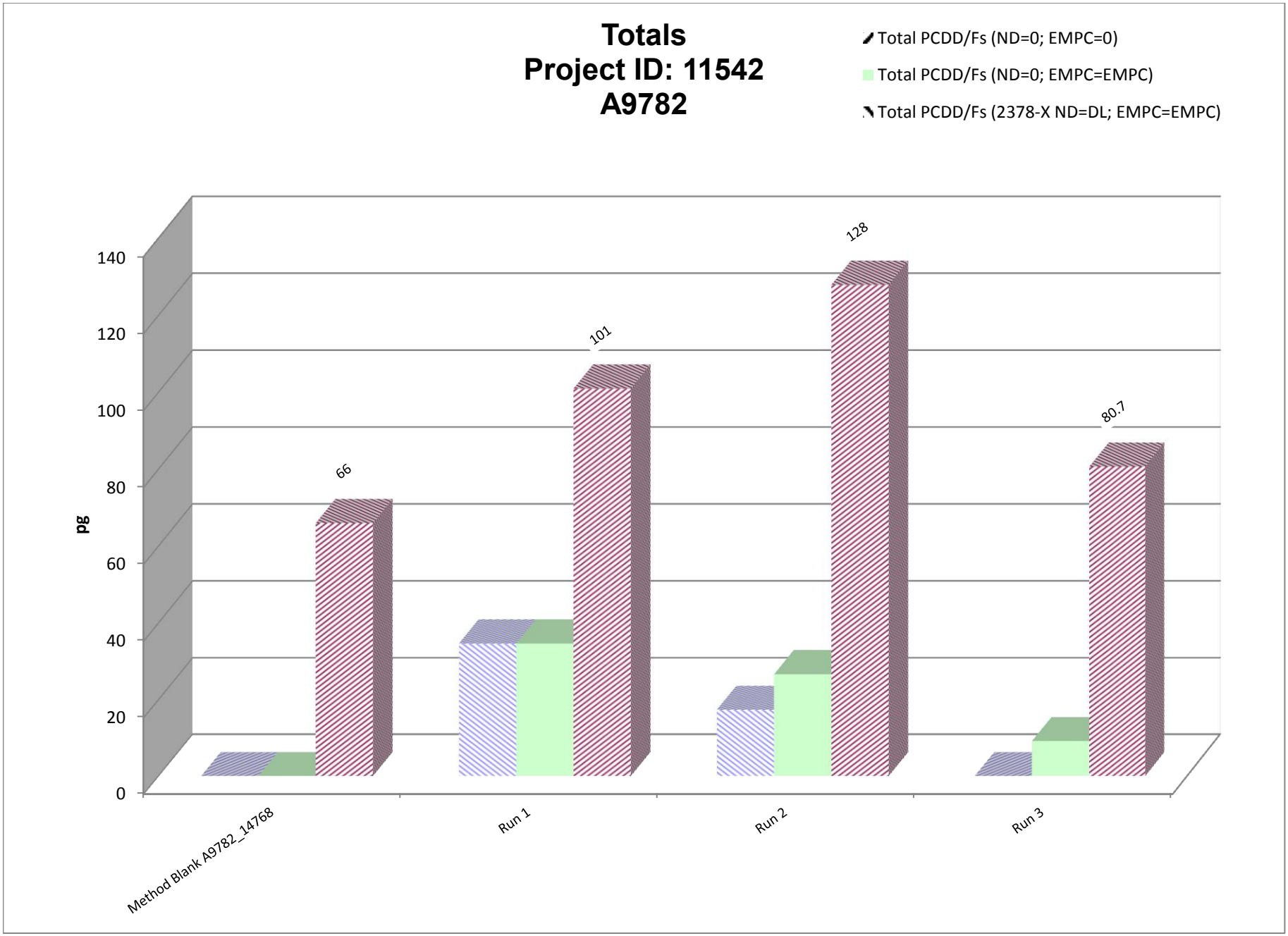
Project ID: 11542

Sample Summary
Part 5 (DLs)

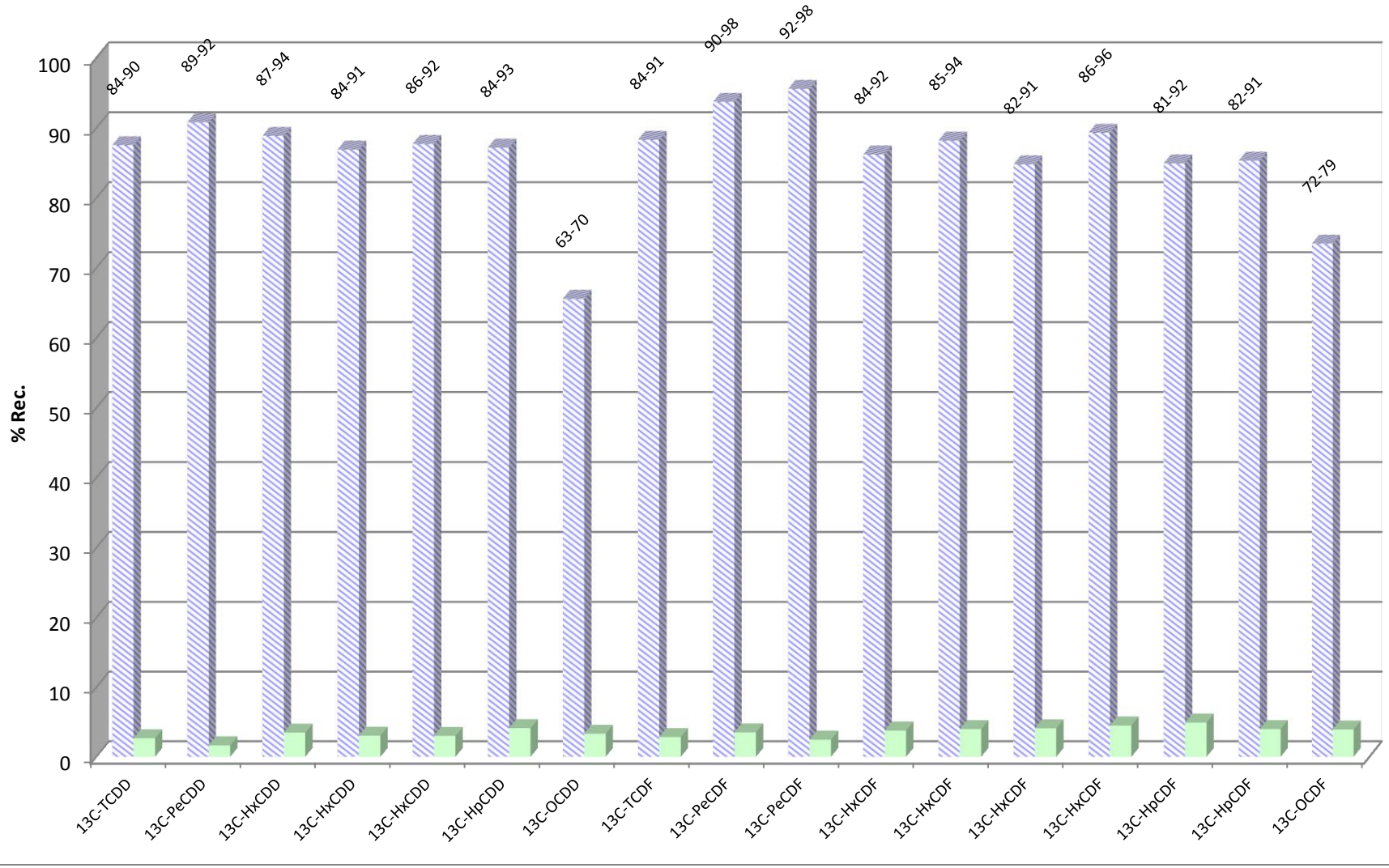
Method 23

Analyte	Method Blank A9782_14768	Run 1	Run 2	Run 3
	pg	pg	pg	pg
2,3,7,8-TCDD	3.34	3.63	4.74	3.23
1,2,3,7,8-PeCDD	2.98	4.06	5.67	4.04
1,2,3,4,7,8-HxCDD	3.22	3.12	6.02	3.6
1,2,3,6,7,8-HxCDD	3.23	3.34	6.08	3.69
1,2,3,7,8,9-HxCDD	3.51	3.47	6.05	3.87
1,2,3,4,6,7,8-HpCDD	4.8	3.99	5.39	4.8
OCDD	9.1	9.63	14.6	11.1
2,3,7,8-TCDF	3.07	3.63	4.54	3.2
1,2,3,7,8-PeCDF	2.56	2.75	4.11	2.68
2,3,4,7,8-PeCDF	2.59	2.59	4.06	2.58
1,2,3,4,7,8-HxCDF	2.79	2.64	4.62	3.09
1,2,3,6,7,8-HxCDF	2.48	2.35	4.24	2.86
2,3,4,6,7,8-HxCDF	2.64	2.64	4.81	3.01
1,2,3,7,8,9-HxCDF	3	3.17	5.33	3.44
1,2,3,4,6,7,8-HpCDF	3.15	2.61	3.78	3.07
1,2,3,4,7,8,9-HpCDF	4.21	3.97	4.33	4.28
OCDF	9.35	8.59	12.9	9.05
Total TCDD	3.34	3.63	4.74	3.23
Total PeCDD	2.98	4.06	5.67	4.04
Total HxCDD	3.31	3.3	6.03	3.71
Total HpCDD	4.8	3.99	5.39	4.8
Total TCDF	3.07	3.63	4.54	3.2
Total PeCDF	2.58	2.67	4.09	2.63
Total HxCDF	2.71	2.67	4.71	3.08
Total HpCDF	3.63	3.22	4.04	3.62
Checkcode	688-738-KHC	346-815-FKJ	042-346-WHX	381-737-YCT
Lab ID	MB1_14768_DF_SDS	A9782_14768_DF_001	A9782_14768_DF_002	A9782_14768_DF_003

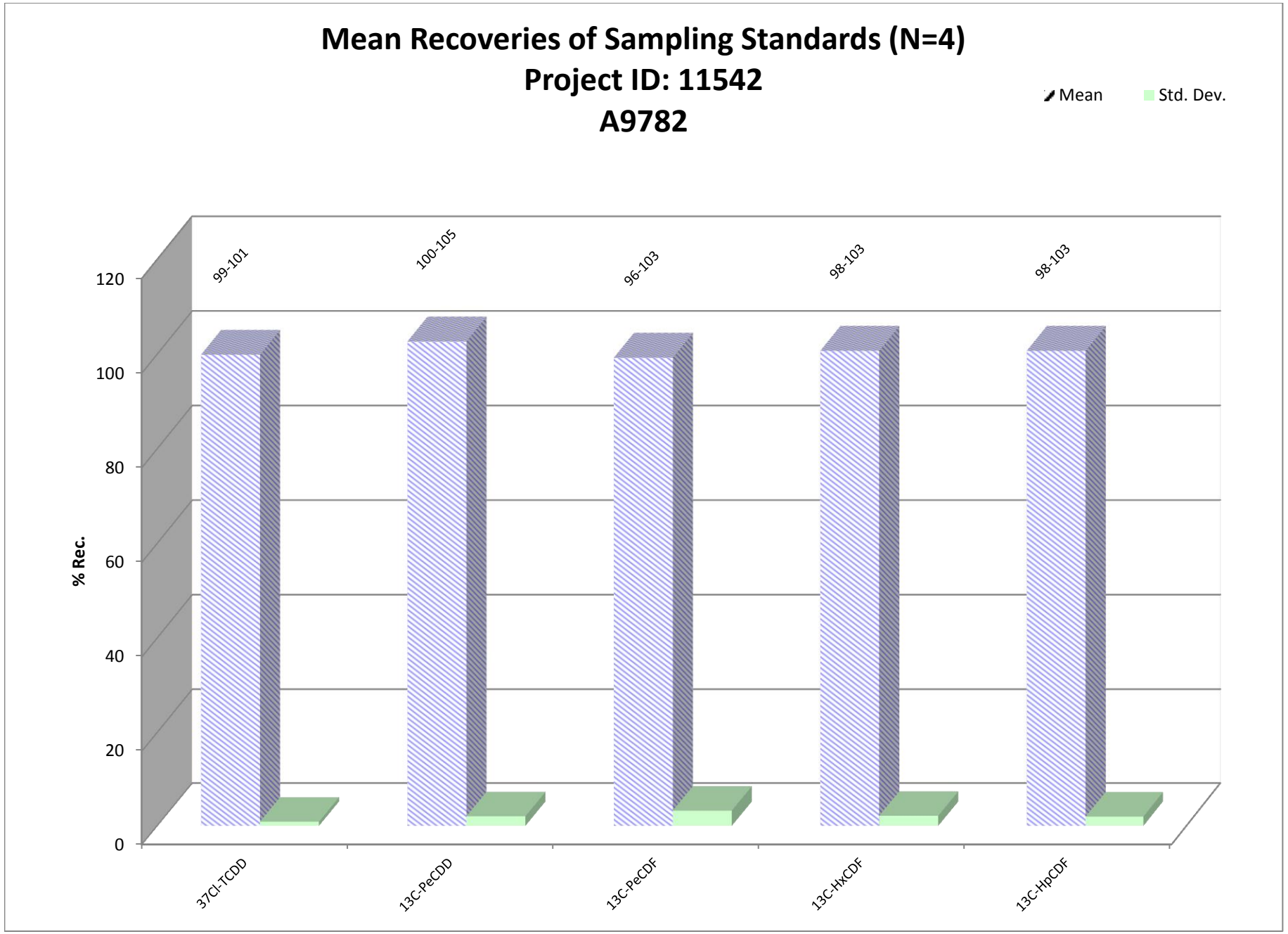

WHO-2005-TEQ
Project ID: 11542
A9782
ND=0; EMPC=0
ND=0; EMPC=EMPC
ND=DL/2; EMPC=0
ND=DL/2; EMPC=EMPC
ND=DL; EMPC=EMPC
pg
0
2
4
6
8
10
12
14
16
18
9.69
11.1
16.1
10.9
Method Blank A9782_14768
Run 1
Run 2
Run 3


Totals
Project ID: 11542
A9782
Total PCDD/Fs (ND=0; EMPC=0)
Total PCDD/Fs (ND=0; EMPC=EMPC)
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)
pg
140
120
100
80
60
40
20
0
66
101
128
80.7
Method Blank A9782_14768
Run 1
Run 2
Run 3

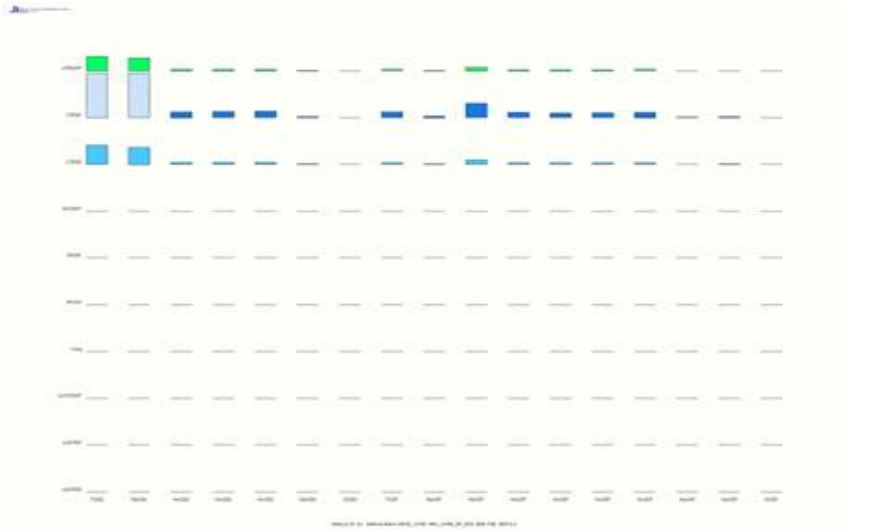
Mean Recoveries of Extraction Standards (N=4)
Project ID: 11542
A9782

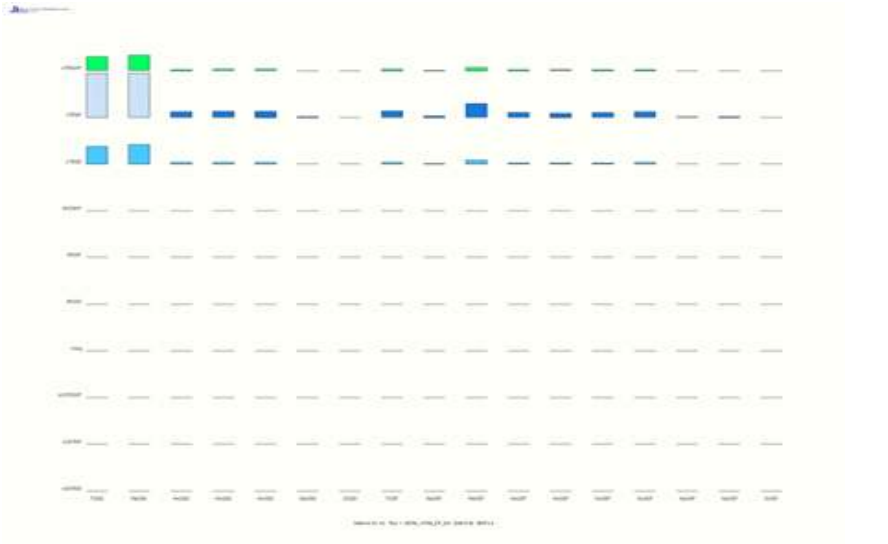


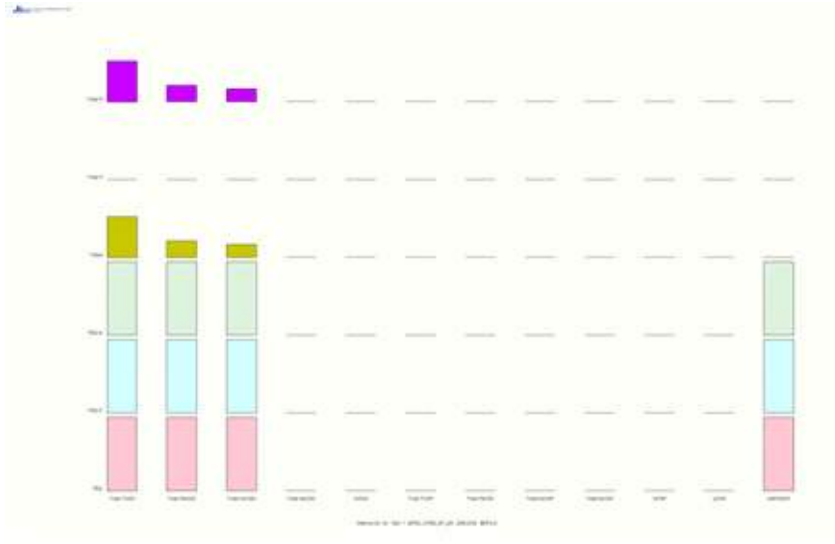
Method Specification Limits: Tetra-Hexa ES: 40-130%, Hepta-Octa ES: 25-130% (F = fail)

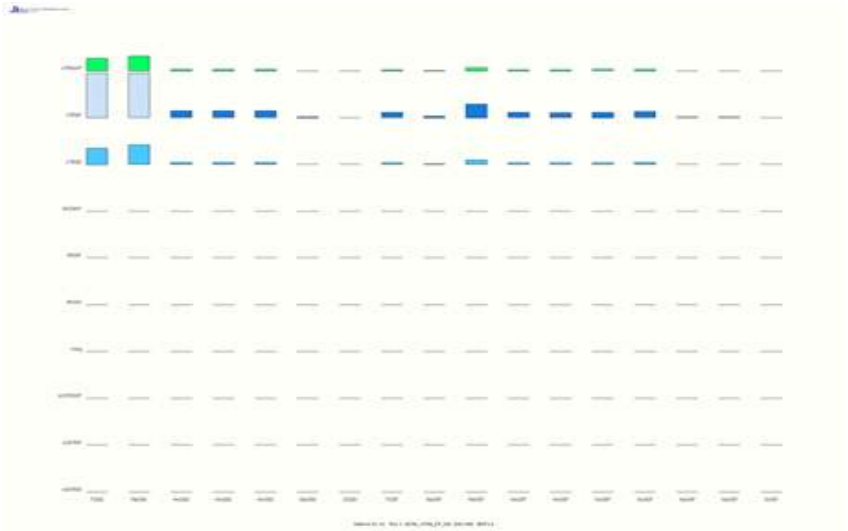


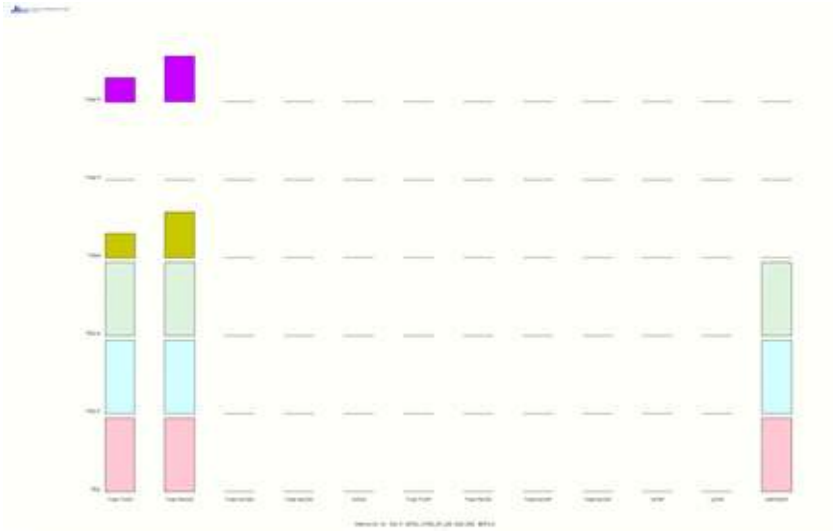
Method Specification Limits: Tetra-Octa SS: 70-130% (F = fail)

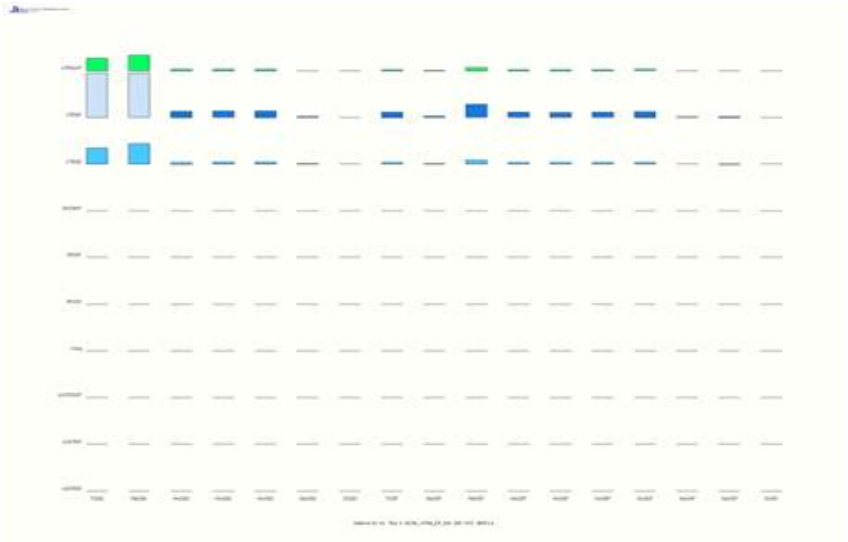












Sample ID: Run 1

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	C.E.M. Solutions, Inc.	Matrix:	Air	Lab Project ID:	A9782	Date Received:	28-Mar-2017
Project ID:	11542	Weight/Volume:	1	Lab Sample ID	A9782_14768_DF_001	Date Extracted:	30-Mar-2017
Date Collected:	22-Mar-2017			QC Batch No:	14768	Date Analyzed:	06-Apr-2017
		Split:	2	Dilution:	-	Time Analyzed:	20:04:04

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	3.63			ES 2378-TCDD	86.4	
12378-PeCDD	ND	4.06			ES 12378-PeCDD	92	
123478-HxCDD	ND	3.12			ES 123478-HxCDD	87.3	
123678-HxCDD	ND	3.34			ES 123678-HxCDD	86.6	
123789-HxCDD	ND	3.47			ES 123789-HxCDD	86.8	
1234678-HpCDD	ND	3.99			ES 1234678-HpCDD	84.5	
OCDD	ND	9.63			ES OCDD	63	
2378-TCDF	ND	3.63			ES 2378-TCDF	84.4	
12378-PeCDF	ND	2.75			ES 12378-PeCDF	91.2	
23478-PeCDF	ND	2.59			ES 23478-PeCDF	94.9	
123478-HxCDF	ND	2.64			ES 123478-HxCDF	84.3	
123678-HxCDF	ND	2.35			ES 123678-HxCDF	86.4	
234678-HxCDF	ND	2.64			ES 234678-HxCDF	83.1	
123789-HxCDF	ND	3.17			ES 123789-HxCDF	86.3	
1234678-HpCDF	ND	2.61			ES 1234678-HpCDF	83.8	
1234789-HpCDF	ND	3.97			ES 1234789-HpCDF	84.9	
OCDF	ND	8.59			ES OCDF	71.5	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	100	
Total TCDD	20.2		20.2		SS 12347-PeCDD	103	
Total PeCDD	8.14		8.14		SS 12346-PeCDF	97.6	
Total HxCDD	6.39		6.39		SS 123469-HxCDF	102	
Total HpCDD	ND	3.99	ND		SS 1234689-HpCDF	103	
					AS 1368-TCDD	79.6	
Total TCDF	ND	3.63	ND		AS 1368-TCDF	81.2	
Total PeCDF	ND	2.67	ND				
Total HxCDF	ND	2.67	ND				
Total HpCDF	ND	3.22	ND				
Total PCDD/Fs	**34.7**		**34.7**				
WHO-2005 TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	5.55	5.55	5.55				
TEQ: ND=DL	11.1	11.1	11.1				

SGS
5500 Business Drive
Wilmington, NC 28405, USA
www.us.sgs.com
Tel: +1 910 794-1613; Toll-Free 866 846-8290

Sample ID: Run 2

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	C.E.M. Solutions, Inc.	Matrix:	Air	Lab Project ID:	A9782	Date Received:	28-Mar-2017
Project ID:	11542	Weight/Volume:	1	Lab Sample ID	A9782_14768_DF_002	Date Extracted:	30-Mar-2017
Date Collected:	23-Mar-2017			QC Batch No:	14768	Date Analyzed:	06-Apr-2017
		Split:	2	Dilution:	-	Time Analyzed:	20:53:12

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	4.74			ES 2378-TCDD	84.3	
12378-PeCDD	ND	5.67			ES 12378-PeCDD	88.6	
123478-HxCDD	ND	6.02			ES 123478-HxCDD	86.8	
123678-HxCDD	ND	6.08			ES 123678-HxCDD	85.4	
123789-HxCDD	ND	6.05			ES 123789-HxCDD	86.2	
1234678-HpCDD	ND	5.39			ES 1234678-HpCDD	87.8	
OCDD	ND	14.6			ES OCDD	63.3	
2378-TCDF	ND	4.54			ES 2378-TCDF	88.2	
12378-PeCDF	ND	4.11			ES 12378-PeCDF	90.4	
23478-PeCDF	ND	4.06			ES 23478-PeCDF	92.4	
123478-HxCDF	ND	4.62			ES 123478-HxCDF	84.2	
123678-HxCDF	ND	4.24			ES 123678-HxCDF	87	
234678-HxCDF	ND	4.81			ES 234678-HxCDF	81.9	
123789-HxCDF	ND	5.33			ES 123789-HxCDF	86.9	
1234678-HpCDF	ND	3.78			ES 1234678-HpCDF	83.1	
1234789-HpCDF	ND	4.33			ES 1234789-HpCDF	82.2	
OCDF	ND	12.9			ES OCDF	71.5	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	101	
Total TCDD	ND		9.34		SS 12347-PeCDD	103	
Total PeCDD	17.4		17.4		SS 12346-PeCDF	103	
Total HxCDD	ND	6.03	ND		SS 123469-HxCDF	103	
Total HpCDD	ND	5.39	ND		SS 1234689-HpCDF	98.1	
					AS 1368-TCDD	79	
Total TCDF	ND	4.54	ND		AS 1368-TCDF	85	
Total PeCDF	ND	4.09	ND				
Total HxCDF	ND	4.71	ND				
Total HpCDF	ND	4.04	ND				
Total PCDD/Fs	**17.4**		**26.7**				
WHO-2005 TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	8.03	8.03	8.03				
TEQ: ND=DL	16.1	16.1	16.1				

SGS
5500 Business Drive
Wilmington, NC 28405, USA
www.us.sgs.com
Tel: +1 910 794-1613; Toll-Free 866 846-8290

Sample ID: Run 3

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	C.E.M. Solutions, Inc.	Matrix:	Air	Lab Project ID:	A9782	Date Received:	28-Mar-2017
Project ID:	11542	Weight/Volume:	1	Lab Sample ID	A9782_14768_DF_003	Date Extracted:	30-Mar-2017
Date Collected:	23-Mar-2017			QC Batch No:	14768	Date Analyzed:	06-Apr-2017
		Split:	2	Dilution:	-	Time Analyzed:	21:42:20

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	3.23			ES 2378-TCDD	89.7	
12378-PeCDD	ND	4.04			ES 12378-PeCDD	92.2	
123478-HxCDD	ND	3.6			ES 123478-HxCDD	87.3	
123678-HxCDD	ND	3.69			ES 123678-HxCDD	84.4	
123789-HxCDD	ND	3.87			ES 123789-HxCDD	85.7	
1234678-HpCDD	ND	4.8			ES 1234678-HpCDD	83.7	
OCDD	ND	11.1			ES OCDD	65.9	
2378-TCDF	ND	3.2			ES 2378-TCDF	89.7	
12378-PeCDF	ND	2.68			ES 12378-PeCDF	95.7	
23478-PeCDF	ND	2.58			ES 23478-PeCDF	97.4	
123478-HxCDF	ND	3.09			ES 123478-HxCDF	84.5	
123678-HxCDF	ND	2.86			ES 123678-HxCDF	85.3	
234678-HxCDF	ND	3.01			ES 234678-HxCDF	83.3	
123789-HxCDF	ND	3.44			ES 123789-HxCDF	88.1	
1234678-HpCDF	ND	3.07			ES 1234678-HpCDF	80.8	
1234789-HpCDF	ND	4.28			ES 1234789-HpCDF	83.2	
OCDF	ND	9.05			ES OCDF	71.5	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	98.8	
Total TCDD	ND		9.18		SS 12347-PeCDD	100	
Total PeCDD	ND	4.04	ND		SS 12346-PeCDF	95.7	
Total HxCDD	ND	3.71	ND		SS 123469-HxCDF	100	
Total HpCDD	ND	4.8	ND		SS 1234689-HpCDF	101	
					AS 1368-TCDD	79.6	
Total TCDF	ND	3.2	ND		AS 1368-TCDF	82	
Total PeCDF	ND	2.63	ND				
Total HxCDF	ND	3.08	ND				
Total HpCDF	ND	3.62	ND				
Total PCDD/Fs	**ND**		**9.18**				
WHO-2005 TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	5.47	5.47	5.47				
TEQ: ND=DL	10.9	10.9	10.9				

SGS
5500 Business Drive
Wilmington, NC 28405, USA
www.us.sgs.com
Tel: +1 910 794-1613; Toll-Free 866 846-8290

Sample ID: Method Blank A9782_14768 — Method 23

Client Data		Sample Data		Laboratory Data			
Name:	C.E.M. Solutions, Inc.	Matrix:	Air	Lab Project ID:	A9782	Date Received:	n/a
Project ID:	11542	Weight/Volume:	1	Lab Sample ID	MB1_14768_DF_SDS	Date Extracted:	30-Mar-2017
Date Collected:	n/a			QC Batch No:	14768	Date Analyzed:	06-Apr-2017
		Split:	2	Dilution:	-	Time Analyzed:	19:14:57

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	3.34			ES 2378-TCDD	89.8	
12378-PeCDD	ND	2.98			ES 12378-PeCDD	90.5	
123478-HxCDD	ND	3.22			ES 123478-HxCDD	94.1	
123678-HxCDD	ND	3.23			ES 123678-HxCDD	91.3	
123789-HxCDD	ND	3.51			ES 123789-HxCDD	92.2	
1234678-HpCDD	ND	4.8			ES 1234678-HpCDD	92.8	
OCDD	ND	9.1			ES OCDD	70.2	
2378-TCDF	ND	3.07			ES 2378-TCDF	91	
12378-PeCDF	ND	2.56			ES 12378-PeCDF	97.7	
23478-PeCDF	ND	2.59			ES 23478-PeCDF	97.7	
123478-HxCDF	ND	2.79			ES 123478-HxCDF	91.9	
123678-HxCDF	ND	2.48			ES 123678-HxCDF	94.1	
234678-HxCDF	ND	2.64			ES 234678-HxCDF	90.9	
123789-HxCDF	ND	3			ES 123789-HxCDF	96	
1234678-HpCDF	ND	3.15			ES 1234678-HpCDF	92.1	
1234789-HpCDF	ND	4.21			ES 1234789-HpCDF	91.1	
OCDF	ND	9.35			ES OCDF	79.4	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	100	
Total TCDD	ND	3.34	ND		SS 12347-PeCDD	105	
Total PeCDD	ND	2.98	ND		SS 12346-PeCDF	101	
Total HxCDD	ND	3.31	ND		SS 123469-HxCDF	98.1	
Total HpCDD	ND	4.8	ND		SS 1234689-HpCDF	101	
					AS 1368-TCDD	78.4	
Total TCDF	ND	3.07	ND		AS 1368-TCDF	81.6	
Total PeCDF	ND	2.58	ND				
Total HxCDF	ND	2.71	ND				
Total HpCDF	ND	3.63	ND				
Total PCDD/Fs	**ND**		**ND**				
WHO-2005 TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	4.84	4.84	4.84				
TEQ: ND=DL	9.69	9.69	9.69				

SGS
5500 Business Drive
Wilmington, NC 28405, USA
www.us.sgs.com
Tel: +1 910 794-1613; Toll-Free 866 846-8290

Sample Receipt Notification

5500 Business Drive
Wilmington, NC 28405 USA
Tel: 910 794-1613
Toll Free: 866 846-8290
Fax: 910 794-3919

Project Manager:	*Amy Boehm*
Receipt Date & Time:	*28-Mar-17 at 11:30*
AP Project name:	*A9782*
Requested TAT:	*14 days*
Projected due date:	*11-Apr-17*
Matrix:	*Air - M23*
Phone#:	*910-794-1613*
Email Address:	*Amy.Boehm@sgs.com*

Company Contact:	*Charles Horton*
Company:	*C.E.M. Solutions, Inc.*
Project Name & Site:	*11542*
Project PO#:	*N/A*
QAAP/Contract #:	*N/A*
Requested Analysis:	*Method 23*
Phone#:	*352-489-4337*
Email Address:	*chorton@CEM-solutions.com*

Received Temps

Client Smp ID	AP Smp ID	Components	Sampling Date	Sampling Time	XAD	Solvent Rinse(s)	Container #	Shipping #
Run 1	A9782_001	Filter #1, T2837-005, Ace/MeCl2, Toluene, XAD #1	22-Mar-17	00:00	6.4	6.4	1	N/A
Run 2	A9782_002	Filter #1, T2837-001, Ace/MeCl2, Toluene, XAD #1	23-Mar-17	00:00	6.4	6.4	1	N/A
Run 3	A9782_003	Filter #1, T2837-004, Ace/MeCl2, Toluene, XAD #1	23-Mar-17	00:00	6.4	6.4	1	N/A

Sample Seals Intact: No **Sample(s) Condition:** Intact

Notes/Comments:

Samples received intact.

Any un-extracted sample will be stored for 90 days from reporting date. Additional storage fees may apply for any samples stored longer than 90 days.

Received by: Ashley Owens *Logged in by: Ashley Owens* *QC'ed by:* AK 28 Mar 17

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/terms_and_conditions.htm

C.E.M. SOLUTIONS
1183 E. Overdrive Circle • Hernando, FL 34442 • Ph: (352) 489-4337 • Fax: (352) 489-4801
www.cem-solutions.com

A9782 1/1

Chain of Custody Record

Project #	Project Name:
11542	GREC Boiler Compliance

Samplers: CRH/MB/TC/AL

Sample ID	Date	Test Method	Comp.	Grab	Sample Location	# of Containers	Filter	Acetone/DCM Rinse	Toluene Rinse	XAD Trap					Comments
Run 1	3/22/2017	23	X		Boiler Stack	4	x	x	x	x					T2837-005
Run 2	3/23/2017	23	X		Boiler Stack	4	x	x	x	x					T2837-001
Run 3	3/23/2017	23	X		Boiler Stack	4	x	x	x	x					T2837-004

Relinquished by: Charles Horton	Date: 3/27/17	Time: 9:35	Received By: Connor McNeill	Relinquished By: Connor McNeill	Date: 03/29/17	Time: 11:30	Received By: Ashley Owens	
Relinquished by:	Date:	Time:	Received By:	Relinquished By:	Date:	Time:	Received By:	
Received for Lab By: Ashley Owens	Date: 3/28/17	Time: 11:30	Remarks: STD T.A.T.	Rec'd @ 6.4° - coming to temp.				

Type & Quantity of Sampling Modules

Qty. XAD Traps:	5
Resin Batch No.:	51867
Qty. PUF:	N/A
PUF Batch No.:	N/A
Filter Size:	82.6 mm
Qty. Filter:	7
Filter Batch #:	9752443
Qty. Petri Dishes:	5
# of BCS3 & MB:	1

Client Specific Instructions

Other Requirements

Rinse Jars: Ø
CarboPacs: Ø

Spike Profile

Vol. PCDD/F : 40µL
Solution ID: DF SS Amount: 1.6-4 ng
Vial ID: 15-250-5 Expiration: 12/5/17

Vol. HR_PAH: 80 µL (40ng)
Solution ID: _____ Amount: 0.5 ng/µL
Vial ID: _____ Expiration: _____

Vol.HR_PCB: 40 µL (4ng)
Solution ID: _____ Amount: 0.1 ng/µL
Vial ID: _____ Expiration: _____

SGS

Sampling Module Request Form

Trap Order #: T2837

Following sample recovery, please return this form with the field samples to:
5500 Business Dr.
Wilmington, NC 28405
Ph.:910-794-1613
Fax.: 910-794-3919

Please be aware of your trap batch # QC begins when we prep your traps. The Method Blanks and BCS_3 are prepared simultaneously with the trap and are properly stored until the trap batch returns for analysis.

We recommend keeping trap batches together and if a set of traps is to be split into multiple projects, please let us know so we can prepare extra Method Blanks/BCS_3

Spike By: HL 3/15/17
Witness: [illegible] 3/15/17

Client Information

Company:	C.E.M. Solutions, Inc.
Contact:	Charles Horton
Email:	CHorton@CEM-solutions.com
Phone:	(352) 464-0372
Project Name:	12582-20
PO#:	12582-20
Order Date:	10-Mar-17
Arrival Date:	16-Mar-17

Ship To: C.E.M. Solutions, Inc.
Charles Horton
1183 E. Overdrive Circle
Hernando, FL 34442
USA
CHorton@CEM-solutions.com
(352) 464-0372

All PROJECTS ARE SHIPPED PRIORITY OVERNIGHT VIA FEDEX

Analyses

Rec'd 3used / 2unused = 3/28/17
PCDD/F A9782
AO

Additional Information

AP Rental Traps Qty.: 5
Air Bill #: _____
Containers: _____
Ship Date: _____

Appendix G: Accreditations and Certifications

STAC
STACK TESTING ACCREDITATION COUNCIL

A2LA
American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

C.E.M. SOLUTIONS, INC.

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this organization is accredited to perform testing activities in compliance with ASTM D7036 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 24th day of November 2015.

President & CEO
Certificate Number 3820.01
Valid to December 31, 2017

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

CHARLES R. HORTON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE SAMPLING METHODS

ISSUED THIS 26TH DAY OF NOVEMBER 2013 AND EFFECTIVE UNTIL NOVEMBER 25TH, 2018

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

LeRoy Owens, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Glenn C. England, QSTI/QSTO Review Board

APPLICATION NO. 2008-230

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

CHARLES R. HORTON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

MANUAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS

ISSUED THIS 26TH DAY OF NOVEMBER 2013 AND EFFECTIVE UNTIL NOVEMBER 25TH, 2018

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

LeRoy Owens, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Glenn C. England, QSTI/QSTO Review Board

APPLICATION NO. 2008-230

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

CHARLES R. HORTON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS

ISSUED THIS 26TH DAY OF NOVEMBER 2013 AND EFFECTIVE UNTIL NOVEMBER 25TH, 2018

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

LeRoy Owens, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Glenn C. England, QSTI/QSTO Review Board

APPLICATION NO. 2008-230

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

CHARLES R. HORTON

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

HAZARDOUS METALS MEASUREMENT SAMPLING METHODS

ISSUED THIS 2ND DAY OF SEPTEMBER 2014 AND EFFECTIVE UNTIL SEPTEMBER 1ST, 2019

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

LeRoy Owens, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Glenn C. England, QSTI/QSTO Review Board

APPLICATION NO. 2008-230